Transitioning Schools to Global 21st Century Learning Environments: Three California Elementary Schools’ Approaches

by

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Transitioning Schools to Global 21st Century Learning Environments: Three California Elementary Schools’ Approaches

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ABSTRACT

While there is a clear need to prepare our students to be successful in these rapidly transitioning times, our educational system is not keeping pace. All states, districts, and schools currently face the challenge of transforming their practice to prepare students for a global, 21st century. This qualitative, phenomenological case study compares and contrasts three California elementary schools’ 21st century learning approaches to the Partnership for 21st Century Learning Framework. The schools were selected because they identify themselves as having a 21st century focus, have strong academic outcomes, and apply a specific and different approach to 21st century learning: design thinking, project-based learning, or world-language immersion. The study uses the 21st Century Learning: Site Visit Protocols and Summaries tool to gather data through semi-structured interviews and classroom observations. The principal and three teacher leaders were interviewed. The study was limited to three different elementary schools in California and involved interviews of nine teachers and three administrators. Participants were asked questions about their own organization and might have been subject to positive and/or negative biases, or to a particular image they wished to project. The researcher relied on school staff to provide access to what was occurring in the school and make available artifacts and data. The data from this study will provide examples of individual school’s progress in the state of California, which is a state that has not adopted the Framework for 21st Century Learning. It is the researcher’s goal that the information gleaned from the study findings will provide specific strategies that schools and districts can employ to prepare students to thrive in the 21st century global
workplace. Study findings should be of benefit to teachers, school leaders, parents, and policy makers interested in moving U.S. education toward 21st century learning outcomes.
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CHAPTER 1—INTRODUCTION

The American educational system is at a crossroads. The need to educate our students to be competitive in a global society is clear. Recognition of this need extends from the highest level of government to teachers in the nation’s classrooms. In his State of the Union speech on January 26, 2011, President Obama stated, “We know what it takes to compete for the jobs and industries of our time…. We need to out-innovate, out-educate, and out-build the rest of the world” (Obama, 2011). The President’s comments expanded remarks by Secretary of Education Arne Duncan, speaking at the Council on Foreign Relations (CFR) on May 26, 2010:

In this global economy, the line between domestic and international issues is increasingly blurred, with the world’s economies, societies and people interconnected as never before. In the United States, we speak frequently about competition. It’s the spirit of competition that drives as a country to do better. Americans understand that the future of our country’s long-term economic prospects depends on the education of our people. (CFR, 2010)

The Partnership for 21st Century Skills (P21), a national coalition of educational nonprofits and businesses working together to make 21st century education a reality for all students, echoed the importance of educational preparation for the future:

The United States is competing in a global economy that demands innovation from our nation’s workforce. Our education policies must help all children keep up with those demands. There is a growing achievement gap between the U.S. and other nations in the interconnected world of the 21st century. America’s economic competitiveness suffers when our nation’s children lack the knowledge
of core subjects and the critical skills necessary for college and career readiness in
the innovation economy of the 21st century. (P21, 2009)

At the same time that our government and national-level organizations are challenging
our educational system, and individuals within the educational system itself know there
must be change. According to the MetLife Foundation annual survey of teachers, released
February 27, 2010, 98% of educators and 99% of school principals believe that global
competence is critical. Yet, the ratings of U.S. students’ knowledge of the world and
communication, as well as ratings of teachers’ capacity to teach in these areas, were very
low.

Even though educators themselves are aware of the need for change, change is
slow to come. For example, in 2006 the P21 created a Framework for 21st Century
Learning, depicted in Figure 1, but to date only 16 states have adopted the framework.

While acknowledging that progress toward change is slow and inconsistent,
Bellanca and Brandt (2010) found some positive developments: “Although the number of
schools that are attuned to the 21st Century skills agenda falls short of those that continue
to be mired in the practices and content of the 20th century, pockets of change are
emerging, especially in the states that have adopted the P21 framework” (p. 4). It is these
pockets of change that are of interest to this researcher. Thus, this study has been
designed to explore some of these pockets of change, specifically three different efforts to
introduce 21st Century learning skills into an elementary school environment in three
elementary schools in the state of California.

Background

Thomas Friedman (2007) wrote in his iconic book The World is Flat that our generation’s parents were sure that they were going to live better than their parents had lived and that their children were going to live better than they were living. In the United States, there is growing concern that this expectation no longer is accurate and that our children will be less well off than our generation. Everyone, according to Friedman, seems to be looking for the magic formula that will spare the next generation from a future of downward mobility, and many look to education as the key to ensuring that upward mobility continues to be the norm for succeeding generations.

Other authors, such as Daniel Pink (2005) in his book, A Whole New Mind, point to another reason, the threat of global competition, to acknowledge an urgent need for change, and these authors also look to education to provide at least a partial remedy:

The peril is that our world moves at a furious pace. Computers and networks
grow faster and more interconnected each day. China and India are becoming economic behemoths. Material abundance in the advanced world continues to grow. That means the greatest rewards will go to those who develop a whole new mind, who master high-concepts and high-touch abilities will do extremely well. The rest-those who move slowly or not at all-may miss out or, worse suffer. (Pink, 2005, p. 247)

Educational experts, in recognizing this need for change, are identifying shifting metacognitive needs for future success. For example, Howard Gardner (2006) identifies five new types of minds in his book, *5 Minds for the Future*:

1. The disciplined mind
2. The synthesizing mind
3. The creating mind
4. The respectful mind
5. The ethical mind

He writes, “It may be the case that computers can achieve literacy and a measure of disciplined thinking. But as we move toward the skills of synthesizing and creating, we move toward the realms that are- and may well remain- distinctly human” (Gardner, 2006, p. 167).

Calls for educational change often quote international educational data that reflect a decline in American performance. The most current PISA (Performance of International Student Achievement) data suggest that America is continuing to fall behind other countries in student achievement since students in other countries are
outperforming American students on international assessments like the PISA (Organization for Economic Cooperation and Development [OECD], 2011):

The released 2009 PISA results are grounds for both optimism and concern for the United States. The data shows that the US ranked 17th in science, which is an improvement from 21st in 2006. Much of these gains come from improvement among the lowest-performing students. But performance in reading and math remains relatively flat. The U.S. ranked 14th in reading, virtually the same ranking as the 2003 test which is the most recent comparable test for the US; and 25th in mathematics, the same ranking as in 2006. These rankings are average or below average compared to other countries in the Organization for Economic Co-operation and Development (OECD). (Jackson, 2010)

Examination results such as the PISA provide important information for the American educational system since the PISA exams are relatively open-ended with students needing to apply their knowledge at higher-thinking levels. The data are alarming to some because they suggest that while America’s focus on educating every child with high accountability for standardized testing has helped struggling students, the PISA scores also imply that current efforts in the U.S. may have back-fired by lowering the overall rigor. Stewart (2012) summarized the concerns of many educators:

Assessments measure application of learning and not simply memorization.

According to many educational researchers and several studies it is evident that America’s focus on high stakes testing has led to unexpected outcomes and a reduction in necessary skills for success in a global, 21st century. Hundreds of reforms are introduced into school systems around the country every year in
curriculum pedagogy, governance, technology, and so on. Unfortunately, most fail to achieve the substantial improvements in student achievement that their advocates hoped for, and, overall, U.S. educational performance has been flat for the past twenty years. We now know that a number of other countries have gotten a lot better than us, accelerating educational improvement in a short time and on a large scale. Their success in improving hundreds of schools is inspiring. But what exactly has enabled them to raise their game and become global high performers? (Stewart, 2012, p. 19)

**Statement of the Problem**

American educators are asking, how can the American educational system transform to truly prepare students for the 21st century, and within any change, what are the priorities? Current messages and trends often conflict. Although President Obama has called for innovation and creativity, in the first Presidential debate for the 2012 election, both candidates failed to provide a strong vision for the future of education while both continued to debate the impact of No Child Left Behind (NCLB). NCLB, the 2001 Elementary and Secondary Education Act titled No Child Left Behind, has been accused of pushing schools into standardized, skill-based “kill and drill” practice (Zhao, 2009). Moreover, when schools fail to perform on these measures, they often are forced to include long blocks of language arts and math instruction using scripted, skill-based curricula. Recent efforts to introduce educational change, such as the national Common Core standards and advances in technology for the field of education, indicate some movement in a more progressive direction; however, these initiatives are not the
transformational reform that is truly needed to prepare students to be competitive in a global, 21st century.

**Purpose of the Study**

The purpose of this study is to identify specific approaches to 21st century education that may inform the field about how to transform our current educational system. Moreover, it is the researcher’s goal that the information gleaned from study findings can provide specific strategies that schools and districts can employ to prepare students to thrive in the 21st century global economy. This comparative case study examines three different California elementary schools’ approaches to advancing 21st century skills. Each school specializes in a different focal area of 21st century skills as identified by the P21 (a) a design-thinking approach, (b) a project-based learning approach, or (c) a world language immersion focus. This study will identify curricular elements for each approach and the differences and commonalities that exist among approaches. It will explore the aspects of the school’s academics, culture and organizational structures and compare alignment with the elements of the Framework for 21st Century Learning developed by the P21 (2009). To accomplish this, teachers and administrators will be interviewed to solicit their opinions about the school instructional practices, understanding of 21st century education, short and medium term goals for their schools, and classroom and Professional Learning Community (PLC) meetings. Observations will be conducted to examine each school’s use of 21st century instructional practices as defined by the P21. Documents and other artifacts will be collected and evaluated to delineate instructional practices and the vision for each school. This case
study will allow for an in depth study of three schools and their current practices in relation to 21st century learning needs.

**Research Questions**

The following research questions guided this study:

1. What does 21st century learning look like in three elementary schools, in strong academic standing, self-identified as employing 21st century learning skills?

2. What educational approaches were used to implement 21st century learning skills?

3. How did these schools align with P21 skills and competencies needed to prepare the students for today’s global economy?

4. How are these schools similar and how are they different?
   
   a. What can be gleaned from the three sites and perhaps replicated on a larger scale?

**Importance of the Study**

Study findings should be of benefit to teachers, school leaders, parents, and policy makers interested in moving U.S. education toward 21st Century learning skills. All states, districts, and schools currently face the challenge of transforming their practice to prepare students for a global, 21st century. The data from this study will provide examples of individual schools’ progress in the state of California, which has not adopted the Framework for 21st Century Learning.
Assumptions

The researcher has assumed that research participants in the schools being studied were forthcoming and truthful during their interviews, that the researcher’s observation times occurred during normal classroom activities and were representative of normal instructional approaches in each classroom, and that sufficient pertinent artifacts were made available and examined.

Limitations

Limitations are circumstances that are beyond the control of the researcher. In this study the researcher attempted to triangulate data as often as possible in order to verify observations and other findings, however, the researcher was aware of various limitations that resulted from the study design. First, the study was limited to three different elementary schools in California and involved interviews of nine teachers and three administrators. The study participants’ views may not be representative the views of others in the school or the school in general. In addition, the findings cannot be generalized to a larger population. Second, participants were asked questions about their own organization and might have been subject to positive and/or negative biases or to a particular image they wished to project. Third, the researcher relied on school staff to provide access to what was occurring in the school and make available artifacts and data. School administrators may have screened the information they chose to share. Fourth, since the schools in the study have specialized foci and are in a state of strong, academic standing, they may have attracted students and parents searching for specialized programs. It may be difficult to determine the impact of an instructional approach on
students’ academic performance since it will not be possible to determine the antecedents.

**Definition of Terms**

*No Child Left Behind:* The 2001 reauthorization of the Elementary Education Act’s (ESEA) regulations represent a significant change in the federal government’s role in public schools in terms of assessment and accountability (Bush, 2001).

*API:* The Academic Performance Index is a measure used by the state of California on the CST (California Star Test). The cornerstone of NCLB, API measures the academic performance and growth of schools on a variety of academic measures.

*High – Performing School:* A school that receives a score of 800 or higher on the Academic Performance Index or API as measured by the state of California on the state standardized test known as the California Star Test or CST (Bush, 2001).

*Program- Improvement (PI):* A school failing to meet its API target growth for more than one year falls into Program Improvement status.

*Strong academic standing:* A school was considered to be in a state of strong academic standing based on the following criteria: (a) high-performing status as defined by the state of California (b) not in Program Improvement status (having achieved API targets) as designated by the state of California Academic Performance Index (API) measure. (c) Strong academic standing per student performance in the national ERB assessment for independent schools.

*PLC:* A PLC is a collaboration of teachers, administrators, parents, and students who works together to seek out best practices, test them in the classroom, continuously improve processes, and focus on results (DuFour, 2002).
**P21 Learning Skills:** The P21 is a national organization that advocates for 21st century readiness for every student. P21 skills are the skills defined in the framework that integrate a rigorous core curriculum with competencies such as critical thinking, collaboration, communication, creativity, global competency, and computer literacy.

**The 4 C’s:** In the P21 framework the Four C’s make up the “Learning and Innovation Skills: and are as follows: Creativity and Innovation, Critical Thinking and Problem Solving, Communication, and Collaboration (P21, 2007).

**Rigorous:** For the purpose of this study, rigorous is defined as challenging above the current grade level standards, with instruction that is deeper and more complex than skills-based instruction.

**GATE or Gifted and Talented Education:** Schools have different criteria for qualifying students for GATE programs. These criteria can include IQ tests, visual-assessments, and performance on standardized testing.

**Growth mindset:** One who seeks out challenges and on-going improvement.

**Science, Technology, Engineering, and Mathematics (STEM):** STEM education is an interdisciplinary approach to learning where rigorous academic concepts are coupled with real-world lessons as students apply science, technology, engineering, and mathematics in contexts that make connections between school, community, work, and the global enterprise enabling the development of STEM literacy and with it the ability to compete in the new economy.

**Organization of the Document**

Chapter 1 has introduced the background, research questions, importance, assumptions, limitations, and vocabulary for this study. Chapter 2 provides an overview
of the recent U.S. educational system. It examines relevant literature related to the need for 21st century learning. It explores various frameworks and defines the P21 framework, central to this study, and the four learning skills referred to as the four C’s. Furthermore, the review explores the three approaches to 21st century learning that are central to this study. The review also explores the important roles of technology and leadership in 21st century learning. The review concludes with cautions and potential obstacles in implementing 21st century learning programs. Chapter 3 describes the methodology used to conduct this study, the schools, and the participants in the study. Chapter 4 presents the finding from the research, and chapter 5 provides conclusions and recommendations.
“At the start of the third millennium, we live at a time of vast changes – changes seemingly so epochal that they may well dwarf those experienced in earlier eras. In short, we can speak about these changes as entailing the power of science and technology and inexorability of globalization. These changes call for new educational forms and processes” (Gardner, 2006). Twenty-first century learning is the current movement that is addressing this call to action in the educational world. The need for “21st century learning” is uniting a growing number of business leaders, politicians, and educators.

“The moment is at hand for a 21st century model of education that will better prepare students for the demands of citizenship, college, and careers in this millennium” (Kay, 2010). While there is a clear need to prepare our students to be successful in these rapidly transitioning times, our educational system is not keeping pace. This review of literature begins with a recent historical look at the American educational system. The review will then explore global, technological, and economic challenges in the current climate and the evolution of education to meet these challenges. In light of the pressing need for change, this review will define what learners will need to know in the 21st century by defining “21st Century Learning” and its competencies specifically: a rigorous core curriculum, communication, creativity, critical thinking, and collaboration. The review will then explore current responses to meet educational needs in the 21st century with a specific focus on the framework created by the P21. The review then moves to specific approaches to 21st century learning designed to focus rigorous core curriculum as well as the four C’s as defined by the P21 Framework, including design thinking, project-based learning, and world language immersion.
A Recent Historical Overview of the U.S. Educational System

A major purpose of education has always been to provide the knowledge and skills necessary to succeed in current economic times. During the first half of the 20th century the economic needs of the time included agriculture, manufacturing, and mining. The American educational system developed around an agrarian calendar and provided the knowledge and skills necessary for employment at the time. World War II was a turning point in the 20th century with an increase in manufacturing due to technological advances as well as a growing service industry. In recent decades jobs have shifted from agriculture and manufacturing to more professional, technical, and service focused (Schrum & Levine, 2009). Only recently has the educational system adapted somewhat with levels of technology that lag behind the business and service industries.

The last 100 years of American education has shown gradual changes, but most classrooms are fundamentally very similar to those that existed 100 years ago. Furthermore, the recent history of American education has been overshadowed by No Child Left Behind (NCLB) Act of 2001. NCLB rose from what was considered a crisis in the American educational system. This crisis was based on a domestic achievement gap as well as an international one (Wagner, 2008; Zhao, 2009). In 1983, the National Commission on Excellence chronicled this “educational crisis” in its report titled *A Nation at Risk: The Imperative for Educational Reform*. The report claimed that America was losing its edge in commerce, industry, science, and technological innovation to competitors throughout the world. To regain the edge the commission made the following recommendations:
1. Increases in English, math, science, social studies, foreign language, and computer science at the high school level

2. Higher expectations with rigorous, measurable standards

3. More time for learning

4. Better preparation of teachers with more recognition and reward for teaching as a profession

5. Government intervention and accountability.

While no immediate legislation resulted from this report, it fueled the standards movement, Goals 2000: Educate America Act, and eventually the No Child Left Behind legislation.

On January 8, 2002, George W. Bush signed into law the No Child Left Behind (NCLB) Act of 2001, legislation which for the first time in U.S. history made federal funding for K–12 public schools contingent upon the use of standardized achievement tests to assess student performance. NCLB, a recent reauthorization of the Elementary and Secondary Act of 1965 (ESEA), moved accountability for student performance to the forefront of the nation’s educational priorities, through an accountability system driven by high expectations, ambitious deadlines, public reporting, and the threat of serious consequences for schools that fail to comply with the policy mandates. NCLB’s principal benefit is the right of each child to learn and be assessed by high academic standards. NCLB helps ensure accountability for each child by disaggregating results by the following sub categories: race, ethnicity, socio-economic status, disability, and English language learner status. The cornerstone of NCLB is accountability through standardized testing in basic levels of reading and math (Zhao, 2009). NCLB was the answer to the
problem of continuous domestic and international achievement gaps. The NCLB Act of 2001 stated:

Today, nearly 70 percent of inner city fourth graders are unable to read at a basic level on national reading tests. Our high school seniors trail students in Cyprus and South Africa on international math tests. And nearly a third of our college freshman find they must take a remedial course before they are able to even begin regular college level courses. As America enters the 21st century full of hope and promise, too many of our neediest students are being left behind.

(Bush, 2001, p. 1)

Opinions on the results of NCLB are mixed, but many in the educational and business world feel interpretation of the legislation has pushed the American educational system in the wrong direction (Kay, 2010; Wagner, 2008; Zhao, 2009). Since the cornerstone of NCLB has been basic language arts and mathematics assessment, most schools and districts have put their focus on what is being tested. According to Darling-Hammond, test-based accountability tends to discourage teaching broad skills because schools teach what is assessed, in the case of NCLB, primarily language arts and math (Darling-Hammond, 2010). Ironically, NCLB may have furthered the achievement gaps it was designed to bridge. Wealthier school districts could afford to infuse more skills and innovative curricula, while poor school districts often focused on attaining the basic content standards, using a “kill and drill” pedagogy (Zhao, 2009). Several studies have shown that the impact of NCLB has caused a large proportion of schools to “teach to the test” and to reduce instructional time for subjects not required by NCLB. It has also been found that in order to raise test scores, many teachers changed their instructional
focus/style and some may have even cheated in order to meet the requirements (Zhao, 2009).

Recent statistics reflect that both the domestic and international achievement gaps continue to grow. In August of 2011, the State Superintendent of Public Instruction announced that nearly three out of four California students who started high school in 2006 graduated with their class in 2010, with slightly more than eighteen percent dropping out rather than completing their PK–12 education (California Department of Education, 2011). The National Assessment of Education Progress (NAEP) scores serve as an independent measure as well as a national measure of progress towards goals set by NCLB. The 2007 NAEP results for eighth grade students showed the following results: Thirty-eight percent of white students were proficient in reading with only twelve percent of black students, fourteen percent of Hispanic students and fifteen percent of low-income students (P21, 2008). Forty-two percent of white students, fourteen percent of black students, and seventeen percent of low-income students were proficient in mathematics (P21, 2008). The scores on the NAEP test, often considered to be the national report card, clearly show a growing national achievement gap. Additionally, the global achievement gap continues to grow as well. Results for U.S. students on the 2006 Program for International Student Assessment (PISA) declined from 2003 PISA results. Fifteen-year-old students ranked 36th in science and 35th in mathematics among fifty-seven countries participating in the 2006 PISA. The PISA also measures problem solving in a special assessment. On the 2006 PISA, U.S. students scored lowest on these problem-solving items in each disciplinary area tested (Darling-Hammond & McCloskey, 2008).
According to the P21’s (2008) Resource and Policy Guide, the domestic and global achievement gaps are disturbing because people with only basic competencies will struggle in the rising high-skill service economy. Pendulum swings in education have hindered progress towards preparing students for 21st century learning. According to Darling-Hammond (2010), “Back and forth swings between teaching for understanding and assessing authentic performances versus basic skills measured by multiple choice and short answer test items have cost the United States a lot of time and progress” (p. 34). Efforts today must adjust from the extreme back to basics courses created by misinterpretation of No Child Left Behind (Darling-Hammond, 2010; Wagner 2008; Zhao, 2009). According to Wagner (2008) in The Global Achievement Gap, “Schools haven’t changed: the world has. And so our schools are not failing. Rather, they are obsolete- even the ones that score the best on standardized tests” (p. xxi). If every level of the educational system doesn’t change dramatically and quickly, the consequences to our nation will be devastating (Darling-Hammond, 2010; Kay, 2010; Marzano & Hefflebower, 2012; Wagner, 2008; Zhao, 2009).

**Compelling Needs for 21st Century Learning**

The extreme challenges facing U.S. citizens of the 21st century are numerous and include:

1. Economic challenges - America and the rest of the world are currently struggling with a major economic crisis and unemployment is a major factor. The global economy is so closely interlinked that economics will continue to be a major challenge in the 21st century.
2. Global interdependence – Americans are competing domestically and internationally for jobs and will continue to do so. Diversity will continue to increase not just internationally, as a result of our flattened world (Friedman, 2007), but domestically as well (Johnson & Johnson, 2009). The 2008 U.S. Census Bureau predicted that by 2042 racial and ethnic minorities would make up the majority of the nation’s population, with 62% of children in the minority categories, which will be up from 44% today.

3. Environmental – Global climate changes have led to numerous natural disasters and America will have to compete with the rest of the world for natural resources.

4. Technological – Rapid advances in technology connect events globally and instantaneously. Additionally, powerful technology tools are easily accessible to the masses, and each new generation will be more technologically skilled. (Jerald, 2009)

In 2007, the New Commission on the skills of the American Workforce highlighted America’s declining educational performance compared to other nations. They concluded the following reasons for the decline: Inferior quality of the nation’s teaching force, prioritization of narrowly tested standardization that restrict the innovation necessary for a high-skill, high-wage workforce in a rapidly changing global economy (Hargreaves, 2010).

public schools, and Condoleezza Rice, former U.S. secretary of state. “The country will not be able to keep pace—much less lead—globally unless it moves to fix the problems it has allowed to fester for too long” (CFR, 2012). This independent task force examined U.S. educational reform and concluded a lack of educational preparedness poses threats on five national security fronts: economic growth and competitiveness, physical safety, intellectual property, U.S. global awareness, and U.S. unity and cohesion. The task force found that too many young people are not employable in an increasingly high-skilled and global economy, and too many are not qualified to join the military. “Human capital will determine power in the current century, and the failure to produce that capital will undermine America's security,” the report states. “Large, undereducated swaths of the population damage the ability of the United States to physically defend itself, protect its secure information, conduct diplomacy, and grow its economy” (CFR, 2012).

Reports of future job skills support the findings of the CFR committee and highlight the need for change in order for American students to compete both domestically and globally. The U.S. Department of Labor (2011) estimated that today’s learner would have ten to fourteen jobs by the age of 38. Job mobility is on the rise with one in four workers having been with their current employer less than a year and one in two has been there less than five years. Twenty-five percent of all employed workers earn less than two-thirds of the median gross hourly wages of all employees (National Research Council [NRC], 2012). Factors such as changes in technology, increasing trade, offshoring of work, and immigration have contributed to the decline of wages for those who lack a higher education (NRC, 2012). Men with advanced degrees made more than 2 1/2 times as much per hour as men with less than a high school diploma (NRC,
This information indicates that educational advancement appears to play a larger role today in explaining average earnings than it did in 1979, noting “the gap between that which employers pay college graduates relative to high school graduates” has grown (NRC, 2011a).

According to the most recent 10-year occupational growth projections by the U.S. Department of Labor’s Bureau of Labor Statistics (BLS, 2008), the demand for more educated workers should continue. “In the next decade,” says U.S. Secretary of Labor Elaine Chao, “nearly two-thirds of the estimated 15.6 million net new jobs created in America will be in occupations that require postsecondary education or considerable on-the-job training” (Jerald, 2009). While the future job market will need a highly skilled and educated work force, statistics on higher levels of education are not promising. More than 25 percent of students fail to graduate from high school in four years; for African-American and Hispanic students, this number is approaching 40 percent (NRC, 2012). Only 22 percent of U.S. high school students met "college ready" standards in all of their core subjects; these figures are even lower for African-American and Hispanic students. The College Board reported that even among college-bound seniors, only 43 percent met college-ready standards, meaning that more college students need to take remedial courses (NRC, 2012). The United States ranks tenth among industrial nations in the rate of college completion by 25 to 44 year olds (Wagner, 2008). Statistics from American employers are also disheartening. In a survey of more than 400 employers on work-readiness, fewer than 25% reported that new employees with four-year college degrees have “excellent” basic knowledge and applied skills (Wagner, 2008).

If American students are unprepared to fill the need for highly educated skilled
workers, we risk giving those jobs away. Many highly educated immigrants are employed in science, technology, engineering, and mathematics (STEM) careers, in contrast to the popular perception of immigrants as unskilled (NRC, 2008). Between 1990 and 2000, the immigrant share of all doctorates employed in science and engineering fields grew from 24 to 38 percent, while the share of younger doctorates in these fields (under the age of 45) increased from 26 to 52 percent. Clearly a strong 21st century education is of critical importance, as is bridging both the national and global achievement gaps and giving American students the skills and education they need to thrive in the 21st century (P21, 2008).

The time for educational transformation is imperative but the history of U.S. education reform shows a poor track record of extreme pendulum swings (Darling-Hammond, 2010). While, accountability is still necessary and at the top of our nation’s priorities, we should not only worry about students “left behind” on basic standards in reading and math, but of entire generations of students being “left behind globally” for the following reasons: They can’t think critically, have lost their creative and innovative edge, fail to speak a language other than English, are ranked low in math and science on international assessments, and do not share the same drive work ethic, and resiliency of previous generations (Rotherham & Willingham, 2009; Wagner, 2008). The first challenge facing the American educational system, is to overcome the chronic problem of poor academic performance among low-income and minority students. The second is to prepare students for work and civic roles in a global knowledge economy, where success increasingly requires the ability to compete, connect, and cooperate on an international scale (Kay, 2010).
21st Century Competencies and Skills

Twentieth-century assumptions about the world are rapidly becoming obsolete. Globalization, the digital revolution, mass migration, and the prospect of climate instability are triggering new concerns and demanding a new kind of graduate. At the dawn of the 21st century, we are recasting our understanding of economics, communication, security, cultural identity, citizenship, and the environment. Indeed, a growing number of reports document the new demands and opportunities these changes present our youth. They call for more powerful, relevant, and self-directed learning that will prepare the young to live, compete, and collaborate in a new global scenario (Mansilla & Jackson, 2011).

The need for 21st century learning is clear, but what is 21st century learning? In the landmark report, *Education for Life and Work: Developing Transferable Knowledge and Skills in the 21st Century*, the Committee on Defining Deeper Learning and 21st Century Skills for the National Resource Council (NRC) examined the broad term “21st century skills” and identified three domains of competence – cognitive, intrapersonal, and interpersonal. The cognitive domain refers to reasoning and memory, the intrapersonal involves the ability to manage one’s behavior and emotions for the purpose of achievement, and the interpersonal involves the sharing of thoughts and ideas with others. The committee stated, “The various sets of terms associated with the “21st century skills” label reflect important dimensions of human competence that have been valued for many centuries rather than skills that are suddenly new, unique and valuable today” (NRC, 2012, p. 3). What is new according to the committee is the need for all students, not just...
the elite, to master these skills or competencies for success in education and the workplace.

So what are the competencies and skills that will be sought after? The Boston Advanced Technological Education Connection (BATEC, 2007) survey was designed to learn more about the skills employers sought in their employees (Salaam, 2007). The following skills rated most highly by the survey respondents: Communication skills (oral and written); Ability to work productively in teams and groups (teamwork skills); customer and business focus (understanding the big picture); an ability to listen for meaning and comprehension; an ability to prioritize work and self-evaluate (self-reflection and time management); development of original solutions to novel problems (problem-solving); an ability to lead and act responsibility (leadership and ethics). Additionally respondents stated that while technical skills may help someone get an interview, it is soft skills that get the person the job (as cited in NRC, 2011b).

According to Jerald (2009), in Defining a 21st Century Education, five major lessons emerge from the research on the knowledge and skills necessary for a 21st education:

1. Postsecondary education or technical training
2. High levels mastery in math, language arts, and science
3. The ability to apply key learning in core subjects in order to solve real world challenges, not just reproduce information on tests
4. Students who develop an even broader set of in-demand competencies—the ability to think critically about information, solve novel problems,
communicate and collaborate, create new products and processes, and adapt to change

5. Applied skills and competencies can best be taught in the context of the academic curriculum, not as a replacement for it or “add on” to it; in fact, cognitive research suggests that some competencies like critical thinking and problem solving are highly dependent on deep content knowledge and cannot be taught in isolation.

In *The Global Achievement Gap*, Wagner (2008) identifies seven critical survival skills for the 21st century: (1) critical thinking and problem solving, (2) collaboration across networks and leading by influence, (3) agility and adaptability, (4) initiative and entrepreneurship, (5) effective oral and written communication, (6) accessing and analyzing information, and (7) curiosity and imagination. Students learning today will need creativity, problem solving, communication and other broad skills in order to negotiate “Multiple careers and multiple jobs. Furthermore, they may even need these broad competencies as a “self-defense mechanism” against displacement and lay-offs due to trends towards job elimination through computerization and globalization (Kay, 2010).

The P21 is an organization that has brought different organizations together to examine what a 21st century education should resemble. The P21 organization has developed a framework that would help define 21st century learning and the challenges facing young people today. This construct, the Framework for 21st Century Learning (P21, 2009), offers a holistic and systemic view of how we can conceptualize and reinvigorate public education, bringing together all the elements – 21st century outcomes and 21st century education support systems – into a united framework. The starting point
for the framework is actually the end result: mastery of core academic subjects, 21st century themes, and 21st century skills that should be expected of students once they leave school to venture successfully into higher education, workplaces, and independent life (Kay, 2010). 21st century themes include: (1) global awareness - financial, economic, business and entrepreneurship literacy, civic literacy, health literacy, (2) information, media and technology skills – information and media and information and communications technology literacy, (3) life and career skills flexibility and adaptability - initiative and self-direction, and (4) social and cross-cultural skills, productivity and leadership responsibility. Global awareness in the framework includes: 21st century skills to understand and address global issues, and learning and working collaboratively with individuals representing diverse cultures, religions and lifestyles. Sixteen states have adopted the P21 Framework and are becoming leaders in the 21st century learning movement. In states where the P21 Framework has not been adopted, there are pockets of success in preparing students for 21st century learning.

The United States is far from the only nation responding to the need for 21st century learning. In 2005, the OECD created its 21st century skills framework. In this framework, the OECD identifies three categories: category 1 – using tools interactively, category 2 – interacting in heterogeneous groups, and category 3 – acting autonomously (Dede, 2010). Dede also identifies the North Central Regional Educational Framework & the Metri Group’s (2003), enGuage 21st Century Skills Framework, and the National Leadership Council for Liberal Education and America’s Promises Framework (Association of American Colleges and Universities, 2007). Dede observes that these frameworks were fairly consistent in their articulation of what students will need to learn
in the 21st century (Dede, 2010).

These responses and frameworks reflect a growing recognition in the United States and other countries that 21st century learning must build on a more rigorous core content as well as broader competencies such as information and communication skills, thinking and problem-solving skills, interpersonal and self-directional skills, and the necessary knowledge to utilize 21st century technological tools (Pearlman, 2010). New standards in the United States, such as the Common Core standards and frameworks such as the P21 framework stress critical thinking, creativity, problem solving, and communication, but few curricula develop these standards as learning outcomes. Furthermore, the nation, states, schools, and even classrooms rarely assess these competencies (Pearlman, 2010).

**Responses to the Need for 21st Century Learning**

There have been both political and educational responses to the need for 21st century learning. In 2010, the U.S. Department of Education (US DOE) released *A Blueprint for Reform, The Reauthorization of the Elementary and Secondary Education Act*. As of January 2013, Congress has yet not passed this act. In the introduction of this act, President Obama writes:

> Every child in America deserves a world-class education. A world-class education is also a moral imperative – the key to securing a more equal, fair, and just society. We will not be able to keep the American promise of equal opportunity if we fail to provide a world-class education to every child. Instead of investing in the status quo, we must reform our schools to accelerate student achievement, close achievement gaps, inspire our children to excel, and turn
around those schools that for too many young Americans aren’t providing them with the education they need to succeed in college and a career. This Administration’s blueprint for reauthorization of the Elementary and Secondary Education Act is not only a plan to renovate a flawed law, but also an outline for a re-envisioned federal role in education. This is a framework to guide our deliberations and shared work – with parents, students, educators, business and community leaders, elected officials, and other partners – to strengthen America’s public education system. (US DOE, 2010)

This Blueprint builds on the significant reforms already made in response to the American Recovery and Reinvestment Act of 2009 around four areas:

1. Improving teacher and principal effectiveness to ensure that every classroom has a great teacher and every school has a great leader.

2. Providing information to families to help them evaluate and improve their children’s schools, and to educators to help them improve their students’ learning.

3. Implementing college- and career-ready standards and developing improved assessments aligned with those standards.

4. Improving student learning and achievement in America’s lowest-performing schools by providing intensive support and effective interventions.

While these policies are steps in the right direction, several educational experts propose that more needs to happen. According to Darling-Hammond (2010) there are four necessary policy changes:
1. Aligned standards, deeper, targeted instruction, and an aligned assessment system

2. An infrastructure that gives teachers and school leaders sufficient time to do the alignment work

3. Schools that are more supportive of in-depth teaching and learning

4. More equitable distribution of resources

Over the past decades others in the educational world have advocated for a rigorous core curriculum as well as the complex thinking skills required for success in college, life and career in the 21st century (Darling-Hammond, 2010). The 2010 release of the Common Core State Standards (CCSS) have advanced efforts towards developing a more rigorous core curriculum. The CCSS provide a consistent, clear understanding of what students are expected to learn, and promote a deeper learning of the standards. These standards are designed to be robust and relevant to the real world, reflecting the knowledge and skills that students need for success in college and careers, positioning them to compete successfully in the global economy (Common Core State Standards Initiative, 2010).

Deeper Learning is defined as the process of taking one’s learning and applying it to different situations (NRC, 2012). Through deeper learning (which often involves shared learning and interactions with others in a community), the individual develops expertise in a particular domain of knowledge and/or performance (NRC, 2012). Furthermore the NRC examined the Common Core State Standards (2010) and NRC Framework for K-12 Science Education (NRC, 2012) and made the following conclusions: Goals for deeper learning and some 21st century competencies are found in the standards documents, indicating that disciplinary goals have expanded beyond their traditional focus on basic
academic content and include critical thinking, non-routine problem solving, and constructing and evaluating evidence-based arguments—is strongly supported across all three disciplines. Coverage of other competencies – particularly those in the intrapersonal and interpersonal domains – is uneven. This uneven coverage could potentially lead to learning environments for different subjects that vary in their support for development of 21st century competencies. Development of the full range of 21st century competencies will require systematic instruction and sustained practice.

A majority of states has begun the important work of aligning, integrating and implementing the Common Core State Standards (CCSS) for English Language Arts (ELA) and mathematics (Kay, 2010). However, there are those, such as the P21, who advocate that CCSS be implemented in a way that incorporates 21st century skills or competencies, such as critical thinking and problem solving, collaboration, communication, and creativity and innovation (Kay, 2010). In an attempt to aide districts and schools in fusing the three R’s (reading, writing and arithmetic) with the four C’s (communication, collaboration, critical thinking, and creativity) the P21 developed a guide called *P21 Common Core Toolkit: A guide to Aligning the Common Core State Standards with the Framework for 21st Century Skills* (P21, 2012). The guide states that while the Common Core State Standards does not explicitly address every skill in the P21 Framework, several competencies such as critical thinking, communication, and collaboration are strongly represented in the Common Core State Standards. The guide recommends these areas as a strong starting point towards 21st century learning but advocates for additional work in the important content areas of science, social studies,
world languages, and the arts and music which they consider essential for student success.

As districts and schools begin the work of implementing the Common Core State Standards and hopefully aligning the standards with the P21 Framework, they will need effective assessments to match what they are teaching. If assessments continue to be low level, bubble in forms, then instruction will not evolve. According to Darling-Hammond (2010) assessments need to evolve to drive deeper learning and 21st century skills. She recommends the following steps for creating 21st century assessments:

1. Assessments are grounded in a thoughtful, standards based curriculum and are managed as part of a tightly integrated system of standards, curriculum, assessment, instruction, and teacher development.

2. Assessments include evidence of actual student performance on challenging tasks that evaluate standards of 21st century learning.

3. Teachers are integrally involved in the development of curriculum and the development and scoring of assessments that include both the on-demand portion of state or national examinations and local tasks that feed into examination scores and course grades.

4. Assessments are structured to continuously improve teaching and learning (e.g., school-based curriculum embedded assessments and a close examination of student work).

5. Assessment systems are designed to emphasize the validity and quality of external assessment aimed at driving high-quality learning of ambitious intellectual skills.
6. Assessment and accountability systems use multiple measures to evaluate students and schools.

7. Assessment and accountability systems are used primarily for information and improvement.

Assessments, at the national, state, and site level, will play a critical role in transitioning schools to 21st century learning environments. If schools are forced to focus only on national or state standardized assessments, they will continue to ignore the teaching of critical 21st century skill sets (Zhao, 2012).

**The Four C’s**

In the National Education Association’s (NEA) (2012) *An Educator’s Guide to the “Four C’s”: Preparing 21st Century Students for a Global Society*, the “Four C’s” are defined as critical thinking and problem solving, communication, collaboration, and creativity and innovation. In this guide which is based on the P21 Framework, John Stokes writes, “Using the “Four C’s” to engage students is imperative. As educators prepare students for this new global society, teaching the core content subjects- math, social studies, the arts- must be enhanced by incorporating critical thinking, communication, collaboration, and creativity” (P21, 2012, p.3). In the same guide, President Barak Obama is quoted:

I’m calling on our nation’s governors and state education chiefs to develop standards and assessments that don’t simply measure whether students can fill in a bubble on a test, but whether they possess 21st century skills like problem-solving and critical thinking and entrepreneurship and creativity. (Montopoli, 2009)
According to the American Management Association’s (2010) *AMA 2010 Critical Skills Survey*, the Four “C’s” will become even more important to organizations in the future. Three out of four executives responding believed that these skills and competencies would become more important to their organizations as the businesses grow in a global marketplace. Eighty percent of the executives believed that fusing the “Three R’s” with the “Four C’s”, in other words combining a strong core curriculum with the 21st century skills of communication, collaboration, creativity, and critical thinking would better prepare students to enter the workforce (NEA, 2012).

**Critical Thinking**

Critical thinking and problem-solving skills are of great importance for future success in a global economy. Tony Wagner (2008), in *The Global Achievement Gap*, refers to critical thinking as the first survival skill in a global economy. In fact, employers rank critical thinking/problem solving as the number one competency they expect to become more important for new job entrants over the next five years (Jerald, 2009). This statement is supported by Levy and Murnane’s research showing the steady rise in workplace tasks demanding such skills (NRC, 2011b). Additionally, because of the up-skilling of many jobs due to technology and the flattening of corporate hierarchies, such competencies will become the expected “norm” (Jerald, 2009). For example, nearly 60 percent of employers rate critical thinking and problem solving as “very important” for *high school graduates* entering the workforce, yet 70 percent of employers rated such entrants as “deficient” in that area. In another study, the Conference Board (2008), a global, independent business membership and research association, found that while 73
percent of school superintendents considered high school graduates to meet or exceed expectations for problem solving, only 45 percent of employers did so (Jerald, 2009).

There are even connections in how students scored on critical thinking/problem solving components of the PISA assessment and nations’ economic status. Nations with high scores in these areas were the economic leaders between 1960 and 2000. The correlation has not been as strong in the past decade, with American students performing poorly in recent PISA scores, while America maintains its status as an economic leader (P21, 2008). Some consider this change as a potential predictor of America’s economic future and its need to improve critical thinking in its future workforce (Wagner, 2008). A highly skilled workforce can raise economic growth by about two-thirds of a percentage point every year, or an average GDP gain of two to three percent every year. Higher levels of cognitive skill appear to play a major role in explaining international differences in economic growth (P21, 2008).

Critical thinking includes the component skills of analyzing arguments, making inferences using inductive or deductive reasoning, judging or evaluating, and making decisions or solving problems (Jerald, 2009). Critical thinking involves both cognitive skills and dispositions. These dispositions, which can be seen as attitudes or habits of mind, include open- and fair-mindedness, inquisitiveness, flexibility, a propensity to seek reason, a desire to be well informed, and a respect for and willingness to entertain diverse viewpoints (Jerald, 2009). There are both general- and domain-specific aspects of critical thinking. Empirical research suggests that people begin developing critical thinking competencies at a very young age (Lai, 2011).

How do schools go about increasing critical thinking skills for its students? Since
critical thinking is essentially problem solving, people “think” critically every day. Therefore, it is not sufficient to ask students to complete simplistic tasks calling explicitly for “critical thinking” (Jerald, 2009). The research on critical thinking in education can reveal strategies for educators to effectively increase critical thinking outcomes. According to Marzano & Hefflebower (2012), in 2008, Abrami conducted a meta-analysis on critical thinking. He looked at 117 studies with over 20,000 participants. Abrami examined how students responded to the teaching strategies that targeted critical thinking. Overall the research showed teaching critical thinking through careful, in-depth lesson design had a positive outcome on student’s critical thinking skills (Marzano & Hefflebower, 2012). Abrami concluded that making critical thinking a clear and significant component of the lesson design had a significant impact on instructional outcomes.

Lesson design that targets deep instruction helps students achieve expert levels of mastery (Jerald, 2009). Jerald (2009) goes on to cite what the research shows about students who achieve this level of mastery. First, experts do not just know a lot of disconnected facts about a topic. They understand how those facts are linked together by concepts—the underlying “big ideas” in a field. They also develop a deep understanding of how those parts are related and how they function together. In a high school science class, students might be able to remember that arteries are more elastic than veins to get the answer right on a multiple choice test. But do they learn why arteries are elastic? Cognitive scientists use the word “schema” to talk about that kind of rich knowledge base. Schemas are what make effective reasoning and problem solving possible because they facilitate the second element of expert thinking: Pattern recognition. Because they
work from a detailed and highly organized knowledge base, experts are able to connect new information about an issue or problem with what they already know. That allows them to see things about that new information that non-experts simply cannot. That is why students who memorize a lot of facts in a subject do not become good critical thinkers and problem solvers. The issue is not that they didn’t memorize and practice some set of generic “thinking skills.” The problem is that they do not really understand the subject because they lack the big ideas and deep concepts—how and why “things work” in that subject area (Jerald, 2009).

To help students develop strong critical thinking skills and reach levels of mastery, instructors are urged to provide explicit instruction in critical thinking, to teach how to transfer to new contexts, and to use cooperative or collaborative learning methods and constructivist approaches that place students at the center of the learning process (Lai, 2011).

**Creativity**

“Creativity is the greatest gift of human intelligence. The more complex the world becomes, the more creative we need to be to meet its challenges” (Robinson, 2011). According to Daniel Pink (2005), in *A Whole New Mind*, “We’ve progressed from a society of farmers to a society of factory workers to a society of knowledge workers. And now we’re progressing yet again- to a society of creators and empathizers, of pattern recognizers and meaning makers” (p. 50). Pink writes that the future will belong to a very different kind of person with this very different kind of mind. Students must know how to create and innovate or they will be underprepared for the challenges of a new society and workplace (P21, 2007).
In 2006, the Conference Board surveyed 431 employers about the skills they believed most important for new entrants to succeed in the workplace. The survey asked about “basic skills” related to school subjects like reading, math, science, and social studies as well as “applied skills that enable new entrants to use the basic knowledge acquired in school to perform in the workplace.” The results showed that while employers still view basic skills like reading comprehension to be fundamental to success on the job, some broader competencies—such as the ability to communicate, collaborate, think critically, and solve problems—are considered even more valuable. Creativity ranked third among skills employers expect to increase in importance over the next half decade (Jerald, 2009). The New Skills Commission reviewed research and data on workforce and global economic trends. The Commission determined that academic knowledge and skills, applied literacies, and critical thinking will not be sufficient for the U.S. to maintain its competitive edge in the global economy. “The crucial new factor, the one that alone can justify higher wages in this country than in other countries with similar levels of cognitive skills, is creativity and innovation” (Jerald, 2009, p. 62). In order for a country to prosper economically, it must develop attract, and hold onto creative entrepreneurs (Johnson & Johnson, 2009).

America has thrived in creativity and innovation in the past. In fact, Asia and other countries have envied American ingenuity and innovation. According to Dr. Howard Gardner (2006) in *5 Minds for the Future*, “In our global, wired society, creativity is sought after, cultivated, praised” (p.77). Pink (2005), writes, “It is no accident that when you talk to Indian and Chinese business people and even educators, some now openly express their concerns that if math and science are not leavened by art,
literature, music, and the humanities, their countries will be at a competitive disadvantage as they try to get to the next level of global competition” (p. 320). Zhao (2009) refers to these concerns as a “creativity gap”. He writes, “Asian nations have been working on closing the creativity gap, while the U.S. has been troubled by the “achievement gap” revealed by international comparison tests, such as the TIMSS and the PISA (Zhao, 2009, p. 91). However, America has risked losing its creative edge by focusing on a narrow set of basic standards and standardized testing. This focus, driven by accountability consequences in NCLB, has pushed American schools in the wrong direction, away from the development of creativity and innovation (Trilling & Fadel, 2009).

America, the world leader in innovation and technology, is endangering its own future with its recent history of a second-rate school system that seems to be immune to the very innovations it has invented (Chen, 2010). According to Chen, schools in the heart of Silicon Valley in California, next to businesses such as Google and Apple do not share the culture of technology-based creative design, engineering, and collaboration. Most schools in the area operate as if they have been locked in a “time capsule for thirty years”.

According to Zhao (2009), research reveals the following about creativity: (1) Children raised in less conventional settings with less structured rules were more creative than children raised in more conventional settings with more rules. (2) Individualist cultures, such as the United States, value creativity as an expression of one’s individuality. In collectivist cultures, tradition, conformity, and continuity are valued. (3) Traditional schools are either indifferent or suppressive of creativity because they demand conformity and obedience. Research on Asian and American schools reveal that
Asian students spend more time in schools where creativity is diminished. This difference is likely a contributing factor to the “creativity gap”. According to Ken Robinson (2011), “We do not grow into creativity, we grow out of it – or rather we are educated out of it” (p. 49).

In the fall of 2007, the Conference Board worked with the American Association of School Administrators (AASA) on a second survey to find out whether employers and school leaders are aligned in their beliefs about creativity (Barrington, Cassner-Lotto, & Wright, 2006). First they looked at how the two groups define creativity by asking respondents to choose which skills best exemplify it. The number one choice among superintendents was “problem solving,” while the number one choice among employers was “problem identification or articulation.” In fact, superintendents were twice as likely as employers to rank problem solving in the top three creativity skills, while the reverse was true for employers (Jerald, 2009). The survey also revealed a substantial gap in how well employers and superintendents rated new entrants on that dimension. These differences demonstrate the damage of not prioritizing less structured and more open-ended problems in school curricula and assessments.

Traditionally, education has focused on equipping students to “find the right answer” to a set of predictable, well-defined problems. But that is not the kind of creativity adults need in today’s workplace, where problems workers encounter are unfamiliar, ill-structured, and often have no single right solution or even a good solution (Jerald, 2009). As Levy and Murnane point out, educational experts endorse the idea that students should be challenged with more ill structured problems that require divergent rather than convergent thinking (as cited in Jerald, 2009). There is a strong emphasis in
standardized testing on well-structured problems. The ability to identify complex new problems and patterns and suggesting possible solutions are essential, employable skills for the future workforce. “People who’ve learned to ask great questions and have learned to be inquisitive are the ones who move fastest in our environment because they solve the biggest problems in ways that have the most impact on innovation,” says Dell’s vice president, Summers (as cited in Jerald, 2009). Often people think of creativity as a talent possessed by only a handful of “artistic geniuses” (Robinson, 2011). Creativity isn’t a lucky lightning strike, but often the result of difficult and explicit work (Wagner, 2012).

What else does research say about encouraging and nurturing creativity? The New Commission on the Skills of the American Workforce (2010) considered the topic so important that it commissioned a separate review of the topic. The review found that “creativity requires both deep and technical expertise with one area and very broad knowledge of many, apparently unrelated areas. It depends on being able to combine disparate elements in new ways that are appropriate for the task or challenge at hand. Thus, it relies heavily on synthesis, the ability to see patterns where others see only chaos” (Jerald, 2009). Further research by University of California psychologist, Keith Simonton, studied a large sample of creative innovators over time. Simonton found that creative success is linked to the sheer quantity of productive output. Ideas lead to creative insight, which leads to increased productivity and potential success (as cited in Jerald, 2009).

Creativity and innovation tend to be fostered in learning environments that value curiosity, brainstorming, patience, trust, and risk-taking (Trilling & Fadel, 2009). Creators are motivated by uncertainty, surprise, challenge, and disequilibrium (Gardner,
According to Gardner, there is a correlation between synthesizing and creating but there are important distinctions. In education, it is expected that students will be skilled in synthesis before creativity. For example, this very paper requires a synthesis in the form of a literature review before it evolves into a dissertation or an original contribution (Gardner, 2006).

Pink (2005) writes that since foreigners can do left-brain work (linear, logical) cheaper and computers can often automate this type of work; we in the U.S. must do right brain work (global, creative, and empathetic) better. Creativity is an essential skill that must continue to be fostered in our students to ensure America maintains its creative and innovative edge (Zhao, 2009).

**Communication**

Communication is an essential skill for success in the 21st century. Oral and written communication is one of the key survival skills identified by Wagner (2008) in his book, *The Global Achievement Gap*. Communication skills are critical in many industries, but are especially important in the service industry (NEA, 2012). The service economy is estimated to expand to close to 80% of the American job market by 2014 (NEA, 2012). In a study by Barrington et al. (2006), employers were asked about the skills of high school graduates. More than half said that written communication was very important for high school graduates’ successful job performance but 81% identified high school students as deficient in written communication. According to one employer Wagner interviewed, “The biggest skill people are missing is the ability to communicate: both written and oral presentations.” (Wagner, 2008, p. 35).” In a study by Barrington et al. (2006), employers ranked an interpersonal skill, “oral communications,” as a very
high need for college students. According to the study, “oral communication is best thought of not as “collaboration” but rather related “interpersonal skills” that give one the power to interact effectively with others to accomplish a wide variety of aims in the workplace and in life” (Jerald, 2009, p. 12).

For success in the 21st century, students must be able to communicate, including speaking and writing in world languages (Darling-Hammond, 2010). Global teams are now common in business making linguistic and cultural communication an essential skill (NEA, 2012). Linguistic and cultural skills are also important in the service economy (NEA, 2012). Economists Levy & Murnane explain that effective and empathetic communication is an essential skill for the future workplace because it cannot effectively be automated. Effective communication is complex requiring the following skills: explanation, negotiation, empathy, and other forms of intense human interaction (as cited in Jerald, 2009).

Technology plays an important role in communication today and may play even a bigger role in the future. Students must be able to effectively analyze and process the overwhelming amounts of communication, mostly digital, in their lives (NEA, 2012). High-quality relationships will continue to hold considerable importance, but on-line relationships formed around cooperative interactions, such as Skype, Twitter, and Facebook will become more and more dominant. These digital communication tools can be used enhance the educational experience and outcomes for students. However, students are digital natives where most of their teachers are not. Trying to keep up with the innovations of the 21st century can be stressful for educators (Fisher & Frey, 2010). Fisher and Frey (2010) recommend that teachers consider the function of the technology
and not necessarily the tool. Trying to keep up with the tools, such as Twitter, YouTube, and Ning can be overwhelming. They suggest that teachers focus on the function, in the form of a verb (Prensky, 2008), such as sharing, communicating, and presenting. Fisher and Frey (2010) also recommend that young people be taught how to use their mobile phones as educational tools, and that students are taught to be courteous with their technology.

According to the National Council of Teachers of English (2011) in their 21st Century Curriculum and Assessment Framework, teachers recommend that readers and writers can develop their communication skills by:

1. Developing proficiency with the communication tools of technology
2. Build relationships with others to pose and solve problems collaboratively, and cross-culturally
3. Design and share information for global communities
4. Mange, analyze, and synthesize multiple streams of simultaneous information
5. Create, critique, analyze, and evaluate multimedia texts.

Additionally, the NEA (2012), in An Educator’s Guide to the “Four C’s”, recommends several ways for teachers to integrate communication into their classrooms. They give numerous examples for building communication skills in the following curricular areas: social studies, English, science, mathematics, world languages, and the arts. The following is an example from the guide: In a 12th grade world language lesson, students work in small groups and communicate with a Peace Corp volunteer, community activist, or a local leader in the target language. Students exchange information about projects
relevant to them and the individual. Communication is an important 21st century skill that enhances 21st century learning and other 21st century skills such as collaboration.

**Collaboration**

Collaboration is a key skill for preparing students to be successful in the 21st century. Collaboration skills fall under the interpersonal domain of competencies that are essential in a global economy (NRC, 2012). Employers rank “teamwork/collaboration” second only to “professionalism” when asked which skills are currently very important for new entrants in the workforce, and they rank it third when asked which skills they expect to become more important over the next five years. That should not be surprising given the flattening of corporations and the trend toward horizontal collaboration.

Marzano & Hefflebower (2012) write that understanding and interacting with others is essential for 21st century learning. They describe three essential skills for effective collaboration: perspective taking, responsible communication, and thoughtful conflict and controversy. Furthermore, student learning increases when students are engaged in productive tasks that require collaboration (Fisher & Frey, 2010). Productive collaboration calls for students to use the language and the thinking of the discipline with their peers, allowing them to be able to take risks (Fisher & Frey, 2010).

A meta-analysis by Johnson and Johnson (1989) of 378 studies on collaboration concluded that cooperation promoted greater productivity and achievement than interpersonal competition or individualistic efforts. In a follow up meta-analysis by Johnson and Johnson (2000) examined 164 studies looking at eight different approaches to cooperative learning. They concluded that each method produced higher achievement than either individualistic or competitive learning (Marzano & Hefflebower, 2012).
Cooperative learning is the instructional use of small groups so that students can collaborate and maximize their own and each other’s learning (Johnson, Johnson, & Holubec, 2008). Cooperative learning can maximize student experiences and opportunities for collaboration at all grades. Cooperative learning can take many forms from formal, groups of students collaborating or working together for one class period to several weeks, to achieve shared learning goals and complete jointly specific tasks and assignments, to informal, spontaneous or temporary grouping (Johnson & Johnson, 2010). “Cooperative learning, constructive controversy, and integrative negotiations provide students with the essential skills necessary to address 21st century challenges in the more collaborative school and work environment” (Johnson & Johnson, 2010, p. 206).

The 4C’s are very central to 21st century learning and they are often interconnected. For example, efficient collaboration requires effective communication. Problem solving can require both critical thinking and creativity (NEA, 2012). Additionally, the 4C’s can be integrated into lessons designed to enhance core instruction in language arts, math, social studies, and science (P21, 2012). Several 21st century educational approaches integrate the rigorous instruction in the core content areas, integrated with the 4C’s. These educational approaches include: the International Baccalaureate Program, design thinking, flipped learning, world language immersion programs, and project-based learning. This literature review will explore the three following approaches: design thinking, world language immersion, and project-based learning.
Project-Based Learning

One approach for 21st century learning is project-based learning (PBL). This approach integrates rigorous content instruction with the collaboration, critical thinking, creativity, communication, and often technology (Barell, 2010). Project-based learning is often referred to as problem-based learning and often begins with students choosing a problem to solve. Choice plays an important role in PBL because it helps motivate and engage students (Chen, 2010). PBL has a deeper, more complex goals and outcomes than traditional instruction (Marzano & Hefflebower, 2012, pg. 15).” Student engagement is key to promoting deep learning outcomes associated with project-based learning (Trilling & Fadel, 2009).

Research supports project-based learning as an effective approach for increased educational outcomes and deeper learning. In 2008 the George Lucas Educational Foundation conducted a research study on problem-based learning for an Advanced Placement (AP) course. One course taught a traditional approach and the other used a project-based approach. The findings supported the hypothesis that the project-based approach helped more students; including those from diverse backgrounds and learning styles, succeed on the AP test (Chen, 2010). The students that learned with the PBL method had a deeper understanding and better recall of the material (Chen, 2010).

A meta-analyses study by Strobel & van Barneveld (2009) further supported the finding that PBL is more effective than traditional instruction in promoting long-term retention of knowledge (Marzano & Hefflebower, 2012). While Strobel & van Barneveld’s research demonstrated that PBL is as or more effective in factual teaching than traditional approaches, it has also revealed that PBL far outshines traditional
methods in the teaching of 21st century skills (Trilling & Fadel, 2009).

Additionally, Barron and Darling-Hammond (2007) summarized several studies on innovative classroom practices such as project-based learning and they found the following:

1. Students learn more deeply when they can apply classroom-gathered knowledge to real-world problems.
2. They are more engaged when they are involved in projects that require sustained focus and collaboration.
3. The most significant factor in learning, even more than student background, is active learning.
4. Students are the most successful when they are taught how to learn, not only what to learn.

According to John Barell (2010), in his article, “Problem-Based Learning: The Foundation for 21st Century Skills,” there are key elements in planning effective PBL projects:

1. Allowing real world problems that foster inquiry and address important concepts like change, environment, and equity
2. Providing students with choice about content and presentation
3. Embedding high-level objectives like critical thinking, purposeful research, and questioning
4. Providing experiences in small-group collaboration
5. Providing students with frequent feedback from the teacher and from peers
6. Providing ample opportunities for revision, modification, and elaboration
7. Engaging students in the planning, monitoring, progress, and results of their projects
8. Providing opportunities to obtain pre-, formative, and summative assessments
9. Creating a clear and easy-to-follow curricular structure centered on authentic problems and inquiry
10. Ensuring both teachers and students share control of decision making, teaching, and learning.

If well planned, these projects will engage students, increase their curiosity, encourage them to ask good questions, involve them in meaningful research, encourage them to draw conclusions and reflect (Barell, 2010).

Project-based learning is often associated with secondary level instruction. However, PBL is not just for high school and college students. Even students as young as preschool can benefit from the hands-on learning experiences built in PBL (Chen, 2010). Project-based learning can be a very effective approach to 21st century learning at the elementary, middle, high school, and university level. Several schools in San Diego, such as Explore Elementary Charter, have had great success in academic and 21st century outcomes by using a PBL approach. The first of these PBL schools in San Diego was High Tech High in which opened in 2000. This successful charter school had great success and expanded its PBL approach to middle and elementary schools.

**Design Thinking**

Another approach to 21st century learning is called design thinking. A number of educators are exploring design thinking as a means of infusing 21st century skills into school curricula (Gow, 2012). According to Daniel Pink (2005) in *A Whole New Mind,*
“Design is a high-concept aptitude that is difficult to outsource or automate- and that increasingly confers a competitive advantage in business” (p. 86). Pink asserts that design in its simplest form is the activity of creating solutions, “utility enhanced by significance” and is an essential aptitude for the 21st century learner (Pink, 2005). One approach to cultivating creativity in students through design is called “design thinking”. The phrase “design thinking” was popularized by Rowe (1991) to refer to the ways in which designers approach design problems (Schon, 1983). The term refers to both conventional design domains as well as design in different contexts such as business, computing, and even recently, education (Brown, 2008). Despite various uses and applications, design thinking can be seen as a grounding framework for multidisciplinary teams to communicate and collaborate in designing solutions.

The IDEO group in Silicon Valley, a major force in the world of design, has helped to bring design thinking to the K-12 educational world. IDEO Group, founded in 1991 by David Kelley, brings human-centered global design concepts to the public (Wagner, 2012). David Kelley is also a professor at Stanford University where he founded dschool: Stanford’s Institute of Design where students of different majors can study design through the lens of their potential field (Wagner, 2012). IDEO also developed The Design-thinking Toolkit for Educators (Selzer, 2012), a free guide for bringing the design thinking process into the K-12 classroom. The design process is what puts design thinking into action. It’s a structured approach to generating and evolving ideas. It has five phases that help navigate the development from identifying a design challenge to finding and building a solution. It’s a deeply human approach that relies on your ability to be intuitive, to interpret what you observe, and to develop ideas that are
emotionally meaningful. Creating meaningful solutions for students, parents, teachers, colleagues and administrators begins with a deep understanding of their needs.

Owen (2007) identifies the following characteristics of design thinkers: A human-centered approach, an ability to visualize, a predisposition toward multifunctionality, a systemic vision, an ability to use language as a tool, an affinity for teamwork, and utilizing synthesis instead of choice. According to Tim Brown (2008), leader of Harvard’s Graduate School of Design, in his Harvard Business Review article, Design Thinking, adds the following as characteristics of design thinkers:

1. Empathy: Design Thinkers can imagine the world from multiple perspectives. They see the world in minute detail. They notice things that others do not and use their insights to inspire innovation.

2. Optimism: They assume that no matter how challenging the given problem, at least one potential solution is better than the existing alternatives.

3. Experimentalism: Significant innovations don’t come from incremental tweaks. Design thinkers pose questions and explore constraints in creative ways that proceed in entirely new directions.

4. Collaboration: The increasing complexity of products, services, and experiences has replaced the myth of the lone creative genius with the reality of the enthusiastic interdisciplinary collaborator.

The best design thinkers don’t simply work alongside other disciplines; many of them have significant experience in more than one discipline. Of all the design thinking characteristics, Brown (2012), considers collaboration to be the most important. Brown (2012) writes, “The increasing complexity of products, services, and experiences has
replaced the myth of the lone creative genius with the reality of the enthusiastic interdisciplinary collaborator” (p. 86).

Razzouk and Shute (2012) reviewed the educational research on design thinking and drew the following conclusion: Designers are solution focused rather than problem focused. Research studies found that creative and productive design behavior is associated with the switching of cognitive activity such as analysis and synthesis (Dorst & Cross, 2001). According to Razzouk and Shute (2012), “Helping students to think like designers may better prepare them with difficult situations and to solve problems in school, in their careers, and in life in general” (p. 343). They assert that current educational practices continue to narrowly focus on students’ proficiency in math and reading, leaving students disengaged. Educational practices should move beyond that limited focus and integrate valuable skills such as design thinking, multi-tasking, and digital literacy (Razzouk & Shute, 2012).

There are differences in the various models or elements of design thinking. Stempe and Badke-Schaube examined design thinking in 2002, through the lenses of creativity, problem solving, and cognitive theories of human decision-making. They proposed the following as the basic elements of design thinking: generation, exploration, comparison, and selection. IDEO’s model for design thinking identifies the design thinking process through the following stages: discovery, interpretation, ideation, experimentation, and evolution. This design thinking process allows the problem solvers to work through possible solutions creating workable models evolving through a testing, retesting and possible redesigning cycle. According to Kim Saxe, director of the Innovation lab or I-Lab at Nueva School, an elementary school in California, that uses the
design thinking approach, “this iterative prototyping is creating resiliency in students and a different attitude about failure” (Gow, 2012, p.4).

Creative design skills are highly desired in the workforce, therefore entrance into a strong Master’s of Fine Arts Program or MFA program at Harvard, is now more competitive than entering Harvard’s Business School for a Master’s of Business Administration or MBA (Brown, 2012). The Master of Fine Arts is the new MBA, argued author Daniel Pink in a recent New York Times story about the new creative economy, in which even old-school corporations like GM increasingly value imaginative "right-brain" thinkers (Bell, 2008).

In IDEO’s *Design Thinking Toolkit for Educators* (Selzer, 2012), teachers are encouraged to use the process in collaboratively designing curricula. According to one teacher who uses design thinking at the elementary school level, “The design process has helped me see that I have a responsibility to be a change agent for teaching and learning. I don’t need to have all the answers (or be perfect), but I need to be willing to try new things, dare to dream big, and be patient as I experiment with the designs that emerge in the process. Design thinking has given me the tools and empowerment to create meaningful educational change” (Selzer, 2012).

**World Language Immersion**

Missing in many schools’ formula for a world-class education is an urgent call for schools to produce students that actually know something about the world, its cultures, languages, as well as how its economic, environmental and social systems work (Mansilla & Jackson, 2011). Students need knowledge about other countries, regions, cultures, and global systems. They need skills to communicate digitally, effectively, and
in other languages. They need a values’ system to respect global peers and cultures different from their own. According to a survey by the Committee for Economic Development (CED, 2012), eighty percent of U.S. companies surveyed felt business would increase significantly if companies had a more globally competent workforce.

The Framework for 21st Century Learning (Appendix A) includes several 21st century themes that other frameworks do not include. These skills, such as global awareness and world languages are identified by the various stakeholders of the P21 as critical in the development of 21st century skills (P21, 2012). Global Awareness is a new essential theme in the P21 Framework and considered a new essential skill in the global economy (Kay, 2010). “Americans need a secure understanding of global issues that affect them as citizens and workers. They need to be able to learn from, and work collaboratively, with people from a range of diverse cultures and lifestyles. They need to be able to communicate in languages other than English (Kay, 2010, p. xxii).”

In America, world languages are often ignored in curricula until high school where they are taught at as an elective (American Council on the Teaching of Foreign Languages [ACTFL], 2012). Although the United States is a nation of immigrants, roughly eight in ten Americans speak only English and a decreasing number of schools are teaching foreign languages (CFR, 2012). The P21 and other important organizations such as the Asia Society, a non-profit organization whose mission is to educate the world about Asia, feel that a global perspective is a key 21st century competency (Zhao, 2009). According to Zhao, “Students will need a deep understanding of the interconnectedness and interdependence of all human beings; a set of global skills- cultural knowledge and linguistic abilities that enable them to appreciate and respect other cultures and peoples
and interact with other people (Zhao, 2009, p. 192). Zhao includes the need for effective communication with other cultures, which requires effective foreign language instruction. For this to happen, federal and state governments must support international and foreign language education and recognize the lack of effective language programs in American schools (Zhao, 2009).

While most American schools struggle with foreign language instruction, language immersion programs continue to gain popularity. For example, in San Diego County, the number of world language immersion programs has more than doubled in the last five years and include instruction in numerous languages such as Spanish; French, Arabic; Japanese; and Mandarin Chinese immersion programs teach the same standards and content as other schools but do so in other languages as well as English. However, language immersion programs have the additional goals of bilingualism, biliteracy, and mastery of both the student’s native and non-native languages (Fortune, 2013).

Immersion programs are held to the same accountability measures set by NCLB as other schools. Research studies continue to show language immersion students outperform the monolingual peers in state testing usually by the fourth grade (Fortune, 2013).

Many states have begun to recognize the benefit of multilingualism and have adopted Seals of Biliteracy for high school graduates. Some states, such as Utah, have state initiatives promoting immersion programs in every school. Additionally, some schools have even taught students three languages. While popular in some areas of Europe, trilingualism is still seen as elite, exotic, unusual, or even abnormal (King & Mackey, 2007). World language immersion programs show great promise as an
approach to 21st century learning that integrates core learning, 21st century skills and language instruction (Johnson & Johnson, 2009).

Challenges and Cautions

According to Trilling & Fadel (2009), there is a “perfect learning storm” brewing as the need for 21st century learning competencies, thinking tools, digital lifestyles, and learning research all come together to potentially transform learning. They caution that there are challenges and resistance to changes listing the following:

1. Industrial age education policies are designed to deliver mass education and assessment as efficiently as possible.

2. Educational accountability and standardized testing systems that primarily measure performance on basic skills such as reading and math while bypassing 21st century skills.

3. The long history of teaching practices based on transmitting knowledge to students through direct instruction.

4. The influence of the educational publishing companies.

5. The fear among some educational organizations that hard sought improvements in traditional learning outcomes will be undermined by a new focus on 21st century skills.

6. The preferences of parents whom as children learned through traditional approaches and achieved success as adults.

While policies and organizations try to define what will be needed for success in the 21st century, the pace of change is so rapid that prediction of future needs may be a futile task. Marzano and Heflebower (2012) in their book, Teaching and Assessing 21st Century
Skills ask how can we ensure that students will be successful in a society we cannot comprehensively forecast? Their answer is while many 21st century skills cannot yet be determined, if we are now able to identify a small but important set of skills and teach them well, students will be prepared to adapt to the changing conditions of the 21st century.

In order for the American educational system to keep pace, we need to make broad changes in educational policy both at the state and national levels (Darling-Hammond, 2010). In carrying out this responsibility, the bipartisan Congressional 21st Century Caucus seeks to provide opportunities to host leading subject matter experts and model practitioners to speak and demonstrate to policymakers about the importance of 21st Century Skills and the many ways they take shape in student preparedness. It will provide opportunities to connect likeminded and influential policymakers to these leading experts and allow them to discuss and collaborate on areas of mutual interest (P21, 2012).

In order for change to happen, more research is needed according to the National Resource Council Report (2012). They recommend that foundations and federal agencies should support further research designed to increase our understanding of the relationships between 21st century competencies and successful adult outcomes. To provide stronger causal evidence about such relationships, the programs of research should move beyond simple correlational studies to include more longitudinal studies with controls for differences in individuals’ family backgrounds and more studies using statistical methods that are designed to approximate experiments. Such research would benefit from efforts to achieve common definitions of 21st century competencies and an
associated set of activities designed to produce valid and reliable assessments of the various individual competencies.

**Summary**

We are currently living in the dawn of the 21st century, and the need for 21st century learning is here. Our current educational system has been leaving our students behind domestically and internationally, due to a narrow focus on basic levels of language arts and mathematics. For the past decade schools have focused primarily on what has been assessed because they feared consequences outlined in NCLB. Meanwhile the world has been changing at an unprecedented rate and with advances in technology and globalization transforming our everyday lives. Students today are competing with the rest of the world for jobs that require a broad set of skills and competencies, which too often our students are lack.

Our educational system is ready for a sea change that will prepare our students for success in the 21st century. There are many opinions and various frameworks defining 21st century learning. The P21 has developed its’ *Framework for 21st Century Learning* (Appendix A), which has been adopted by sixteen states. This framework defines the core themes and skills necessary for 21st century learning.

The previous review of literature discussed the recent history of the American educational system, examined the need for 21st century skills, explored what students would need to know in the 21st century, and examined three approaches to 21st century learning. The review of the literature relative to 21st century learning summarized researchers’ findings regarding the need for 21st century learning skills, focusing on the skills of collaboration, critical thinking, communication and creativity. Furthermore the
review summarized researcher’s findings regarding possible approaches to 21st century learning including design thinking, project-based learning, and world language immersion.

Research findings demonstrate the need for 21st century learning, exploring both the domestic and global achievement gaps. Researchers examined the different 21st century competencies and skills and for the most part agree that a rigorous core curriculum that promotes deeper learning and critical thinking is essential for 21st century learning. The research also supports creativity, collaboration, and communication as important skills in 21st century learning. Research findings confirmed that project-based learning is an effective teaching method for teaching and retaining information as well as promoting 21st century skills such as critical, thinking and collaboration, and communication. Research findings also supported design thinking as an effective educational approach that promotes creativity, critical, thinking, collaboration, and communication. Research in the area of language immersion programs showed language immersion is an effective teaching approach for the teaching information, while teaching a second or third language, promoting global communication and collaboration skills.

Most of the past studies of 21st century learning skills and approaches have employed qualitative research. Additional quantitative research is needed, because the topic of 21st century learning skills is relatively new. The educational approaches of language immersion, design thinking, and project-based learning are relatively new in the context of 21st century learning. More quantitative research is necessary to explore the effectiveness of these approach and others. More quantitative research is necessary to
demonstrate that the skills of creativity, collaboration, communication, and critical thinking have an impact on the educational and work success of students.

It is the researcher’s intention that this comparison study of different approaches to 21st century learning, with a qualitative tradition of phenomenology, will add to the existing literature by comparing and contrasting these approaches to the P21 Framework for 21st Century Learning (Appendix A). The research findings should provide insights for researchers and practitioners in understanding various approaches to 21st century learning and the skills and competencies they address.
CHAPTER 3—METHODOLOGY

The literature reviewed in Chapter 2 indicates that 21st century learning skills are of critical importance to the education of American students today (Kay, 2010; Wagner, 2008; Zhao, 2009). Empirical data reviewed demonstrates a shifting need of skills in the global 21st century workforce. Furthermore educational experts caution that pendulum swings towards standardized testing have left American students with a diminished capacity to think critically and creatively, and therefore compete globally (Darling-Hammond, 2010; Zhao, 2012). Where specific 21st century approaches, such as project-based learning, design thinking, and have been implemented, the research reviewed shows positive outcomes for overall student learning as well as the acquisition of critical 21st century skills (Fortune, 2013; Law, 2009; Marzano & Heflebower, 2012; Selzer, 2012). In order to acquire a better understanding of how school leaders and teachers utilize different approaches in transitioning schools to 21st century learning environments, there is a need for further qualitative research with the purpose of seeking to understand this social phenomenon (Merriam, 1998).

The purpose of the study is to identify specific approaches to 21st century education that may inform the field about how to transform our current educational system. Moreover, it is the researcher’s goal that the information gleaned from study findings can provide specific strategies that schools and districts can employ to prepare students to thrive in the 21st century global economy. This comparative case study examines three different California elementary schools’ approaches to advancing 21st century skills. Each school specializes in a different focal area of 21st century skills as identified by the P21 (a) a design-thinking approach, (b) a project-based learning
approach, or (c) a world language immersion focus. This chapter begins with a listing of
the research questions that guided this study, followed by a description of the
methodology, selection of the research sites and participants, data gathering instruments,
procedures for data collection and analysis, and considerations of validity and reliability.

**Research Questions**

A defining characteristic of questions in qualitative phenomenological studies is
that they are explanatory and reveal the essence of human experiences (Creswell, 2008;
Moustakas, 1994). Therefore, research questions are crafted to describe the participants’
lived experiences of the phenomenon (Creswell, 2007). Given that this study sought to
capture the experiences of the participants in transitioning elementary schools to 21st
century learning environments, the following research questions guided this study:

1. What does 21st century learning look like in three elementary schools, in
   strong academic standing, self-identified as employing 21st Century learning
   skills?
2. What educational approaches are used to implement 21st century learning
   skills?
3. How do these schools align with P21skills and competencies needed to
   prepare the students for today’s global economy?
4. How are these schools similar and how are they different?
   a. What can be gleaned from the three sites and perhaps replicated on a
      larger scale?
Research Design

Merriam (1998) described qualitative form of inquiry as that which focuses on understanding and explaining a process that occurs in a natural setting where human behavior and events occur. Creswell (2007) described the purpose of phenomenology as narrowing the scope of how and what people experienced to the “essence of the experience for all of the individuals” (p. 58). Yin (2003) asserted that “case studies are the preferred strategy when ‘how’ or ‘why’ questions are being posed, when the investigator has little control over events, and when the focus is on a contemporary phenomenon within some real-life context” (p. 1). Schwandt (1997) observed that case study research serves to generate knowledge of the particular (p. 13).

For this study, the researcher selected a qualitative, phenomenological comparative case study, of three elementary schools in California. Each school was employing one of three strategies to implement 21st Century learning skills: (a) a design-thinking approach, (b) a project-based learning approach, or (c) a world language immersion approach. In addition, each school was considered to be in a state of strong academic standing based on the following criteria: 1) high-performing status as defined by the state of California 2) not in Program Improvement status (having achieved API targets) as designated by the state of California Academic Performance Index (API) measure. 3) Strong academic standing per student performance in the national ERB assessment for independent schools. The researcher believed that the selection of schools in strong, academic standing, employing different 21st century approaches, would provide insight at the school and classroom levels. The goal was to identify commonalities and
implementation strategies that fostered alignment with the P21 Framework (Appendix A).

**Participants**

Moustakas (1994) recommended considering four criteria when selecting participants for a phenomenological study: (a) participants interested in understanding the phenomenon, (b) participants willing to engage in lengthy interviews, (c) participants willing to engage in lengthy interviews, (c) participants agreeable to audio tape interview, and (d) participants having a readiness to share the data collected in a study. Generating a list of qualifying participants began with a purposeful sample of schools.

**Site Selection**

The researcher purposely selected three elementary schools in California for this study. The researcher used a Google search to identify California elementary schools, which utilized the specific approaches identified: project-based learning, design thinking, or world language immersion. The researcher then searched the schools’ websites to determine if they self-identified as educating students for the 21st century and for implementing one of the three approaches. From there the researcher used data from the California Department of Educations for the 2011-2012 school year to select schools in strong academic standing, as defined in the Definition of Terms. Furthermore the researcher chose schools with different designations: charter, independent, or district public. Finally, the three schools were chosen to better understand the phenomenon across different types of schools which all met the specific criteria.
Participant Selection

Purposeful sampling was employed to identify all participants. As Creswell (2008) explains, “The idea behind qualitative research is to purposefully select participants that will best help the researcher understand the problem and answer the research questions” (p. 185). The researcher established the following criteria for selection of participants at each of the three research sites:

- Participants must have a strong academic standing as previously defined
- Participants must belong to a school that has self-identified as meeting the educational needs of 21st century learners.
- Participants must utilize one of the following approaches for 21st century learning: design thinking, project-based learning, or world languages immersion focus
- Participants must hold a valid California teaching or administrative credential or the equivalent for independent schools.
- Participants must be willing to participate in the study.

Following approval from the Institutional Review Board, the researcher contacted and met with the principals or leaders of the three schools to outline the proposed study and request permission for school participation. The IRB approved observation protocol tool (Appendix B) and the IRB approved consent form (Appendix C) were shared with each principal. Once school-site permission was granted, the researcher, with the assistance of the principal, scheduled a visit to talk to the potential, participating teachers about the study.
During the subsequent site meeting, the researcher explained the purpose of the study and the data gathering activities that would be undertaken. Teachers were given the Informed Consent Form (Appendix C), which described the study’s purpose, risks, benefits, confidentiality/privacy concerns, incentives, costs, and voluntary nature of participation. The consent form also provided the researcher’s contact information. Teachers were allowed time with the researcher to ask clarifying questions about the interview and the proposed classroom observations. Participants were advised that the semi-structured interviews would be recorded and later transcribed. Once the researcher believed there was clarity, the *Protocol Tool for 21st Century Learning* (Appendix B) was given to the teachers.

Participation in the study was voluntary. Participants at each school site consisted of the school principal, a lead teacher or grade-level chair, selected from a group recommended by the principal, and two additional teachers selected by the researcher from the pool of teacher volunteers. The principal and lead teachers were purposefully selected because of their instructional leadership positions at each site. The researcher made an effort in the selection of the classroom teachers at each site to include sufficient diversity to ensure the study produced representative samples from the protocol for 21st century learning.

**Data Gathering Instruments**

A case study utilizes multiple forms of data to collect evidence for research study. Using multiple data sources provides triangulation of the data. “Triangulation is the act of bringing more than one source of data to bear on a single point” (Marshall & Rossman, 2006, p. 202). Triangulation verifies data, thus increasing the validity of the research.
findings. Data in this study were gathered from three sources: semi-structured interviews, classroom observations using the Protocol for 21st Century Learning (Appendix B), and artifacts.

**Semi-Structured Interviews**

Semi-structured interviews were held with participants at each site. Questions for the semi-structured interviews evolved from the research questions that had been posed and from the observation protocol that had been established. A total of four semi-structured interviews were conducted at each school site. Interviews were conducted in the office or the teacher’s classroom for an average length of 30 minutes. The researcher used the 21st Century Learning: Site Visit Protocol and Summary Forms (Appendix B) instrument for both semi-structured interviews and classroom observations. The researcher selected this instrument because of its correlation to 21st century learning skills as identified by the P21 Framework (Appendix A). Dr. Cheryl James-Ward, Department of Educational Leadership at San Diego State University, created the instrument for research on 21st century learning conducted in America and China. The researcher, for the purpose of this study, modified the tool with the addition of the following interview questions:

1. What additional competencies or skills are integrated into the taught core curriculum?
2. What does instruction for these skills or competencies look like?
3. How is technology used as an instructional tool?
4. What obstacles or challenges have you faced in implementing your current model?
5. What obstacles or challenges might you face in 5 or 10 years?

6. What are your next steps for your classroom or school?

Classroom Observations

At each school site, a total of six classroom observations were conducted using the 21st Century Protocol presented in Appendix B. Each observation was approximately 15 to 20 minutes in length and was scheduled between 9:00 and 11:00 in the morning. The researcher conducted the observations. During the observation, the researcher recorded evidence of instruction of 21st century skills identified in the protocol using the observational protocol tool in Appendix B (Tables 10-23). Following the observation, the researcher wrote observation notes, recording additional data that could be used for her final meeting with the participants.

Artifacts

While visiting each site, the researcher collected documents for analysis. Documents examined included CST data, school site plans, School Accountability Report Cards (SARC), accreditation reports, the school site’s professional development plan for the 21st century educational approach, assessment data, and PLC agendas and notes.

Data Gathering Procedures

The following six-step procedure guided the data gathering at each school site:

1. Participants were selected, the protocol tool was shared, and consents were obtained.

2. The principal was interviewed.

3. The lead teacher or a grade level chair was interviewed.

4. The classroom teachers were interviewed.
5. Classroom observations were conducted.

6. A follow-up interview was conducted with all participants after the observation for review and follow-up questions and opportunities for the participants to add information. This step allowed participants to include any pertinent information they may have left out of the first interview.

**Data Analysis Procedures**

Throughout this study, the researcher followed Creswell’s (2008) dictum that a qualitative researcher must be engaged in ongoing reflection on the data and asking general questions throughout the process. This case study research entailed gathering detailed descriptions of the dynamics of the schools in order to analyze the descriptions through the *Framework for 21st Century Learning* (Appendix A) created by the P21. Throughout the data gathering process, the researcher continually reflected on the data gathered from the semi-structured interviews, observations, and artifacts. When the data analysis process was initiated, the researcher followed Creswell’s (2008) six-step approach to analyzing qualitative data. Creswell’s steps include the following:

1. Organize and prepare the data
2. Make generalizations about the meaning of the data
3. Code and or chunk the data
4. Create categories or themes for the data
5. Determine how the themes would be represented
6. Use the data to make interpretations or meanings.

**Validity and Reliability**

A qualitative study that aims to explore a problem or describe a setting, a process, a social group, or a pattern of interaction will rest on its validity” (p. 201). Qualitative researchers seek validity through findings that are reasonable given the data collected and an in-depth understanding of the participants in order to better understand their perspectives as related to the study (Marshall & Rossman 2006). This study followed the procedures recommended by Marshall & Rossman (2006) in order to limit bias and increase validity:

1. The use of a “critical friend” to question the researcher’s analyses.
2. Crosschecking, peer debriefing, and searching for negative instances.
3. Not limiting analysis to previous literature.
4. Checking and rechecking the data and a purposeful examination of possible alternative explanations.
5. Providing examples of descriptive, non-evaluative note taking.
6. Citing previous researchers who have written about bias, subjectivity, and data quality.
7. Conducting an audit trail of the data collected and analytical strategies (Richards, 2005).

Furthermore, the instrument used, The 21st Learning: Site Visit Protocol and Summary Form was used investigated as recommended by Creswell (2008). The instrument was used in several other studies with reliable and valid reported results. Additionally, data triangulation was used as a strategy to achieve validity and reliability. According to Marshall & Rossman (2006), “Triangulation is not so much about getting to the “truth” but rather about finding the multiple perspectives for knowing the social world” (p. 204). Interview and observation data, field notes from observations, and the review of
documents provided data sources for triangulation and analytic comparison for emerging themes and patterns. “Triangulation using multiple sources of data means comparing and cross-checking data collected through observations at different times or in different places, or interview data collected from people with different perspectives” (Merriam, 2009, p. 216).

**Ethical Considerations**

The researcher considered the ethical nature of conducting research on human subjects and implemented the following safeguards: (a) The researcher completed the San Diego State’s tutorial and exam on research with human participants (b) The researcher applied for approval with the SDSU Institutional Review Board (c) After approval the researcher sought approval from the selected school districts and schools to conduct the study (d) In order to maintain confidentiality pseudonyms were assigned to schools and human participants (e) The consent form explained that participation was voluntary and could be terminated at any time (f) Findings were generalized for all participants (g) All data gathering instruments and data gathered were kept secured at all times.

**Summary**

Chapter 3 outlined the qualitative research methodology of this phenomenological case study, based upon the work of Marshall and Rossman (2006) and Creswell (2008). The procedures for selecting the research sites and study participants were described. The chapter summarized the data collection procedures, which included using an observational protocol tool and observation of classrooms, examining artifacts from each school, and conducting semi-structured interviews. Data analysis procedures described review, triangulation, and interpretation of the data. Issues of validity and reliability were
addressed. Findings are discussed in Chapter Four.
CHAPTER 4—FINDINGS

At the dawn of the 21st century, transforming education is critical for the success of students as future citizens in a global society (Mansilla & Jackson, 2011). Wagner (2012) believes education is not keeping up with the skills students need to be successful. According to Wagner (2012), “Knowledge is available on every Internet-connected device; what you know matters far less than what you can do with what you know. The capacity to innovate — the ability to solve problems creatively or bring new possibilities to life — and skills like critical thinking, communication and collaboration are far more important than academic knowledge” (p.1). As explained in Chapter 1, the purpose of this study is to explore how three California elementary schools are preparing students for a very global and rapidly evolving 21st century. The previous chapter described the study design and methodology applied in this dissertation. Chapter 4 contains the findings from this study presented in three sections. The first section contains a description of the data collection and analysis processes. The second section examines the three schools in the study. The third section explores the themes that emerged from the process of coding, clustering, and analyzing the data. The themes are used to compare and contrast the experiences of the three schools. The chapter concludes with a synthesized summary of the findings. The findings are intended to inform the body of literature on 21st century learning, as well as inform leaders, policy makers, and teachers on approaches used to transition schools.

Data Collection

The following research questions guided this study:
1. What does 21st century learning look like in three elementary schools, in strong academic standing, self-identified as employing 21st Century learning skills?

2. What educational approaches were used to implement 21st century learning skills?

3. How did these schools align with P21 skills and competencies needed to prepare the students for today’s global economy?

4. How are these schools similar and how are they different?
   a. What can be gleaned from the three sites and perhaps replicated on a larger scale?

With permission from the SDSU Institutional Review Board (IRB Approval #1218087), the researcher approached principals and teachers from three schools in California seeking their agreement to participate in the study. The principals and teachers were informed that their level of involvement in the study would be strictly voluntary, without compensation, and without penalty. Participants were informed they could withdraw their participation at any time during the research project. Each participant was provided a consent form (see Appendix C) that included background information about the study, potential risks and benefits, and confidentiality assurances regarding participation in the study.

For the interview portion of the research, the research and each participant mutually agreed upon a date, time, and location for the interview. The majority of the interviews were conducted in an office or classroom setting, usually during regular school hours. The interview structure included both unstructured and open-ended
questions that were intended to elicit views and opinions from the participants (Creswell, 2008). The set of guided interview questions allowed the researcher to obtain information about participants’ perceptions, knowledge, and experiences regarding 21st century learning and each school’s specific approach. The researcher gathered data through interviews and classroom observations providing a detailed look into the culture, practices, and philosophies of each site and depicted the varied experiences of school leaders and teachers and their work to prepare students for the 21st century. All of the interviews were audio recorded. After each interview, the researcher transcribed each interview question one at a time and then reviewed the text with the participant to ensure the accuracy of each interview. Additionally, the researcher observed three classrooms for approximately twenty minutes at all three sites. The researcher took detailed notes using the classroom observation protocol in the 21st Century Learning: Site Visit Protocol and Summary Form (Appendix B). Following completion of the interview and classroom observation portions of the study, the researcher organized the transcriptions and observation notes for data analysis.

**Data Analysis**

Three California elementary schools were purposely selected for this qualitative phenomenological study. The schools were selected because they met the criteria determined for the study and they each had a separate designation. The criteria were: (a) applying a specific approach to 21st century education such as design thinking, project-based learning, or world language immersion (b) identified as being in a state of strong academic standing as defined in the Definition of terms in this study, and (c) self-identifying as preparing students for a 21st century education.
Table 1 presents an overview of the three schools selected for this study:

Table 1

<table>
<thead>
<tr>
<th>Researched Sites</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>School</strong></td>
</tr>
<tr>
<td>School A</td>
</tr>
<tr>
<td>School B</td>
</tr>
<tr>
<td>School C</td>
</tr>
</tbody>
</table>

Once the researcher identified the three sites, the researcher purposely identified participants. Table 2 shows the human participant selection at each site:

Throughout data collection and analysis, the researcher followed specific procedures to protect the identity of the participants. Each school and its corresponding leader were given an alphabetical code. Teachers from the same school were assigned the same alphabetical code plus a number (see Table 3).

The researcher began data analysis by reading through all the data in order to obtain an overview of the information and its overall meaning (Creswell, 2008). The process of coding started with a holistic analysis of one of the three schools to allow preliminary themes, repeated ideas, and patterns to emerge. Next the researcher
### Table 2

**Research Participants**

<table>
<thead>
<tr>
<th>School</th>
<th>21st Century Learning Approach</th>
<th>Administrator</th>
<th>Lead Teacher or Chair</th>
<th>Classroom Teacher</th>
</tr>
</thead>
<tbody>
<tr>
<td>School A</td>
<td>Project-Based Approach</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>School B</td>
<td>Design Thinking Approach</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>School C</td>
<td>World Language Immersion Focus</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

### Table 3

**Participant Identification in the Selected Schools**

<table>
<thead>
<tr>
<th>Schools</th>
<th>Role of Participants</th>
<th>Participants Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>School A</td>
<td>Principal</td>
<td>Leader A</td>
</tr>
<tr>
<td></td>
<td>Teachers</td>
<td>A1, A2, A3,</td>
</tr>
<tr>
<td>School B</td>
<td>Principal</td>
<td>Leader B</td>
</tr>
<tr>
<td></td>
<td>Teachers</td>
<td>B1, B2, B3</td>
</tr>
<tr>
<td>School C</td>
<td>Principal</td>
<td>Leader C</td>
</tr>
<tr>
<td></td>
<td>Teachers</td>
<td>C1, C2, C3</td>
</tr>
</tbody>
</table>
conducted a cross-school analysis of two of the schools. Data from the third school were compared with the preliminary themes, and some of the preliminary themes not supported by the three-school analysis were eliminated. The researcher used color-coding to help identify characteristics, as well as eliminate redundancies. Categories were developed more easily due to color-coding the data. Data from the classroom observations were then analyzed to further solidify characteristics and eliminate redundancies. The researcher then turned to the literature to cross-reference the characteristics with current characteristics in the body of literature on 21st century learning. The synthesis of the themes from all three California schools provides the findings presented in this chapter.

**Description of the Participating Schools**

Three California schools that had self-identified as following a 21st century learning approach were selected as research sites for this study. The following descriptions of the participating schools are presented.

**School A**

School A is a public charter K-5 elementary school located in a suburban area in California. The school was built 2 years ago on a campus shared by a middle school and high school that are part of the charter. Classrooms are in single story buildings. The school had 624 students enrolled in 2011. Table 4 summarizes the ethnic composition of the school as reported by the 2012 California Basic Educational Data System (CBEDS) (California Department of Education, 2012).

Table 5 summarizes the ethnic composition of the school as reported by the 2012 CBEDS (California Department of Education, 2012).
School A is known for its international leadership in project-based learning. School A's Academic Performance

School A employed a diverse certificated staff of 45 employees. All 18 members of the teaching staff were fully credentialed; 18 teachers held a baccalaureate degree, and 6 had earned a master’s degree. The average number of years of teaching experience at the time of this study was 4 years. Table 5 summarizes the ethnic composition of the teachers (California Department of Education, 2012).

Principal A had served as director of the school for the past two years with 14 years of previous teaching experience.

School A applied a project-based learning approach as the foundation of its educational program. School A is seen as an international leader in this area and provides frequent tours to educators from around the world. School A’s Academic Performance

<table>
<thead>
<tr>
<th>Total</th>
<th>Hispanic</th>
<th>White</th>
<th>African American</th>
<th>Asian</th>
<th>Pacific Islander</th>
<th>Filipino</th>
<th>Multiple Ethnicities</th>
</tr>
</thead>
<tbody>
<tr>
<td>424</td>
<td>285</td>
<td>47</td>
<td>32</td>
<td>0</td>
<td>3</td>
<td>38</td>
<td>1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Total</th>
<th>Hispanic</th>
<th>White</th>
<th>African American</th>
<th>Asian</th>
<th>Pacific Islander</th>
<th>Filipino</th>
<th>Multiple Ethnicities</th>
</tr>
</thead>
<tbody>
<tr>
<td>18</td>
<td>3</td>
<td>13</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>
Index (API) had only been available for last year, its first year. In 2011, the API score of the school was 778. Although, this is 22 points below what the state considers high performing, the school is not in program improvement and met the criteria for “strong academic standing” as defined in this study. Additionally, the school’s unique and successful approach to providing a 21st century education, along with its excellent reputation, had qualified the school to participate in the study.

**School B**

School B is an independent, college-preparatory school, located in a wealthy suburban area of Northern California, serving students from age 4 to 11. The school was built more than 40 years ago on several acres. The classrooms are modern and spacious and the facility has a theater and a 3000 square foot Design-thinking lab. The school enrolled 400 Gifted and Talented (GATE) students in 2012. In 2011-2012, School B enrolled 200 students in grades preK-5 and 200 students in the middle school. Students are enrolled based on an enrollment process that includes an IQ test, and is considered a school for gifted students. The school has a non-discrimination policy and enrolls twenty percent of its students in its scholarship program. Table 6 summarizes the ethnic composition of the school.

Table 6

*School B Student Population by Ethnicity*

<table>
<thead>
<tr>
<th>2010-2011 Ethnic Breakdown</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
</tr>
<tr>
<td>200</td>
</tr>
</tbody>
</table>
School B employed a diverse staff of employees: Twenty were full time employees. All twenty of the teaching staff had earned a baccalaureate degree and six had earned a master’s degree. The average number of years of teaching experience was 6 years. Table 7 summarizes the ethnic composition of the teachers.

Table 7

*School B Teacher Population by Ethnicity*

<table>
<thead>
<tr>
<th>2011-2012 Ethnic Breakdown</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
</tr>
<tr>
<td>-------</td>
</tr>
<tr>
<td>20</td>
</tr>
</tbody>
</table>

School B integrated Design thinking approach into their philosophy of providing a differentiated education at where gifted students could follow their passions. The Western Association of Schools and Colleges (WASC) had accredited by the California Association of Independent Schools (CAIS) and school B. In addition, the school was a member of the National Association of Independent Schools (NAIS).

The director of the school has been in this position for the past eight years and has 20 years of teaching experience. In the last two years, she has been heavily involved in expanding the school from K-8 to K-12. The high school component of the school will open in the Fall of 2013.

School B is seen as a leader in the field of educating gifted students, design thinking, and Social and emotional learning. The school’s excellent student achievement, as measured by the ERB exams, and its unique approach to 21st century learning qualified the school to participate in the study.
School C

School C is a public K-5 school located in a suburban setting off a busy street in Southern California. Due to the rapid growth of the school in the last several years and the size of the main campus, the school’s kindergarten program is housed about one mile away on a separate campus. Both campuses were built more than 50 years ago. School C has a trilingual program that began in 2007. The classrooms are in single story buildings and portable bungalow classrooms. In 2012, the school enrolled 855 students. Table 8 summarizes the ethnic composition of the school as reported by the 2012 CBEDS (California Department of Education, 2012).

Table 8

\textit{School C Student Population by Ethnicity}

<table>
<thead>
<tr>
<th>2012-2013 Ethnic Breakdown</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
</tr>
<tr>
<td>-------</td>
</tr>
<tr>
<td>855</td>
</tr>
</tbody>
</table>

School C employed a diverse certificated staff of 44 employees. All members of the teaching staff were fully credentialed; 23 teachers held a baccalaureate degree, and 21 had earned a master’s degree. The average number of years of teaching experience at the time of this study was 10.1 years. Table 9 summarizes the ethnic composition of the teachers.

Leader C has served as the leader of the program for the past five years and had served as a Principal for two years previous to this assignment. Additionally the leader
Table 9  

School C Teacher Population by Ethnicity

<table>
<thead>
<tr>
<th>2012-2013 Ethnic Breakdown</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
</tr>
<tr>
<td>-------</td>
</tr>
<tr>
<td>44</td>
</tr>
</tbody>
</table>

had earned her master’s degree in multi-cultural education and is currently working on a doctoral degree in educational leadership.

School C has two immersion programs. The Spanish immersion program started with full Spanish immersion in Kindergarten. Spanish immersion students also received Mandarin enrichment instruction every week. School C (did not change to Mandarin Language Academy) was a 50/50 program model providing half Mandarin instruction and half English instruction in grades K-5. Mandarin immersion students also received Spanish enrichment instruction every week.

School C’s Academic Performance Index (API) had been increasing steadily over the past five years. In 2012, the API score of the school was 875. The school’s mission and vision identified the school as providing a global, 21st century education for its students. The academic success of the school along with its approach to 21st century learning qualified the school participation in this research study. The researcher recognized that a trilingual, global approach would provide helpful data for the study.

**Themes**

This section presents the themes that emerged from data analysis of the participant responses to the interview questions, observation notes, and collected
documents. The data were coded by color and analyzed with the following themes emerging:

1. Integration of a 21st century skills and a rigorous core curriculum
2. Student engagement and empowerment in their own learning
3. A clear vision supported by all stakeholders and strengthened through collaboration
4. Freedom to develop their own curricular focus
5. Assessment measured instruction including 21st century skills
6. Flexible and dynamic classroom instruction and use of classroom space
7. Education focused on the whole child

Each theme is analyzed in the following sub-sections.

Theme 1: Integration of 21st Century Skills with a Rigorous Curriculum

An effective 21st century education involves the integration of a deep, rigorous curriculum integrated with important 21st century themes and learning skills, such as collaboration, creativity, critical thinking, and communication (Kay, 2010). Some educators incorrectly believe that 21st century learning emphasizes 21st century skills over content (Rotherham & Willingham, 2010). None of the frameworks explored in the literature review of this study, supported this view. Most frameworks had an all-encompassing vision for 21st century learning that clearly emphasizes core subjects, 21st century themes, learning and innovation skills, information, media, and technology.

The three California schools in the study all practiced the integration of core content and 21st century learning themes and skills to create a well-rounded 21st century educational program. Each of the three schools integrated 21st century skills and content
through a specific approach and careful design and planning. This practice stemmed from the challenge of meeting curricular demands, as well as teaching 21st century skills within the boundaries of the school day. Rotherham and Willingham (2010) identify key components in integrating core content and 21st century skills:

1. Educators and policy makers must ensure that the instructional programs complete and that content is not shortchanged.
2. Skills and knowledge should not be separate but rather intertwined.
3. Teacher training in designing student-centered work is essential.
4. Time for teachers to collaborate and design units that integrate both skills and content is essential.
5. Assessments are needed that can accurately measure richer learning and more complex tasks.

At each school site, the researcher observed carefully designed instruction that integrated a rigorous core curriculum with essential 21st century skills. This researcher used the P21 Framework (Appendix A) to identify the key components of 21st century learning: Core subjects, 21st century themes, learning and innovation skills, informational, media, and technology skills, and life and career skills. The researcher used the 21st Century Protocol Observational Tool (Appendix B) to identify key components through classroom observations at each site. At each site, the researcher observed a minimum of five classrooms for 15 to 20 minutes, providing a snapshot of daily instruction at the site. Additionally, the researcher combined the data from the observations with the data form the interviews, which were based on the interview portion of the 21st Century Protocol
(Appendix B), in addition with artifacts from each site. Figure 2 reflects the 21st century learning that emerged from the triangulation of the data.

![Table]

**Figure 2.** Observed 21st century education skills.

**Inquiry–based learning.** Each of the three sites applied a child-centered, constructivist philosophy into their programs, which promoted student curiosity. Inquiry-based learning, which Barron and Darling-Hammond (2008) define as authentic learning tasks as opportunities for students to participate in lessons that foster curiosity and require students to construct and organize knowledge, consider alternatives, engage in detailed research, inquiry, writing, and analysis. Inquiry-based learning includes specific approaches such as project-based, problem-based learning, and design thinking. Inquiry-
Based learning programs were an important component of School A and School B and to a lesser degree at School C.

School A applied a project-based approach that was the dominant focus of the curriculum. Projects were initiated by student and or teacher interest and then carefully crafted to integrate content standards and 21st century skills. The projects were very diverse in their structure, length, and product. Leader A stated:

Project-based learning provides students a transformative experience by allowing students to experience content deeply and in a new way. Projects can be based on a problem or on other things such as the answer to an essential question such as, what is risk-taking? Products can be all different creations like art, poetry, stories, presentations, fun investigations, or specific products such as cardboard boats or derby cars.

Much of the research on project-based learning supports it as an effective way to provide a deeper understanding of material. Research on project-based learning shows that factual learning is equivalent or superior to students who learned material in traditional formats (Marzano & Heflebower, 2012; Thomas, 2000).

Additionally, School B also fostered inquiry-based learning in two major ways at the elementary level. First of all, School B applied a constructivist philosophy and a thematic approach. According to Leader B:

Children play an important role in developing curricula through project-based themes and are encouraged to explore individual areas of interest. This thematic approach provides powerful experiences as students are directly invested in the intellectual process and have a meaningful connection to, and mastery of,
Secondly, School B integrated design thinking, as early as the kindergarten grades. Design thinking was infused into the themes as well as explicitly taught through separate projects. According to Teacher B1:

The power of design thinking comes from practicing and gaining confidence in a variety of different types of thinking, which includes both mindsets and specific techniques, which foster creativity and critical thinking. Design thinking helps teach students to put one's own thoughts and preferences to the side, going for a deeper understanding as well as empathetically listening with both heart and mind to the needs and perspectives of others.

Some examples of design projects integrated into the program include a Cooperative Games Project in second grade and a Service Learning Fair in third grade. The researcher observed a fifth grade class working on health science project which in which they were redesigning or improving the Band-Aid. According to Teacher B1 and Leader B the project involved a partnership with Kaiser and evolves to the point where students meet a patient and use the design thinking process to help the patient have a better experience. Design thinking is based on the premise that children learn deeply when they asked to design and create an artifact that requires understanding and application of knowledge (Barron & Darling-Hammond, 2007; Gow, 2012).

School C also created an inquiry-based learning environment, to a lesser degree than School A and School B. School C had created an implemented a trilingual, immersion model where children learned content and 21st century skills in Spanish, Mandarin Chinese, and English. Furthermore, School C created thematic units and
infused a few projects, which contained a global or cultural component. For example, students at School C study a country in depth and create independent and collaborative projects based on the country. They demonstrate their learning and projects in a culminating, International Fair. According to Teacher C2, students used a design thinking approach when they participated and competed in a First Lego League (FLL) robotics competition this past year. The students had completed a design thinking project the previous year, based on reducing their carbon footprint, and then reapplied the process themselves to help them compete in the robotics challenge. Both Leader C and Teacher C2 commented that the school has moved to more inquiry-based strategies over the past three years. The shift to Common Core standards and the infusion of projects were important steps in infusing more 21st century learning skills. According to Leader C:

The shift to a more inquiry-based approach began when we realized teaching students in three languages was a great step in preparing them for the 21st century but it was not transformative enough to complete the vision. For the past three years, we have been exploring and taking steps in implementing inquiry-based learning.

This shift encompasses a deeper understanding of the content, integrated with 21st century skills, in the three languages taught at School C. Some next steps for School C include the infusion of global projects with sister schools in Spain, Mexico, Taiwan, and China. According to Teacher C1 – Projects with other classmates and international friends help build critical global, 21st century skills, while also giving students great opportunities to practice their language skills.”
According to Barron and Darling-Hammond (2007), successful inquiry-based lessons must meet complex criteria such as targeting key subject matter concepts, balancing direct instruction with inquiry opportunities, differentiating and scaffolding learning, facilitating learning among multiple groups, as well as creating assessments to guide and measure progress. They write, “Successful inquiry-based approaches require careful planning and the development of strategies for collaboration, classroom interaction, and assessment” (Barron & Darling-Hammond, 2007, p.6).

**Direct instruction.** Trilling & Fadel (2009) view 21st century learning as a continuum between core content and some traditional practices such as memorizing math facts with essential 21st century skills and tools. Striking a balance between the two ends of the continuum is important for a complete education today. All three sites discussed the importance of a balance in varying degrees of direct, explicit, and targeted instruction with inquiry-based approaches to ensure there were no gaps in what they wanted students to know and be able to do. Director A, Teacher A1, and Teacher A2 all stated that the content and skills embedded into the projects need to fit naturally and not be forced. The skills and content need to emerge authentically, and some skills were so foundational, especially in the primary grades, that they need explicit instruction and practice.

According to Teacher A1, there are less traditional instructional approaches, such as direct instruction, in the upper grades. However, math is an exception because it is difficult to authentically infuse into the projects. Therefore, students in her fourth grade classroom learn explicit lessons in small groups and also use a technology-based program that targets and individualizes math instruction.

School B and School C also provide targeted, explicit instruction differentiated to
meet students’ needs. Both schools also used technology as an important tool in this endeavor. Both schools share the same philosophy of meeting students where they are academically and ensuring they continue to progress academically. Furthermore, School C found it necessary to provide direct instruction in order to correctly model proper language skills in the targeted immersion languages. Sarah Brown-Wessling states:

Twenty-first-century learning embodies an approach to teaching that marries content to skill. Without skills, students are left to memorize facts, recall details for worksheets, and relegate their educational experience to passivity. Without content, students may engage in problem-solving or team-working experiences that fall into triviality, into relevance without rigor. Instead, the 21st-century learning paradigm offers an opportunity to synergize the margins of the content vs. skills debate and bring it into a framework that dispels these dichotomies. Twenty-first-century learning means hearkening to cornerstones of the past to help us navigate our future. Embracing a 21st-century learning model requires consideration of those elements that could comprise such a shift: creating learners who take intellectual risks, fostering learning dispositions, and nurturing school communities where everyone is a learner. (Education Week, 2010)

**Maximizing instructional time.** When asked what challenges their schools faced, leader A, B, and C all mentioned not having enough time in the school day to accomplish everything. Instructional minutes were viewed as a precious resource. Teacher B2 stated, “Time is a very scarce resource. There is so much we want to do with our students, and it is very difficult to fit it all in.” All three sites wove 21st-century skills, primarily through their specific approach, into the core content on a daily basis. McTighe
and Seif (2010) encourage educators to carefully craft 21st century outcomes-based curriculum by planning both fundamental concepts of core disciplines with key, naturally occurring 21st century skills. They state that careful planning through backward, integrated design maximizes what can be accomplished in a short school day. Leader C noted that American students compete globally for jobs, with students in other countries, such as China and India, that have significantly longer instructional days and greater amounts of homework. Leader C commented:

American students need to maximize their learning during the school day. They must have the skills and knowledge to compete globally with students that traditionally spend greater amounts of time learning and studying. Each minute of the day must be strategically designed to integrate critical 21st century skills with important content.

**Theme 2: Student Engagement and Empowerment**

Most schools today follow a very traditional approach, which is teacher centered and provides students with a step-by step, standardized curriculum (Zhao, 2009). Zhao (2012) advocates that students be allowed to pursue their own interests and take responsibility for their own learning. He writes, “Only when children learn what they want to learn and take responsibility for learning and living can they stay truly engaged (Zhao, 2012, p.171).” The researcher noted in all classrooms visited, at all three sites, students were deeply engaged in their learning experiences, whether working individually or in small groups. Marzano (2007) defines engagement as more than just on-task behavior but the central role of student’s emotion, cognition, and voice which drives student learning. Barell (2010) describes learning experiences driven by real word
problems or by students’ natural curiosity, as naturally engaging opportunities for student learning.

**Student-centered learning.** Zhao (2012), writes, “Education must be designed around the child and be child centered. Good education should aim to meet each child’s unique needs, capitalize on each child’s strengths, and grant the child autonomy so he or she can take the responsibility for learning” (p. 156). A student-centered approach to learning was a common philosophy and practice in all three schools. Teachers viewed themselves as facilitators of learning, helping to motivate and guide their students through the natural learning process. Leader A noted that the teachers at the site really know their students and are committed to a learner-centered approach that supports and challenges each student. Teacher A3 viewed the projects as a way for students to discover and follow their passions. Teachers frequently design the projects around student interest and choices. This process shows students their opinions and interests are valued. Motivation and high level of engagement are then natural products of the learning process.

Teacher B3 had similar feelings about student learning at her site. “Students are empowered to take charge of their own learning, taking responsibility for themselves and others.” Students are encouraged to pursue their own passion, creating a new skill or talent. Some examples include designing and building a product, writing an app, or designing a way to make dialysis less expensive. Students choose what they want to pursue, and then exhibit their passion-based projects in a special event.

**Risk-taking.** Findings at School C demonstrated similar challenges for students. Students at School C face great challenges every day as they strive to learn content in
three languages. As native English speakers, students are completely immersed in Spanish and/or Mandarin Chinese. As students are immersed in languages, they learn to take risks naturally and at a very young age. According to teacher C3, when students face new challenges and are nervous, she reminds them that they faced similar feelings when they were younger and began to learn in Spanish and Chinese. This type of encouragement gives students additional confidence in risk taking.

McTighe and Seif (2010) describe 21st century classrooms as encouraging students to take risks as opportunities to grow. They describe opportunities for students to ask questions, offer ideas, discuss their thoughts, give each other feedback, and sharing thoughts and opinions. They describe teachers as models of reflective process. Leader B described her school’s philosophy on risk-taking:

When children feel freely empowered to make mistakes and ask questions, receive and give honest feedback, there is greater learning, and greater capacity for taking future risks and facing new or difficult challenges.

According to Teacher B2 students at School B are GATE students, and they often prefer to avoid a challenge if they fear they might not be successful. Perseverance is an important attribute that the School B tries to foster in their students.

**Feedback.** At School A, the school culture also promotes risk-taking and considers feedback an important part of the risk-taking process. Teacher A3 described risk-taking, as the courage students need to face their fears, especially their fear of failure. Providing students with on-going feedback can make students uncomfortable. She describes a process called “critique” used at the school, which provides students with important feedback and helps them discover that making mistakes is part of the process
of creating “beautiful work”. Even kindergartners are taught to receive and give a “critique”. The culture of the school teaches students to be reflective, using critique to improve their work. According to Teacher A1, teaching students this process gives students the confidence to persevere. She states that, “Critique and reflection helps kids develop a growth mindset.”

The design thinking process practiced at School B has an iterative component. Students evolve their projects in order to continuously improve them. Students give and receive feedback on a regular process even in kindergarten. According to teacher B3, “Students are taught to focus on the process more than the content and the product. Feedback and reflection are viewed as very important parts of the learning process.”

**Resiliency.** According to Dictionary.com (2013) the definition for resiliency is the ability to recover or bounce back from change, adversity, or the like. The data showed that developing resiliency was a very important goal at each site. Wagner (2008) describes agility and adaptability as necessary survival skills in the global workplace. He states that employers today look for workers who are flexible, open to change, reflective and comfortable with failure (Wagner, 2008, p. 33). According to Leader A, students working on projects naturally develop resiliency because they develop the ability to analyze for pros and cons, view issues from different perspectives, develop a flexible position, incorporate feedback and ideas from others, collaborate and cooperate, and discriminate and discern important information.

The 21st century approaches employed at each site, challenge students and increase student-learning outcomes in both content and 21st century skill sets. The 21st century skills highlighted by the various approaches often push students beyond their
comfort zones and foster risk-taking. Student resiliency results from the process of facing challenges, receiving feedback, adapting as needed, and reflecting.

**Theme 3: A Clear Vision Supported by all Stakeholders and Strengthened Through Collaboration**

According to McTighe & Seif (2010), vision and mission statements should include 21st century outcomes. Effective vision statements should overtly articulate 21st century knowledge and skills, habits of mind, and personal qualities to be developed. Developing a clear mission and vision for 21st century learning is an essential component for today’s schools (DuFour & DuFour, 2010). At School C, stakeholders including parents, staff, and students helped to develop the vision for the school. The resulting school’s motto is “Creating tomorrow’s global leaders today.” According to Teacher C1, students at the school are very aware of the vision and mission of the school, but in a very natural way. They don’t articulate the motto word for word, but they are able to express the sentiment in their own words when asked. “They know why they are at the school and why they are learning three languages.” Leader C shared how a common vision drives staff, students, and parents at the school to work hard every day.

At School A, common expectations for learning that value 21st century skills, the integration of hands and minds, and the merging of academic disciplines are articulated to all stakeholders. The strong mission and vision of the school is driven by five qualities that are encouraged and developed by stakeholders. The five qualities are: (1) act confidently, (2) have integrity, (3) be empathetic, (4) be reflective, and (5) be curious. Staff models these qualities daily, so that students are empowered to do the same.
**Peer collaboration.** The P21 (2009) states that the environments best suited to teach 21st century skills support PLCs that enable educators to collaborate, share best practices, and integrate 21st century skills into classroom practice (DuFour & DuFour, 2012). Peer collaboration was a critical component of School A’s professional development plan. Teachers A1, A2, and A3 all felt that the collaboration time they were provided was critical to the success of the program. The teachers felt the time was necessary in order to plan the projects in a high quality way. Furthermore teachers could ask for “project tunings” as they needed. In project tunings, teachers come together to help each other evolve and improve the projects. According to teacher A2, project tunings greatly helped her improve her projects based on feedback from her peers. Since students often choose the topics for the projects, Leader A felt it was critical that she provide adequate time for grade level teams to design high quality projects, which integrate important content and 21st century skills.

Wagner (2012) advises educational leaders create an environment where teachers work in teams. He cautions that isolation is the enemy of improvement, and that leaders need to create as many opportunities as possible to give teachers time to work together. This important collaboration will help teachers to develop opportunities and environments for 21st century learning. Wagner points out that countries, such as Finland and China, which consistently outperform America in international assessments, provide far greater amounts of collaboration time for their educators. American teachers spend close to double the time in the classroom working in isolation, compared to teachers in these two countries (Wagner, 2012).
**Growth mindset.** Among all three schools the leaders and teachers shared a desire to continue to learn and grow as professionals. Leader B referred to the process as personal learning development and Teacher A1 referred to the process as a growth mindset. Teacher A1 commented that when leaders encourage and model a growth mindset, it helps foster that mindset among all stakeholders from staff to students.

Leader A shared her own desires to continue to learn more about project-based learning in order to improve as an instructional leader. Assessment for projects and 21st century learning was an area she felt she needed personal development. Teachers A1, A2, and A3 commented on the numerous opportunities for personal development. Teachers at School A are encouraged to follow their own personal learning based on their interests and passions. At school A, a group of teachers had recently visited schools in England, which were applying a project-based, 21st century approach. The teachers all shared that the experience gave them great personal growth and allowed them to make large strides in their own personal development. Furthermore, teachers were encouraged to take next steps in their personal learning through classes, conferences, and workshops supported by the charter organization.

Leader C discussed her own personal development over the past five years, as she strived to learn all she could about language immersion and 21st century learning. She referred to collaborating with language learning experts, and using their expertise to guide and mentor her as she evolved the trilingual program. Leader C shared a desire to further develop her learning in the area 21st century learning and language immersion.

**High level of parental investment and involvement.** According Watson, Murin, Vashaw, Gemin, and Rapp (2013), schools of choice like charter schools, offer parents a
unique form of involvement from the time they decide their child will attend the school. The data revealed that parental investment and parental involvement were both important factors in the culture of all three schools. School C transitioned from a traditional school to a world language immersion school because a parent group advocated for the change to the district school board. Leader C stated that parental investment was the common denominator among the ethnic, geographic, level of education, and socioeconomic differences of her school’s families. All three leaders maintained an “open door” policy to families and volunteers. Parents were viewed as an important resource at all three sites.

All three schools had parental representation on oversight committees, such as their school boards, steering committees, and school site councils. Parents were viewed as important stakeholders who supported the mission and vision of the school. Leader B noted that she provided on-going parental education of the various school programs and evolving practices. By doing so, she kept parents informed of practices, which varied greatly from the practices they had experienced as children. For example, School B does not assign their students grades or rank their students in any way. Students are provided narratives three times a year, which reflect student progress towards individualized goals. This is a paradigm shift for many parents, and providing them information of the benefits of this practice keeps them supportive of the school.

**Theme 4: Freedom to Develop Their own Focus**

Zhao (2012) warns that education may continue towards homogenization, even with the adoption of Common Core standards. He states that homogenization is achieved through three interconnected measures implemented by national control of what children
should learn: (a) identification of core subjects (b) the development of centralized curriculum standards and (c) the use of high-stakes testing to enforce standards of core academic subjects (Zhao, 2012, p.27). Zhao (2012) even warns against global homogenization with nations wanting to improve their ranking on PISA scores. Zhao questions where important qualities such as right-brain directed skills including design, symphony, and empathy (Pink, 2005) fit into the homogenization of education.

The researcher identified freedom to develop a focus and a curriculum as an important theme, which emerged from the data. School B had the greatest autonomy and freedom to create their focus, curriculum, and assessment. As an independent school, School B was not tied to any national mandates, curriculum, or high stakes assessment. School B did have oversight from a Board of Trustees and accreditation requirements from the Western Association of Schools and Colleges (WASC). Leader B shared that the school had a great deal of autonomy and flexibility and they were able to design and evolve their curriculum. The school had a fifty-year history of having this type of autonomy. School B did not have the same accountability measures as School A or School C, but students take a yearly, national assessment and have historically performed well. The assessment is an independent school assessment called ERB, which is not an acronym but the name of the test. Since students at School B historically perform well on this assessment, Leader B and the staff feel the students are receiving the essential knowledge required for college preparation through their approach to education. Therefore, the focus of the school continues to be shaped by visiting speakers, such as Daniel Pink, collaboration with educational partners such as Stanford University’s “
dschool”, as well as partnerships and collaboration with innovative companies in Silicon Valley, which surround the school.

As a charter school belonging to a strong group of charter schools, School A had flexibility and autonomy to provide a project-based approach for their students. School A has oversight from a school board and follows WASC accreditation guidelines, but as a public school they are also expected to follow national and state standards, and students at School A are expected to take national and state assessments outlined by NCLB. Therefore, School A faces potential sanctions and limitations placed on the focus and curriculum of the school if the school falls into Program Improvement (PI) status, which occurs if the school does not meet the targeted growth each year for its entire school and each identified sub group. Leader A fears that since the philosophy of the school is not to teach to the test, in the future the school may fall into this category. If that were to happen the fear is that School A would be mandated to follow a prescribed curriculum, and no longer be allowed to follow a project-based approach. The staff would most likely have to follow prescribed curricula instead of designing amazing projects that infuse content with important 21st century skills.

School C had the least amount of autonomy as a district, public school. The school follows the overall district plan but does so by teaching content in three language, Spanish, Mandarin Chinese, and English. Furthermore, the school started infusing inquiry-centered learning projects at different grade levels. The school is also required to meet its yearly, increasing state mandated growth goals for the entire school and each of its subgroups. Leader C shares similar fears to Leader A. According to Leader C:

We play the game to a certain degree so we are free to continue to evolve our
program to give our students what we know they will need to be successful as
global citizens. Therefore, we are careful and monitor our students’ progress
towards state defined goals, by keeping a close eye on progress in all three
languages, and asking our parents to help make sure students practice English,
tested skills at home.

Stakeholders at School C are aware of the potential sanctions that could arise from falling
into “Program Improvement” status. According to Teacher C3, the very real fear is that
the state government will not allow the school to teach in three languages and mandate
instruction is in English only. She accredits the success of the school’s program to the
autonomy that the school and the teachers have to create the program they envision. “We
have been given a great stage, and the freedom to design what we feel works, and the
flexibility and support to make it happen. It would be a great tragedy if that was to be
taken away!”

**Theme 5: Assessment Measured Instruction Including 21st Century Skills**

The researcher discovered that the need for assessment, which measured both
knowledge and 21st century skills, was a common theme among all three schools.
Practicing ways to measure the rich curriculum and 21st century approaches to learning
was important, and on-going work at all three sites. All three leaders stressed this
component as a major challenge each school faced. Each site took different approaches
to their assessments, based very much on their approach and philosophy of learning.
School B followed a no grades philosophy for it students all the way through the fifth
grade for the lower school, and eighth grade for the middle school. Leader B stated that
their new high school would follow the same philosophy through the tenth grade, but that
in the eleventh grade they would need to assign grades for transcript purposes and college entrance requirements. Grades at School B are narrative and based on student goals and progress towards those goals. Goals include academic progress but also reflect emotional and social learning, collaboration and cooperation skills, and creativity. Students frequently exhibit their talents and design thinking projects, and reflect on their own leaning and goals.

School A does provide their students with grades in a reporting period, based on content and skills learned, and the quality of the process and product in their projects. Leader A stated:

The quality of the project tells you a lot about what a student has learned. It shows us what they understand and how they are able to apply their new knowledge. Listening to a child present what they understand, what they have created, and their reflections of their process is a great indication of their learning. A student may reflect on what I knew then is this… and what I know now is this. Furthermore, listening to groups as they talk and work on their projects gives great insights into their learning. Teachers can assess the vocabulary they are using and the depth of their understanding, as well as their creativity, collaboration skills, and their work ethic.

Leader A went on to describe a project where second grade students created go carts, as simple machines, which they ultimately raced and timed while completing a designated course. One teacher asked a student how do the cars go and the student stated that the go-carts were on an inclined plane. The student even gave the teacher a look as if to say, duh – don’t you realize the cars are on an inclined plane. That type of experiential
knowledge is not easily captured and translated into an assessment. Leader A stated that it takes a lot of human capital, where adults invest a great deal of time and energy, measuring student learning.

Teacher A1 shared the learning that is demonstrated in student-led conferences is performance-based. “Students develop projects, solve problems, and write reflections of their findings. Students are given traditional weekly exams and tests sparingly. The measure of accomplishment lies primarily in the students’ ability to explain or demonstrate his/her learning from the beginning of the project to the end.”

Leader C shared that assessment at School C, was fairly traditional but had the added component of assessing three languages as well as the knowledge and skills that were learned. Standards-based report cards are used but addendums reflect language targets and student progress towards those language targets. Student led conferences are utilized in the upper grades and students have digital portfolios of their language progression and projects. The school has a strong technology component and digital portfolios also demonstrate students’ progress in their technology and communication skills.

**Theme 6: Flexible and Dynamic Classroom Instruction and Space**

All three sites shared a similar philosophy regarding flexible and dynamic classroom space and/or instruction. School A and School B both had well designed physical spaces which supported student learning. At School A and School B classroom walls are moveable, so groups of students can work in small groups or large groups. Both sites also have a large engineering space where students can design and create
products. Student work is created and displayed for audiences throughout both schools. Both schools also have designated spaces for classes in the visual and performing arts.

At School A, all classroom furniture is specifically selected to meet the needs of growing students. The floor plan was intentionally designed for teams of three teachers at each grade level, who plan collaboratively on projects. Shared spaces throughout the building allow for older students to mentor younger students in a variety of structured activities. Teacher A3 shared that classrooms are noisy, with lots of resources being used while students collaborate and work comfortable to develop their project. Some students might be at tables and in chairs with others scattered on the floor. The flexibility and adaptability of the space helps foster an environment for collaboration and creativity, which is critical for effective project-based learning.

School B’s physical environment is critical to creating a space where students can thrive as they use design thinking to create and share their ideas. The engineering lab allows students the space to create numerous prototypes and evolve their projects as needed. The instructional flexibility allows students to each work at their own individual pace. Flexibility is crucial for gifted children, who often have areas of significant strength and other developing areas. Teachers nurture individual strengths and areas for continued growth by tapping into children's passions and interests. While teachers guide coursework and cover skills, students take charge of their learning processes and challenge themselves to go as far as they can. There are no boundaries to student learning. Teacher B1 shared that some students work up to five years above grade level in certain disciplines.
School C was housed in a much older facility and did not have the same flexible learning space as School A and School B. The school had been given a strong technology infrastructure upgrade, but lacked a modern, flexible facility. Furniture was frequently moved and teachers used what they had to create flexible learning spaces in their rooms. Of the three schools, School C had the greatest variety of technology. Leader C envisioned a future space where students could work and collaborate with other students globally around high quality projects. She was searching for partners that could help her fund and create such a space.

Technology was viewed as an important tool at all three sites. Leader A stated that technology was not the focus of the projects but a means to research and present. Fisher and Frye (2010) state: “focusing on the tool at the expense of the purpose means that we shortchange our students. We risk failing to prepare our students to be 21st century learners who can adapt to new technology because they understand the collaborative, cooperative, and communicative purposes that underlie the tool” (p. 223). All three sites used a great variety of technology tools for students to use to further their independent academic progress, as well as for research and presentation. All three sites also explicitly taught students how to use various software and programs to help them have greater access to the potential of each tool. Leaders and teachers at all three sites shared the philosophy that technology was a very important tool, which helped students develop deeper understandings, individualized their instruction through differentiated levels and programs, and provided them the means to research, design, create, and share their learning.
Theme 7: Educating the Whole Child

All three sites shared a strong constructivist approach, which fostered the education of the whole child. Strong evidence emerged from observations, interviews, and artifacts of the following commonalities in each sites’ attempts to provide a well-rounded education: The Arts, leadership and character development, social and emotional learning, fostering of 21st century skills, service learning, empathy and cultural understanding.

School B has a strong commitment to nurturing the whole child. The school has an excellent reputation in the area of Social-Emotional Learning, which plays an integral role in the curriculum at every grade level. School B encourages students to examine their own thoughts and actions and to be sensitive to others’ feelings and needs. School B’s philosophy describes, “Through the context of guided activities and peer feedback, students are provided the tools to be successful within the interpersonal domain, as well as to develop personal resiliency and awareness in the intrapersonal domain.” In the literature review of this study, it was noted that the NRC identified three important domains of 21st century learning: cognitive, intrapersonal, and interpersonal. Fostering an environment of social and emotional well-being is fundamental to 21st century learning (NRC, 2011b). Furthermore, the design thinking approach utilized at the school teaches students a great deal of empathy for others. Students use the design thinking projects to create solutions for those in the community around them. An example is a health project, in partnership with Kaiser Permanente, where students interview patients and learn to empathize with their struggles. Through the design thinking process students create solutions to help ease discomfort for the patients they are trying to help.
School C utilizes the *Leader in Me* and Covey’s *Seven Habit for Elementary Kids* program for its students. Leadership is an important goal for the students at School C. Each fourth and fifth grade student applies for a job on the campus by creating a resume, applying for a position, and interviewing for the position. Students take great pride in their positions, such as being on the Tech Team, the Green Team, Ambassadors, etc. Furthermore students at School C study different cultures and cultural perspectives, as well as the three languages they study. Students at School C, regularly interact with guest intern teachers from around the world, as well as with students in sister school programs. School C emphasizes global interactions and understandings, to teach their students the importance of understanding and appreciating cultural differences. For success in the global, 21st century, linguistic and cultural communication is an essential skill (Zhao, 2012).

Furthermore additional programs, beyond the specific 21st century programs, helped develop foster 21st century skills. For example, the arts were an important discipline at all three sites. Each school has infused high quality, visual and performing arts into their programs. The arts are important in fostering important 21st century skills such as creativity. The arts are frequently cut out of school programs, as schools narrow their curriculum to increase performance on standardized assessments. According to Zhao (2008), having a strong arts program helps American students develop an innovative and creative edge when compared to schools in China. Each site provided a well-rounded program which moved beyond the specific 21st century approach and offered an overall environment which fostered important 21st century learning.
Chapter Summary

In Chapter 4, the researcher has presented findings from data analysis of the participant interviews, observation notes, and relevant documents. The chapter contained summaries of the data collection and data analysis processes, descriptions of the participating schools. The following themes emerged from data analysis:

Integration of a 21st century skills and a rigorous core curriculum, student engagement and empowerment in their own learning, a clear vision supported by all stakeholders and strengthened through collaboration, freedom to develop their own curricular focus, assessment measured instruction including 21st century skills, and flexible and dynamic classroom instruction and space.

When comparisons were made between all three schools and the Partnership for 21st Century Learning Framework (Appendix A), there were many consistencies and some differences that emerged from the data. Each of three schools philosophically believed that preparing their students for success in the 21st century was a very important focus for their school. Each school followed a different approach, with School A following a project-based approach, School B following a design thinking approach, and School C following a world language immersion approach. When the researcher studied the data from each site and compared each school with to the Partnership for 21st Century Learning Framework (P21 Framework, Appendix A), Figure 2, it became evident that all three sites had strong 21st century programs in place. The researcher had anticipated that each approach would emphasize specific 21st century skills. For example, the researcher thought that the project-based school would have a strong emphasis in critical thinking and collaboration, the design thinking approach would have
a strong correlation to creativity and collaboration, and that the world language approach would have a strong emphasis in communication and global competence. What the researcher discovered was that each site had moved beyond the specific educational approach and had implemented a well-rounded, 21st century program. Instead of discovering only one or two 21st century skills emphasized at each site, the findings showed that all three sites had a solid foundation in almost every skill, and theme listed in the P21 Framework (Appendix A).

Furthermore, the data showed that each site had carefully integrated the core content with 21st century themes and skills. Careful and strategic design allowed all three schools to strike the balance between content and 21st century learning, within the restraints of the short school day. High levels of student engagement were byproducts of well-designed programs, which were student-centered and motivating to students. Time for collaboration and feedback was very important to the quality of the program at each site. Each site also shared a strong growth mindset in their efforts to improve their own knowledge of 21st century learning and assessment.

Autonomy for each site to design their program was an important finding, which emerged from the data. All three schools emphasized the importance of autonomy in developing a common 21st century focused, child-centered vision. However, each site had different levels of autonomy based on their school structure. For example, School B, which is an independent school, had the greatest autonomy to follow their vision. School A and School C feared possible testing sanctions and mandates as potential outcomes of standardized testing. School C had the least autonomy as a district, public school and
feared possible mandates and sanctions, not only from the state, but also from the district if they did not continue to perform well on mandated state assessments.

Assessment for 21st century learning was another important finding, which emerged from the data. Each school followed very different approaches to their assessment just as they followed different approaches to their programs. School B had the most authentic approach to student assessment. Students were not given grades or rankings; instead students were given a narrative based on their individual goals and performance. The assessments were designed to help reinforce hard work, resiliency and risk-taking as important qualities for 21st century learning.

While students in School A were assigned grades, the grades were based on authentic assessments, which measured the project process as well as the product. As in School B, School A’s assessments were designed to encourage risk-taking, resiliency, and a growth mindset. School C had the most traditional assessments of the three sites. Due to the trilingual nature of the program, their focus was on integrating standards and language targets and reporting results to students and families. As they adopt more of an inquiry-based approach, they hope to have the autonomy to develop more authentic assessments that integrate knowledge, 21st century skills, and language development.

Finally the data showed that all three schools applied a constructivist approach, which was designed to educate the whole child. Important components included an integration of the visual and performing arts, character development and leadership, empathy and service learning, communication and global competence, and social, emotional and cooperative learning skills. Risk-taking was an important component for
all three schools, and in all three schools very young students were challenged in a
developmentally appropriate way.

In Chapter 5, a summary of the study will be provided and the findings examined through the lenses of the research questions and the literature. The chapter will conclude with a discussion of implications for practices and recommendations for further research.
CHAPTER 5—DISCUSSION

The United States educational system is in a pivotal point, one in which major discussions regarding how to prepare students for the workplace are common from school sites to the White House. The Secretary of Education and many Governors believe that the development and implementation of the National Common Core Standards are an important new step for American schools. According to the California Common Core website (Common Core State Standards Initiative, 2010), “The standards are designed to be robust and relevant to the real world, reflecting the knowledge and skills that our young people need for success in college and careers. With American students fully prepared for the future, our communities will be best positioned to compete successfully in the global economy.”

Zhao (2012) articulates the significance of these national standards for American schools and views the Common Core as “an unprecedented journey- a journey towards a common, almost national curriculum” (p. 25). However, Zhao (2012) cautions that moving towards a national curriculum but keeping a traditional educational paradigm move students away from the skills they will need for success in the 21st century:

The traditional educational paradigm may have worked before but it is no longer adequate for the changed world. The efforts to develop common curriculum, nationally and internationally, are simply working to perfect an outdated paradigm. The outcomes are precisely the opposite of the talents we need for the new era. It is the wrong bet for our children’s future. (p. 45)

Wagner (2008) also writes of the demands of 21st century employers and the new skill sets students will need. This new demand has challenged U.S. schools to look beyond the
current mandates of federal and state accountability. While students will need a rigorous, core curriculum, which the Common Core addresses by adding “depth and complexity”, they also need additional skills such as creativity, collaboration, communication and global competence. According to the P21 (Kay, 2010), “A 21st century education must be tied to outcomes, in terms of proficiency in core subject knowledge and 21st century skills that are expected and highly valued in school, work, and community settings” (p. xxi). While the Common Core will help strengthen the core curricular foundation it does not address other important 21st century skills outlined in the Framework for 21st Century Learning (Appendix A). For example, Common Core does not address innovation, collaboration, or creativity skills. According to Kay (2010), these 21st century skills are rarely incorporated deliberately throughout the curriculum, nor are they routinely assessed. The status quo relegates these skills into the “nice to have” rather than the “must have” domain in education.

As different states and districts adopt the Common Core curriculum, they must also look toward integrating other critical 21st skills into the school day. The purpose of this study was to identify the similarities and differences in implementing 21st century learning skill sets in three different California elementary schools utilizing different approaches. A secondary purpose was to glean lessons from each employed approach. The previous chapter detailed the findings and analysis of the data collected in this study. This chapter summarizes the overall study and the results implicated by the data. Implications for teachers, principals, and policy makers are then discussed, followed by the practical recommendations. Finally, the limitations of the study are delineated as well as recommendations for further studies.
Summary of the Study

A review of the literature revealed the importance of 21st century skills and the need for American schools to move beyond the narrow skills fostered by standardized testing. Furthermore the review of the literature revealed that there was limited research examining educational approaches to preparing students for the 21st century. Even less research focused on providing elementary school students with a 21st century skillset. In order to understand different approaches to designing and implementing programs focused on 21st century skills, the researcher conducted a comparison of three California elementary schools, each employing a 21st century focus through a different approach. The intent was to identify various approaches implemented at the elementary school level that might contribute to the body of 21st century educational research in general. This study’s literature focused on the recent history of the American educational system, examined the need for 21st century skills, explored required student-learning outcomes for the 21st century, and examined three approaches to 21st century learning. The review of the literature relative to 21st century learning summarized the researchers’ findings regarding the need for 21st century learning skills, focusing on the skills of collaboration, critical thinking, communication, and creativity. Furthermore, the review summarized researcher’s findings regarding possible approaches to 21st century learning including design thinking, project-based learning, and world language immersion.

A qualitative research design with the tradition of phenomenology was chosen as the most appropriate approach for the study. Data were collected from interviews of principals and teachers, classroom observations, and relevant documents including school mission and vision statements, School Accountability Report Cards, site plans,
curriculum maps, and PLCs schedules and notes. The researcher conducted an in-depth examination of what was occurring at each site and phenomena related to each 21st century approach at each site by exploring school leaders’ and teachers’ experiences, instructional philosophies and practices, and their reflections. Furthermore the researcher compared and contrasted all three sites and approaches, identifying benefits as well as challenges experienced by both principals and teachers.

The study, which compared three elementary schools in California, examined principals’ and teachers’ experiences designing and implementing programs with a 21st century approach and focus. Similarities and differences in philosophies and practices between educators at all three sites were presented using descriptions from the three leaders and nine teachers interviewed, and from observations of practice, and examination of artifacts. The study was undertaken as an emerging process, allowing the findings to emerge from the data.

Analysis of the qualitative data gathered during this study resulted in identification of several themes. The themes are described later in this chapter. The themes were then cross-referenced with the research questions.

In this study, each elementary school had a different designation: district public, charter, or private. Each site was also considered in strong, academic standing as identified in the definition of terms in chapter one. Furthermore, each site self-identified as providing a 21st century focus and each site followed a different 21st century approach: world language immersion, design thinking, or project-based learning. The data showed that all three sites integrated the core content with 21st century skills and themes. The researcher then compared the data from each site to the Framework for 21st Century
Learning (Appendix A). Each approach emphasized specific 21st century skills: project-based learning emphasized critical thinking and collaboration, design thinking emphasized creativity and collaboration, and world language immersion emphasized global competence and communication. While each approach emphasized specific skills, most 21st century skills and themes, identified by the P21 Framework (Appendix A), were evident and embedded in practice at all three sites.

A clear purpose and goals were evident at all three sites, with each leader commenting on the importance of having the freedom to follow his/her site’s collective vision. Curriculum, professional development, and collaboration all supported each school’s vision. Furthermore, students were empowered to fulfill the vision and highly involved and engaged in the learning process at all three sites.

Discussion of the Findings

Four research questions guided this study’s analysis of three elementary schools’ approaches to 21st century learning:

1. What does 21st century learning look like in three elementary schools, in strong academic standing, self-identified as employing 21st Century learning skills?
2. What educational approaches were used to implement 21st century learning skills?
3. How did these schools align with P21 skills and competencies needed to prepare the students for today’s global economy?
4. How are these schools similar and how are they different?
a. What can be gleaned from the three sites and perhaps replicated on a larger scale?

The researcher collected data from in-depth participant interviews, artifacts, and classroom observations. The data were coded by color and analyzed with the following themes emerging:

1. Integration of a 21\textsuperscript{st} century skills and a rigorous core curriculum
2. Student engagement and empowerment in their own learning
3. A clear vision supported by structured collaboration
4. Freedom to develop their own curricular focus
5. Assessment measured instruction including 21\textsuperscript{st} century skills
6. Flexible and dynamic classroom instruction and use of classroom space
7. Education focused on the whole child

In the section below, the themes are aligned with the research questions.

**Research Question 1**

Research Question 1: What does 21\textsuperscript{st} century learning look like in three elementary schools, in strong academic standing, self-identified as employing 21\textsuperscript{st} century learning skills? In the case of all three elementary schools, it was immediately evident that these were not traditional elementary schools. Each site had a clear mission, vision, and goals that emphasized preparing students for success in the 21\textsuperscript{st} century. Many schools have similar visions, but it was evident that all stakeholders were invested in the vision because it was apparent in the day-to-day workings of the schools. Structured collaboration played a critical role in creating a positive learning environment.
at each site. Each site had developed mottos and mnemonics to help students internalize the cultural elements that were highlighted at each site.

Classrooms at all three sites were buzzing with child-centered learning. Students were actively engaged in the learning process. High levels of student engagement were evident and students were clearly motivated. Furthermore, students were empowered and noticeably involved in their learning process. At times students worked in large groups, and at other times they worked in smaller groups or individually. At two of the sites, classroom space was flexible and dynamic. Partitions could be used to create smaller spaces within the larger rooms. Technology was an important tool, which was used in numerous ways and for various purposes at all three sites. The findings from the three schools aligned with what the literature revealed. According to Darling-Hammond (2010), students learn more deeply when they can apply classroom-gathered knowledge to real-world problems, and they are more engaged when they are involved in projects that require sustained focus and collaboration.

Site leaders and teachers at all three sites philosophically believed that 21st century learning skills were of great importance to the future success of their students. Site leaders and teachers at each school strove to fulfill the important visions and missions of their school. Furthermore, they made sure that the students, even the youngest, were aware of the purpose of their daily work and that they were active and involved in their own learning process. Students’ interest and passion were important factors in student learning, as well as flexibility and student choice. These practices were embedded in the daily instruction of each site, resulting in high levels of student engagement. This finding is consistent with the research on the brain and learning.
According to Wolfe (2010), student learning improves when expectations and real world purpose are made clear for the student. Furthermore, students were encouraged to take risks, give and receive feedback, and reflect on their own learning process and products. Additionally, these findings are consistent with the literature reviewed in this study.

According to Barell (2010), well-planned, inquiry-based learning experiences engage students, increase their curiosity, encourage them to ask good questions, involve them in meaningful research, encourage them to draw conclusions and reflect.

Professional development and collaboration focused on the purpose and goals of the site. Leaders and teachers worked together to shape instructional units, projects, and lessons that integrated core content with 21st century themes and skills for each classroom and individual students. Time for collaboration was a precious resource, and critical to the design of the curricula at each site. Each participant was highly motivated and passionate about their purposeful work and had developed a growth mindset. At one site, each staff member had a personal learning development plan. The findings in this study confirms that American schools need more time for critical teacher collaboration and professional development, and that American schools trail other countries like China or Finland in providing such opportunities (Darling-Hammond, 2010; Wagner, 2008; Zhao, 2009).

**Research Question 2**

Research Question 2: What educational approaches were used to implement 21st century learning skills? Each of the three elementary schools applied one of three specific approaches: project-based learning, design thinking, or world language immersion. The specific approaches and 21st century skills were integrated with a
rigorous core curriculum at all three sites. Strategic planning and professional
development were key components shaping each site’s development of programs
integrating content and 21st century skills.

Data analysis revealed, at all three sites, that each administrator and all the
interviewed teachers were knowledgeable about the specific approach and the benefits of
integrating the approach with content to maximize 21st century student learning outcomes
for students.

The review of the literature examined each approach as a vehicle for infusing 21st
century skills into a rigorous core curriculum. The project-based approach emphasized
critical thinking and collaboration but also highlighted creativity and communication
while integrating core instruction through the projects. The design thinking approach
emphasized creativity and collaboration but also highlighted critical thinking,
communication and cultural competence through empathy while integrating core
instruction. The language immersion approach infused trilingual instruction with hands-
on learning. This approach emphasized global and cultural competence, communication
and collaboration, but also highlighted critical thinking and creativity while infusing the
core instruction in different languages and through the hands-on learning. At all three
sites core instruction also occurred explicitly outside of the specific approaches, as
needed, through direct targeted instruction. Another similarity found among the study
schools was the presence of strong commitment to a vision for 21st century education and
the belief that applying their particular approach would help achieve the vision for
students.
Research Question 3

Research Question 3: How did these schools align with P21 skills and competencies needed to prepare the students for today’s global economy? At each site, a rigorous core curriculum was integrated with a specific approach highlighting 21st century learning skills. This strategy at each site was intended to provide students with the important cognitive knowledge they would need as well as the ability to relate their ideas and responses to themselves and to others. At each of the three sites, students worked independently and collaboratively around specific challenges and had to navigate their learning through synthesis and collaboration with others. Marzano & Heflebower (2012) describe this type of integration as a development of both cognitive and conative skills. They describe conative skills as an ability to analyze situations in light of what one knows and how one feels and select appropriate actions. Marzano & Heflebower (2012) note the importance of both cognitive and conative skills for the success of citizens living and working in the highly varied and quickly changing knowledge economy of the 21st century:

The intrapersonal and interpersonal skills of understanding and controlling oneself and understanding and interacting with others in the 21st century will require students to combine their factual knowledge about topics, such as effective communication techniques, with their assessment of how they are feeling and choose the most appropriate course of action. (p. 10)

Each site was studied through the lens of the P21 Framework to determine which if any Framework skill sets and expectations were being addressed. Although, the findings varied at each site the following were consistent at all three schools: When data from
each site was compared to the P21 Framework (Appendix A), it was evident that each site had a strong foundation in all areas of 21st century learning, which moved beyond the expected outcomes of following a specific approach. Specifically, each site met all of the core subjects, most of the 21st century themes, all of the learning and innovation skills, most of the information, media, and technology skills, any of the life and career skills (even at the elementary level), and each site emphasized all of the components in 21st century education support system on the P21 Framework (Appendix A).

The data revealed that the schools had strong foundations in almost all areas of 21st century learning as identified by the P21 Framework (Appendix A). Darling-Hammond (2010) refers to the importance of this type of education. She writes:

The notion that we could take twelve years of schooling, and learn those facts and be done does not equip young people for the future. Twenty-first century students need a deeper understanding of the core concepts in the disciplines than they receive now. In addition, students need to be able to design, evaluate, and manage their own work. (p. 33)

Research Question 4

Research Questions 4: How are these schools similar and how are they different? What can be gleaned from the three sites and perhaps replicated on a larger scale? All three schools shared many commonalities, which emerged as findings from the data. Some of the commonalities include: (a) a child-centered constructivist philosophy (b) applying a specific approach which aligned with the overall 21st century philosophy (c) an integration of a rigorous core curriculum with essential 21st century skills (d) assessment which measured content knowledge and 21st century skills (e) a strong vision shared by
all stakeholders (f) the importance of a growth mindset, the need for high quality professional development (g) time for critically needed collaboration (h) flexible instruction and learning environments which help empower and engage students.

While there were many commonalities among the three schools there were also some fundamental differences. While all three sites were elementary schools, they were each a different type of elementary school: private, charter, and a regular public school. While all three schools had different designations, all three schools had an identified a common, important factor: the freedom to develop their own curricular focus allowing them to design their programs in order to accomplish their mission, vision, and goals. However due to the structure of each school, they all had different levels of autonomy and accountability to state and national accountability measures. School A and School C feared state standardized assessments would eventually interfere with their freedom to pursue their 21st century vision with their students. The independent school did not share the same fear. Autonomy to pursue a 21st century vision is an important finding that may have larger implications for all schools, whether they are independent, charter, or district-public.

Furthermore all three sites followed different assessment plans, which were designed to measure content knowledge, outcomes of their unique programs, as well as the specific 21st century skills. The independent school, School B, did not assign grades or provide any ranking of students. Traditional and authentic assessments were used to measure content knowledge and 21st century skills such as collaboration and creativity. Teachers and students provided narratives and reflections based on individual student goals instead of specific grades. School A, which was a charter school, used a balance of
traditional and authentic assessment to assign student grades in content knowledge and 21st century skills. Students presented projects at the end of each trimester to a panel, which helped to determine grades.

Furthermore, the independent school, School B, had a much higher student to teacher ratio, and greater resources for training and connections for professional development. Leader B shared that the additional resources allowed her staff to receive critical training and inspiration to pursue their work. She even shared that Daniel Pink had worked with teachers during a professional development. Investment for professional development for teachers at all schools is another important factor in helping schools achieve a 21st century vision. Hargreaves (2010) urges educational systems to focus on a long-term commitment to 21st century learning and learning globally from each other’s strengths and limitations. According to Hargreaves, the payoff would be enhanced economic competitiveness, as well as social justice and quality of life that complement that competitiveness.

**Implications for Teachers**

There is a general agreement in education, that one of the greatest factors of student achievement is having an effective teacher in every classroom. What it means to be an effective teacher today is rapidly changing. Teachers today need a 21st century mindset in order to prepare students for success in a global society. Based on data from this study, teachers must strongly believe in an educational vision, which prepares students for success in a rapidly evolving, global society. Additionally, a constructivist, student-centered educational philosophy emerged as a common attribute among teachers. Teachers need to be facilitators of learning, applying various techniques and strategies as
needed. At times, teachers can utilize an inquiry-centered, experiential approach, such as problem-based learning or design thinking. At other times direct instruction is needed to deliver targeted instruction to the whole class or a small group. Teachers can utilize technology as a powerful tool for delivering individualized instruction, as well as a tool for researching, developing, and presenting projects.

As shown in the study, teachers can promote a growth mindset for their students by encouraging them to take risks and accept feedback as part of the learning process. This can promote resiliency, which emerged from the data as an important attribute for students. Teachers can develop important 21st century skills in their students by encouraging them to work together, view issues from different perspectives, and cooperate with others to develop solutions and solve problems.

Teachers need time to integrate content and 21st century themes into carefully crafted units, projects, and lessons, which maximize instructional minutes. Study data revealed that teachers have a better chance of accomplishing this goal by engaging in teamwork and collaboration. By working together, teachers can help each other to not only to plan but to give each other feedback on a routine basis. Furthermore, teachers can serve as mentors and role models for students by adopting a growth mindset themselves as they participate in professional development and collaborate with others.

**Implication for School Principals**

As shown in the study the principal’s role is essential to creating and implementing a strong vision for education in the 21st century. Principals must understand what will be demanded of their students in the future. They should continuously study what students will need to know and be able to do to find success in
an ever-changing world. They must articulate this need and passionately advocate for that vision, even if it moves beyond district, state, or national expectations. Additionally, the study revealed that principals should navigate challenges, such as assessment and curricular mandates, with a “what-ever it takes attitude”.

As the data demonstrated, leaders can inspire all stakeholders to adopt a “21st century” mindset, so even young students understand and work hard to achieve the vision. Principals can create optimal learning environments to support the vision by searching for and maximizing resources. Moreover, principals can strategically align resources, such as professional development, time, and money, to focus on the vision.

Principals today are generally viewed as instructional leaders with strong expectations for quality instruction (Cotton, 2003; Gurr, Drysdale, & Mulford, 2006; Leithwood, Louis, Anderson, & Wahlstrom, 2004; Mullen, Gorden, & Greenlee, 2002; Spillane, 2006). As the study showed, principals should have high expectations and see themselves as role models and mentors for staff and students. Since students at all three sites were encouraged to work hard, take risks, accept feedback, and develop a growth mindset, the principals modeled the behaviors they expected.

The researcher believes that school principals can learn from the examples presented in this study, adopt some of the important qualities of the change leadership noted, and, more importantly, gain new insights for transforming their schools regardless of the obstacles. Based upon the data analysis, it is the researcher’s belief that leadership for 21st century learning requires courage, ingenuity, passion, and persistence.
Implication for Policy Makers

The study revealed that state educational policy had huge implications for two of the three schools in the study. The two public elementary schools in the study had less autonomy and resources to create 21st century learning environments for their students than the independent school in the study. Both principals of the public schools felt that they were at risk of not being able to continue their educational approaches of project-based learning and trilingual education because of potential sanctions and mandates from state assessments. The principal of the independent school was able to continue her vision for 21st century learning without the worry of state mandates and sanctions.

Currently, educational policy is at a critical turning point in the United States. The Elementary and Secondary Education Act expired in 2007, and in 2010 President Obama released a blueprint for reauthorizations, which Congress failed to act on in 2011 (Resmovits, 2012). Race to the Top and the Common Core National Standards are attempts to change the national educational landscape by creating a more rigorous core curriculum. These educational policies are designed to help students compete on an international level on assessments such as the PISA and the TIMMS. As a result of this study, it is the researcher’s belief that current and pending educational polices are not enough to prepare students for the 21st century; moreover, high success on the PISA and TIMMS both have an inverse correlation to innovation and entrepreneurialism (Zhou, 2012). The data from the study revealed that we must transform the way we educate and assess American students, or we will continue to produce students that lack the necessary qualities to thrive in a 21st century, global economy.
Recommendations

After reviewing all of the data gathered from the participants’ in-depth interviews, observations, and collected documents, and analyzing the data, and identifying the relevant findings, the researcher offers the following recommendations:

Infuse 21st Century Skills and Themes into the Current National Common Core Standards

The first recommended action is to infuse 21st century learning skills and themes into the current National Common Core Standards. This work could be done with a national movement to align the P21 Framework (Appendix A), with the National Common Core standards. Additionally, districts and schools would benefit from professional development in creating and implementing curriculum, which integrates core content and critical 21st century skills. Teachers should be given the adequate training and time to work together to create high quality units, projects, lessons, and assessments, and instructional approaches. Principals and schools should be provided with incentives and support to create instructional approaches that seamlessly embed 21st century skill sets.

Transform State Assessments to Include Authentic Assessment of 21st Century Learning Skills

As schools face varying amounts of potential sanctions and restrictions based on their performance of state and national assessments, it is critical that the government at the national and state level examine what is measured and how. The clear lesson from NCLB is that what is measured is taught, especially if outcomes are connected to severe sanctions and mandated curricula. Marzano and Heflebower (2012), Zhao (2012), Wagner (2012), Darling- Hammond (2010), Gardner (2010), Kay (2010), Fisher and
Frey, (2010), Reeves (2010), and Hargreaves (2010) all share the view that assessments need to transform in order to measure 21\textsuperscript{st} century learning. Reeves (2010) compares current assessment philosophies to a horse and buggy racing with the space shuttle. Reeves (2010) writes:

Thus, teachers and school leaders need a different set of tools to determine whether or not students are learning in light of 21st century essential skills. In particular, we need practical ways to assess students in the following three ways: 1) In variable rather than standardized conditions, 2) As teams rather than as individuals, 3) With assessments that are public rather than secret. (p. 306)

According to Hargreaves (2010) a missing element in assessment is the process by which both students and educators can develop and realize inspiring purposes of their own and engage in deeper conversations about student learning. Assessments that embed this type of process support and connect to transformational goals (Hargreaves, 2010, p. 341).

The current standardized assessment system, as well as the proposed changes to the current system, using computerized assessments aligned to the National Common Core Standards, is not enough to assess students for a comprehensive, 21\textsuperscript{st} century education. Currently the state of California is considering altering the percentage of the proposed standardized assessment to make up 60 percent of the score of the state’s overall assessment of each site’s performance. The researcher proposes that the state of California consider the other forty percent be a measure of authentic students learning of 21\textsuperscript{st} century skills and themes. For example, teachers could use rubrics and videos to measure student performance on projects. The assessments could measure content attained in the project as well as the 21\textsuperscript{st} century skills students used during the process of
developing the project. Finally the culminating product and presentation could be a significant part of the overall score. Providing this type of assessment requires human capitol, and it is a further recommendation of this research, that we invest in this type of assessment.

**Limitations**

Limitations are circumstances that are beyond the control of the researcher. In this study the researcher attempted to triangulate data as often as possible in order to verify observations and other findings; however, the researcher was aware of various limitations that resulted from the study design. First, the study was limited to three different elementary schools in California and involved interviews of nine teachers and three administrators. The study participants’ views may not have represented the views of others in the school or the school in general. In addition, the findings cannot be generalized to a larger population. Second, participants were asked questions about their own organization and might have been subject to positive and/or negative biases or to a particular image they wished to project. Third, the researcher relied on school staff to provide access to what was occurring in the school and make available artifacts and data. School administrators may have screened the information they chose to share. Fourth, since the schools in the study have specialized foci, they may have attracted students and parents searching for specialized programs. Therefore, it is difficult to determine the impact of an instructional approach on students’ academic performance since it will not be possible to determine the antecedents.
Recommendations for Further Studies

Several topics emerged from this study that merit additional research. First, additional qualitative and quantitative research in the area of assessment for 21st century learning would provide more insight and direction for educators and policy makers. Moreover, the schools that were examined in this study were California elementary schools, and California is not one of the sixteen states that have adopted the Framework for 21st Century Learning developed by the P21. Research could compare and contrast schools in states that have adopted 21st century learning initiatives with those that have not. This research could give insight into the role of the state and district in supporting 21st century learning. Third, this study produced some promising findings about leadership for 21st century learning. Future research could extend this investigation by focusing primarily on transformational leadership for 21st century learning. Last, the role of technology in 21st century learning was touched upon in this study. Further quantitative and qualitative research in this area could provide great insight into the power of technology to help transform education.

Conclusion

This study explored three California elementary schools’ endeavors to transition or evolve their programs to provide a 21st century education for their students. Each school had a different designation, with the first being a charter school, the second an independent school, and the third a district, public school. Furthermore, each school employed a different approach to 21st century learning, which includes in order: project-based learning, design thinking, and multilingual education. The researcher compared each school to the P21 Framework (Appendix A) and discovered that each site met
almost all the criteria of 21st century learning, in all areas, as outlined by the P21 Framework. The data revealed that while each school practiced a specific approach, they continued to evolve their programs to include additional opportunities, such as social and emotional learning for their students. Additionally, the data revealed that a continuous growth mindset was essential to the progress of the vision at each site.

The most important challenge the educational systems faces today is to foster 21st century skills along with a depth and complexity of thinking in learners so that they are prepared to participate in the global society (Xu, 2012). This challenge requires leaders, teachers, and policy makers to adopt a mindset for 21st century learning. The findings in this study showed that leaders must have a strong vision for 21st century learning and must inspire all stakeholders. Additionally, the findings in this study showed that integrating a rigorous core curriculum and 21st century skills and themes, as referenced in the P21 Framework (Appendix A), allowed each site to strike a balance that aligned with their vision. Additionally, each site clung to their autonomy to follow their school’s vision and designated approaches; moreover each site utilized site level assessments that measured their students’ authentic learning experiences, as well as their core knowledge and skills. Each leader aligned their precious resources such as time and funding towards their school’s vision. As educators and policymakers continue to explore the demands 21st century learners face, they must translate that knowledge into educational policy, practice and assessment.

Opportunities for a high quality 21st century education should be provided to every student in this country. Educational policy should support and not hinder this endeavor in public schools. Educators, businessmen, and policymakers from across the
nation, formed the P21, and more schools, district, and state educational departments need to support, adopt, and expand their work, or find alternate ways to support 21st century learning for every student in America.
REFERENCES


APPENDIX A

Framework for 21st Century Learning

The Partnership for 21st Century Skills has developed a vision for student success in the new global economy.

21st Century Student Outcomes and Support Systems

Core Subjects – 3Rs and 21st Century Themes

- Learning and Innovation Skills – 4Cs
  - Critical Thinking
  - Communication
  - Collaboration
  - Creativity

Life and Career Skills

Information, Media, and Technology Skills

Standards and Assessments

Curriculum and Instruction

Professional Development

Learning Environments

21ST CENTURY STUDENT OUTCOMES

To help practitioners integrate skills into the teaching of core academic subjects, the Partnership has developed a unified, collective vision for learning known as the Framework for 21st Century Learning. This Framework describes the skills, knowledge and expertise students must master to succeed in work and life; it is a blend of content knowledge, specific skills, expertise and literacies.

Every 21st century skills implementation requires the development of core academic subject knowledge and understanding among all students. Those who can think critically and communicate effectively must build on a base of core academic subject knowledge.

Within the context of core knowledge instruction, students must also learn the essential skills for success in today’s world, such as critical thinking, problem solving, communication and collaboration.

When a school or district builds on this foundation, combining the entire Framework with the necessary support systems—standards, assessments, curriculum and instruction, professional development and learning environments—students are more engaged in the learning process and graduate better prepared to thrive in today's global economy.
Core Subjects and 21st Century Themes

Mastery of core subjects and 21st century themes is essential to student success. Core subjects include English, reading or language arts, world languages, arts, mathematics, economics, science, geography, history, government and civics.

In addition, schools must promote an understanding of academic content at much higher levels by weaving 21st century interdisciplinary themes into core subjects:

- Global Awareness
- Financial, Economic, Business and Entrepreneurial Literacy
- Civic Literacy
- Health Literacy
- Environmental Literacy

Learning and Innovation Skills

Learning and innovation skills are what separate students who are prepared for increasingly complex life and work environments in today’s world and those who are not. They include:

- Creativity and Innovation
- Critical Thinking and Problem Solving
- Communication and Collaboration

Information, Media and Technology Skills

Today, we live in a technology and media-driven environment, marked by access to an abundance of information, rapid changes in technology tools and the ability to collaborate and make individual contributions on an unprecedented scale. Effective citizens and workers must be able to exhibit a range of functional and critical thinking skills, such as:

- Information Literacy
- Media Literacy
- ICT (Information, Communications and Technology) Literacy

Life and Career Skills

Today’s life and work environments require far more than thinking skills and content knowledge. The ability to navigate the complex life and work environments in the globally competitive information age requires students to pay rigorous attention to developing adequate life and career skills, such as:

- Flexibility and Adaptability
- Initiative and Self-Direction
- Social and Cross-Cultural Skills
- Productivity and Accountability
- Leadership and Responsibility

21st Century Support Systems

Developing a comprehensive framework for 21st century learning requires more than identifying specific skills, content knowledge, expertise and literacies. An innovative support system must be created to help students master the multi-dimensional abilities that will be required of them. The Partnership has identified five critical support systems to ensure student mastery of 21st century skills:

- 21st Century Standards
- Assessments of 21st Century Skills
- 21st Century Curriculum and Instruction
- 21st Century Professional Development
- 21st Century Learning Environments

For more information, visit the Partnership’s website at www.p21.org.
APPENDIX B

21st Century Learning: Site Protocol and Summary Forms

21st Century Learning: Site Protocol and Summary Forms

Dr. Cheryl-James Ward, Educational Leadership, San Diego State University 2011
– Modified by Olympia D. Kyriakidis January 2013 (highlighted questions are modifications)

School Administrators (Principals/Assistant Principals/ Lead Teachers)

What is your perception of 21st century education?

What does it look like?

Where on the continuum would you place your school?

Please briefly describe your approach to 21st century learning?

What do you perceive to be your role in advancing a 21st century education for the students at this school?

What are the core subjects taught at your school?

What does instruction in the core subjects look like?

What competencies or skills are integrated into the core curriculum through your specific approach?

Are additional 21st century skills or competencies integrated into the curriculum and what instructional strategies are used?

How is technology used as an instructional tool?

What do you want your students to know and be able to do in the next 5 years, 10 years?

• How is this different than 10 years ago?

• How will you know if you are making the progress toward these goals?

How do you assess student progress toward current goals daily, quarterly, annually?
• How is this information from assessments used?

• Are student portfolios kept?

Is technology used to assess students’ progress in given areas?

• How might this look different in the next 5 to 10 years?

What type of professional development are teachers provided and for what purpose?

• How might professional development change or look different in the next 5 to 10 years?

What obstacles or challenges have you faced in implementing your current model?

What obstacles or challenges might you face in 5 or 10 years?

Thank your participation for helping us to better understand your educational system.
### 21\textsuperscript{st} CENTURY LEARNING

Table 10

*Core Subjects and 21st Century Themes Core Subjects*

<table>
<thead>
<tr>
<th>Subject</th>
<th>Notes</th>
<th>I\textsubscript{1}, F I\textsubscript{2}, E NO**</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mandarin</td>
<td></td>
<td></td>
</tr>
<tr>
<td>English</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reading or Language Arts</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arts</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mathematics</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Economics</td>
<td></td>
<td></td>
</tr>
<tr>
<td>History</td>
<td></td>
<td></td>
</tr>
<tr>
<td>World Language</td>
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<td></td>
</tr>
</tbody>
</table>

*Note: **I\textsubscript{1}, Innovative or Advanced Implementation, F-Full implementation, I\textsubscript{2}-Intermediate Implementation, E – Early or Beginning Implementation, NO- Not Observed*
Table 11

21st Century Learning Interdisciplinary Theme

<table>
<thead>
<tr>
<th>Subject</th>
<th>Notes</th>
<th>I₁, F, I₂, E NO**</th>
</tr>
</thead>
<tbody>
<tr>
<td>Global Awareness</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Learning from and working collaboratively with individuals representing diverse cultures, religions and lifestyles in a spirit of mutual respect and open dialogue; Understanding other nations and cultures, including the use of non-English/Mandarin languages.</td>
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<td></td>
</tr>
<tr>
<td>Financial, Economic, Business and Entrepreneurial Literacy</td>
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<tr>
<td>Knowing how to make appropriate personal economic choices; understanding the role of economy in society; and using entrepreneurial skills.</td>
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<tr>
<td>Civic Literacy</td>
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<td></td>
</tr>
<tr>
<td>Knowing how to stay informed and understanding governmental processes; Exercising the rights and obligations of citizenship at local, state, national and global levels; Understanding the local and global implications of civic decisions.</td>
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<td></td>
</tr>
<tr>
<td>Health Literacy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Obtaining, interpreting and understanding basic health information and services; Understanding preventive physical and mental health measures, including proper diet, nutrition, exercise, risk avoidance and stress reduction; Using available information to make appropriate health related decisions; Establishing and monitoring personal and family health goals; Understanding national and international public health and safety issues.</td>
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<td></td>
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<tr>
<td>Environment Literacy</td>
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<td></td>
</tr>
</tbody>
</table>

Note. **I₁, Innovative or Advanced Implementation, F-Full implementation, I₂-Intermediate Implementation, E – Early or Beginning Implementation, NO- Not Observed

Learning and Innovation Skills

Creativity and Innovation

Creative thinking involves creating something new or original. It involves the skills of flexibility, originality, fluency, elaboration, brainstorming, modification, imagery, associative thinking, attribute listing, metaphorical thinking, forced
relationships. Creative thinking is putting things together in new ways, observing what others might miss, constructing something novel, using unusual or unconventional imagery that works to make an interesting point, and the like (Brookhart, 2010).
Table 12

**Creativity and Innovation**

<table>
<thead>
<tr>
<th>Skills</th>
<th>Note</th>
<th>I₁ F I₂ E NO**</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use the writing process, media and visual literacy, and technology skills to create products that express new understanding</td>
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<tr>
<td>Demonstrates creativity by using multiple resources and formats</td>
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<tr>
<td>Use both divergent and convergent thinking to formulate alternative conclusions and test them against the evidence.</td>
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<tr>
<td>Consider diverse and global perspectives in drawing conclusions</td>
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<tr>
<td>Create products that apply to authentic, real-world contexts</td>
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<td></td>
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<tr>
<td>Respond to literature by using creative expressions of ideas in various formats and genres</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Use creative and artistic formats to express personal learning</td>
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<td></td>
</tr>
<tr>
<td>Maintain openness to new ideas by considering divergent opinions, changing opinions or conclusions when evidence supports the change</td>
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<td></td>
</tr>
<tr>
<td><strong>Think Creatively</strong>: use a wide range of idea creation techniques (such as brainstorming); create new and worthwhile ideas (both incremental and radical concepts); elaborate, refine, analyze and evaluate their own ideas in order to improve and maximize creative efforts</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Work Creatively with Others</strong>: Develop, implement and communicate new ideas to others effectively; be open and responsive to new and diverse perspectives; demonstrates originality and inventiveness in work; view failure as an opportunity to learn.</td>
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</tr>
</tbody>
</table>

*Note.** **I₁ Innovative or Advanced Implementation, F-Full implementation, I₂-Intermediate Implementation, E – Early or Beginning Implementation, NO- Not Observed*

**Critical Thinking**

Critical thinking is reasonable, reflective, thinking that is focused on deciding what to believe or do (Brookhart, 2010, Assessing higher order thinking skills). Critical thinking is disciplined, self-directed thinking. It requires thinking about your thinking while you are thinking in order to make your thinking more clear, more accurate and more defensible (Buchanan, 2011). Critical thinking involves logical thinking and
reasoning including skills such as comparison, classification, sequencing, cause/effect, patterning, webbing, analogies, deductive and inductive reasoning, forecasting, planning, hypothesizing, and critiquing.
**Table 13**

*Critical Thinking*

<table>
<thead>
<tr>
<th>Skill</th>
<th>Notes</th>
<th>I₁, F I₂, E NO**</th>
</tr>
</thead>
<tbody>
<tr>
<td>Follow an inquiry based process in seeking knowledge in curricular subjects.</td>
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<tr>
<td>Find, evaluate, and select appropriate sources to answer questions ,</td>
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<td></td>
</tr>
<tr>
<td>Evaluate information found in selected sources on the basis of accuracy, validity, appropriateness for needs, importance, and social and cultural context</td>
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</tr>
<tr>
<td>Read, view and listen for information presented in any format (e.g., textual, visual, media, digital) in order to make inferences and gather</td>
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<td></td>
</tr>
<tr>
<td>Make sense of information gathered from diverse sources by identifying misconceptions, main and supporting ideas, conflicting information, and point of view or bias ,</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maintain a critical stance by questioning the validity and accuracy of all information</td>
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<td></td>
</tr>
<tr>
<td>See divergent perspectives during information gathering and assessment</td>
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<td></td>
</tr>
<tr>
<td>Use strategies to draw knowledge from information and apply knowledge to curricular areas, real world situations, and further investigation.</td>
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<td></td>
</tr>
<tr>
<td><strong>Reason Effectively</strong>: Use various types of reasoning (inductive, deductive) as appropriate to the situation</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Analysis</strong>: break down information into parts for examination. Analyze how parts of a whole interact with each other to produce overall outcomes in complex systems.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Synthesis</strong>: Apply prior knowledge and skills to combine elements into a pattern not clearly there before.</td>
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<td></td>
</tr>
<tr>
<td><strong>Evaluation</strong>: Judge or decide according to some set of criteria, without real right or wrong answers.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Judgment</strong>: Effectively analyze and evaluate evidence, arguments, claims and beliefs; analyze and evaluate major alternatives points of view; synthesize and make connections between information and arguments; interpret information and draw conclusions based on the best analysis.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Note.** **I₁** Innovative or Advanced Implementation, F-Full implementation, I₂-Intermediate Implementation, E – Early or Beginning Implementation, NO- Not Observed
**Problem Solving**

Problem solving is the ability to define and represent a complex problem, solve complex problems with many paths to a single solution, and more than one viable solution.

Table 14

*Problem Solving*

<table>
<thead>
<tr>
<th>Skill</th>
<th>Notes</th>
<th>I₁ F I₂ E NO**</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solve different kinds of non-familiar problems in both conventional and innovative ways.</td>
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<td></td>
</tr>
<tr>
<td>Identify and ask significant questions that clarify various points of view and lead to better solutions.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Note.** I₁ Innovative or Advanced Implementation, F-Full implementation, I₂-Intermediate Implementation, E – Early or Beginning Implementation, NO- Not Observed*
### Communication and Collaboration

#### Table 15

**Communication and Collaboration**

<table>
<thead>
<tr>
<th>Skill</th>
<th>Notes</th>
<th>I₁ F I₂ E NO**</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collaborate with others to broaden and deepen understanding, exchange ideas, develop new understandings, make decisions and solve problems.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contribute to the exchange of ideas within the learning community.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Use interaction with and feedback from teachers and peers to guide own inquiry process; be open and responsive to new and diverse perspectives; incorporate group feedback into own work</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Participate and collaborate as members of social and intellectual network of learners</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Use knowledge and information skills and dispositions to engage in public conversation and debate around issues of common concern</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Articulate thoughts and ideas effectively using oral, written and nonverbal communication skills in a variety of forms and contexts.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Listen effectively to decipher meaning, including knowledge, values, attitudes and intentions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Use communication for a range of purposes (e.g. to inform, instruct, motivate and persuade)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Utilize multiple media and technologies, and know how to judge their effectiveness as well as assess their impact</td>
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<td></td>
</tr>
<tr>
<td>Communicate effectively in diverse environments (including multi-lingual)</td>
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<td></td>
</tr>
<tr>
<td>Demonstrate ability to work effectively and respectfully with diverse teams</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exercise flexibility and willingness to be helpful in making necessary compromise to accomplish a common goal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Assume shared responsibility for collaborative work.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Note.** I₁ Innovative or Advanced Implementation, F-Full implementation, I₂-Intermediate Implementation, E – Early or Beginning Implementation, NO- Not Observed*
Information, Media and Technology Skills

Information Literacy

Information Literacy is the skill in locating and evaluating information; the ability to locate, understand, evaluate, utilize, and convey information at home, at work, and in the community. www.nald.ca/adultlearningcourse/glossary.htm. The American Library Association's (ALA) Presidential Committee on Information Literacy, Final Report states, “To be information literate, a person must be able to recognize when information is needed and have the ability to locate, evaluate, and use effectively the needed information.” http://en.wikipedia.org/wiki/Information_literacy, www.nald.ca/adultlearningcourse/glossary.htm, http://en.wikipedia.org/wiki/Information_literacy

Table 16

Information Literacy

<table>
<thead>
<tr>
<th>Skill</th>
<th>Notes</th>
<th>I1 F I2 E NO**</th>
</tr>
</thead>
<tbody>
<tr>
<td>Access Information Efficiently (time) and effectively (sources)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Use information accurately and creatively for the issues or problem at hand</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manage the flow of information from a wide variety of sources</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Apply a fundamental understanding of the ethical/legal issues surrounding the access and use of information</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note. **I1, Innovative or Advanced Implementation, F-Full implementation, I2-Intermediate Implementation, E – Early or Beginning Implementation, NO- Not Observed

Media Literacy

Media literacy is a repertoire of competences that enable people to analyze, evaluate and create messages in a wide variety of media modes, genres and forms; the
process of understanding and using the mass media in an assertive and non-passive way.

This includes an informed and critical understanding of the nature of the media, the techniques used by them and the impact of these techniques. Media literacy is the ability to sift through and analyze the messages that inform, entertain and sell to us every day (Media Literacy Network, 2010).

Table 17

*Media Literacy*

<table>
<thead>
<tr>
<th>Skill</th>
<th>Notes</th>
<th>I₁ F I₂ E NO**</th>
</tr>
</thead>
<tbody>
<tr>
<td>Access, analyze, evaluate, and produce communication and information in a variety of forms and means</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Comprehend and utilize mass communication</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bring critical thinking skills to bear on all media—from music videos and Web environments to product placement in films and virtual displays (Media Literacy Network, 2010)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Examine how individuals interpret messages differently, how values and points of view are included or excluded, and how media can influence beliefs and behaviors</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Understand and utilize the most appropriate media creation tools, characteristics and conventions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Understand and effectively utilize the most appropriate expressions and interpretations in diverse, multi-cultural environments</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Apply a fundamental understanding of the ethical/legal issues surrounding the access and use of media</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Note.* **I₁** Innovative or Advanced Implementation, **F**-Full implementation, **I₂**-Intermediate Implementation, **E** – Early or Beginning Implementation, **NO**- Not Observed
### Information, Communications and Technology Skills

**Table 18**

**Information, Communications and Technology Skills**

| Skill                                                                 | Notes | I₁, F₁₂ E NO**  
|-----------------------------------------------------------------------|-------|----------------
| Use technology and other information tools to analyze and organize information |       | (I₁, F₁₂ E NO) **  
| Use technology and other information tools to organize and display knowledge and understanding in ways that others can view, use, and assess. |       |                      
| Use Technology as a tool to research, organize, evaluate and communicate information |       |                      
| Use digital technologies (computers, PDAs, media players, GPS, etc.), communication/networking tools and social networks appropriately to access, manage, integrate, evaluate and create information to successfully function in a knowledge society |       |                      
| Apply a fundamental understanding of the ethical/legal issues surrounding the access and use of information technologies, Use information technology responsibly |       |                      

*Note.* **I₁**, Innovative or Advanced Implementation, F-Full implementation, I₂-Intermediate Implementation, E – Early or Beginning Implementation, NO- Not Observed
Life and Career Skills

Flexibility and Adaptability

Table 19

*Flexibility and Adaptability*

<table>
<thead>
<tr>
<th>Skill</th>
<th>Notes</th>
<th>I$_1$ F I$_2$ E NO**</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adapt to change: Adapt to varied roles, jobs responsibilities, schedules and contexts; work effectively in a climate of ambiguity and changing priorities</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Be Flexible: Incorporate feedback effectively, deal positively with praise, setback and criticism; understand, negotiate and balance diverse views and beliefs to reach workable solutions, particularly in multi-cultural environments</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Note.** I$_1$, Innovative or Advanced Implementation, F-Full implementation, I$_2$-Intermediate Implementation, E – Early or Beginning Implementation, NO- Not Observed*
## Initiative and Self Direction

Table 20

**Initiative and Self Direction**

<table>
<thead>
<tr>
<th>Skill</th>
<th>Notes</th>
<th>I₁ F I₂ E NO**</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Manage goals and time:</strong> Set goals with tangible and intangible success criteria; balance short term and long term goals; utilize time and manage workload efficiently.</td>
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<td></td>
</tr>
<tr>
<td><strong>Work independently:</strong> Monitor, define, prioritize and complete tasks without direct oversight.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Self-Directed Learner:</strong> Go beyond basic mastery of skills and/or curriculum to explore and expand one’s own learning and opportunities to gain expertise; demonstrate initiative to advance skill levels towards a professional level; demonstrate commitment to learning as a lifelong process; reflect critically on past experiences in order to inform future progress.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Note.* **I₁** Innovative or Advanced Implementation, **F**-Full implementation, **I₂**-Intermediate Implementation, **E** – Early or Beginning Implementation, **NO**- Not Observed
Social and Cross Cultural Skills

Table 21

**Social and Cross-Cultural Skills**

<table>
<thead>
<tr>
<th>Skill</th>
<th>Notes</th>
<th>I₁ F I₂ E NO**</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Interact Effectively with Others</strong>: Know when it is appropriate to listen and when to speak; conduct oneself in a respective, professional manner</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Work Effectively in Diverse Teams</strong>: Respect cultural differences and work effectively with people from a range of social and cultural backgrounds; respond open-mindedly to different ideas and values; leverage social and cultural differences to create new ideas and increase both innovation and quality of work</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Note. **I₁, Innovative or Advanced Implementation, F-Full implementation, I₂-Intermediate Implementation, E – Early or Beginning Implementation, NO- Not Observed*
### Productivity and Accountability

#### Table 22

**Productivity and Accountability**

<table>
<thead>
<tr>
<th>Skill</th>
<th>Notes</th>
<th>I₁ F I₂ E NO**</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Manage Projects:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Set and meet goals,</td>
<td></td>
<td></td>
</tr>
<tr>
<td>even in the face of</td>
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<td></td>
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<tr>
<td>obstacles and</td>
<td></td>
<td></td>
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<tr>
<td>competing pressures;</td>
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<td></td>
</tr>
<tr>
<td>prioritize, plan,</td>
<td></td>
<td></td>
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<tr>
<td>and manage work to</td>
<td></td>
<td></td>
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<tr>
<td>achieve the intended</td>
<td></td>
<td></td>
</tr>
<tr>
<td>result.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Produce Results:</strong></td>
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<td></td>
</tr>
<tr>
<td>Demonstrate</td>
<td></td>
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</tr>
<tr>
<td>additional attributes</td>
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<tr>
<td>associated with</td>
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<tr>
<td>producing high quality</td>
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<tr>
<td>products including</td>
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<tr>
<td>the abilities to:</td>
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<tr>
<td>work positively with</td>
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<tr>
<td>others, manage time</td>
<td></td>
<td></td>
</tr>
<tr>
<td>and projects</td>
<td></td>
<td></td>
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<tr>
<td>effectively, multi-task,</td>
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<tr>
<td>participate actively,</td>
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<tr>
<td>as well as be</td>
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<tr>
<td>reliable and punctual</td>
<td></td>
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</tr>
</tbody>
</table>

*Note. **I₁ Innovative or Advanced Implementation, F-Full implementation, I₂-Intermediate Implementation, E – Early or Beginning Implementation, NO- Not Observed*
## Leadership and Responsibility

### Table 23

**Leadership and Responsibility**

<table>
<thead>
<tr>
<th>Skill</th>
<th>Notes</th>
<th>I₁ F I₂ E NO**</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Guide and Lead Others</strong>: Use interpersonal and problem-solving</td>
<td></td>
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<tr>
<td>skills to influence and guide others toward a goal; leverage strengths of others to accomplish a common goal; inspire others to reach their very best via example and selflessness; demonstrate integrity and ethical behavior in using influence and power</td>
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<tr>
<td><strong>Be Responsible to Others</strong>: Act responsibly with the interest of the larger community in mind</td>
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</tbody>
</table>

*Note. **I₁ Innovative or Advanced Implementation, F-Full implementation, I₂-Intermediate Implementation, E – Early or Beginning Implementation, NO- Not Observed*
APPENDIX C

Consent to Act as a Research Subject Form

San Diego State University

Consent to Act as a Research Subject

Transitioning Schools to a Global, 21st Century: Three California Elementary Schools’ Approaches

Dear Principal/Director or Teacher:

You are being asked to participate in a research study comparing different approaches to 21st century learning in three California elementary schools. Before you give your consent to volunteer, it is important that you read the following information and ask as many questions as necessary to be sure you understand what you will be asked to do. This study is being conducted by Mrs. Olympia Kyriakidis, a doctoral candidate in the Educational Leadership Program at San Diego State University and a California public school district principal.

Purpose of the Study:
The primary purpose of this research is to examine how schools are preparing students for the future in the United States. The secondary purpose is to contribute to the body of knowledge regarding 21st century learning skills. The results will be reported in Mrs. Kyriakidis’ dissertation. You have been identified for this study because your school is a high performing private or public elementary school with a specific approach for 21st century learning.

Description of the Study:
If you decide to participate, you and three members of your staff will be interviewed using the attached questionnaire. Additionally, if you decide to participate the researcher will observe three classrooms at your school for approximately 20 to 30 minutes. The interview will take anywhere from thirty minutes to an hour and a half depending on the length of the responses and dialog between the researcher and the participants.

Confidentiality:
This study is confidential and confidentiality will be maintained to the extent that is allowed by law. Your participation and responses will be confidential – that is, recorded without any identifying information that is linked to you or your school. All data will remain confidential and secure. Upon completion of the data collection phase of this study, any possible link to your identity will be destroyed. Interview responses from the study’s and classroom observation data will be stored on the researchers’ password-protected computer, accessible only to the researcher, Mrs. Kyriakidis. Should the research be used in a published study, only the types of programs and the region of the school’s location will be identified.

Institutional Review Board
San Diego State University
Approval Expires: 3/13/2014
Study Number: 1218087
Benefits of the Study
The research findings will be shared with you prior to being shared with others. The findings may provide practical and powerful information to help schools transition to 21st century learning approaches.

Costs and/or Compensation
There are no costs to you for participation in this study. You will not be paid to participate in this study.

Voluntary Nature of Participation:
Participation in this study is voluntary. Your choice of whether or not to participate will not influence your future relations with San Diego State University or [include San Diego State University Foundation if the study is funded and the names of other institution(s) involved in the research]. If you decide to participate, you are free to withdraw your consent and to stop your participation at any time without penalty or loss of benefits to which you are allowed.

Questions about the Study
If you have any questions regarding this study, you can reach me, Mrs. Kyriakis, at 619-507-6521 or email me at olympia@lmsd.net. If you have any questions about your rights as a participant in this study, you may contact an IRB representative in the Division of Research Administration at San Diego State University (telephone: 619-594-6622; email: irb@mail.sdsu.edu).

Consent to Participate
The San Diego State University Institutional Review Board has approved this consent form, as signified by the Board’s stamp. The consent form must be reviewed annually and expires on the date indicated on the stamp. Your signature below indicates that you have read the information in this document and have had a chance to ask any questions you have about the study. Your signature also indicates that you agree to be in the study and have been told that you can change your mind and withdraw your consent to participate at any time. You have been given a copy of this consent form. You have been told that by signing this consent form you are not giving up any of your legal rights.

Name of Participant (please print)

Signature of Participant Date

Signature of Principal Investigator Date

Institutional Review Board
San Diego State University
Approval Expires: 3/13/2014
Study Number: 1218087