ARE THEY READY? A MULTI-CASE STUDY OF TRADITIONAL AND INNOVATIVE
TEXAS TEACHER’S PERCEPTIONS OF 21ST CENTURY SKILLS IN
TEACHING AND LEARNING

Joy R. Royal, B.S., M.S.

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APPROVED:

Scott J. Warren, Major Professor
Greg Jones, Committee Member
Lin Lin, Committee Member
Michael Spector, Chair of the Department of Learning Technologies
Linda Schamber, Acting Dean of the College of Information
James D. Meernik, Acting Dean of the Toulouse Graduate School

The 21st century is now in the second decade and the need for 21st century skills is discussed at all levels of education as necessary for student success in the future. Federal, state, and districts are addressing this need and have written technology plans to address 21st century skills needed. The purpose of this dissertation is to contribute to the knowledge of 21st century educational technology. The data includes seven recorded interviews from two separate research projects covering two models of education as teachers discuss teaching, learning, and technology. The data studied determines how educational technology perceived in the school environments has been integrated into the classrooms.

The initial scripting of video interviews from two research projects began the analysis of data. Particular themes emerged in response to questions established by the two separate research projects focused on classroom, school, and district environmental arrangements that examined; teaching responsibilities and practices; student learning opportunities; and how technology is woven throughout instruction. Further exploration of themes stemmed from analysis conducted with the qualitative software program, NVivo 9.
The themes discussed in this paper relate to instructor perceptions of teaching, learning, classroom procedures, and the role technology plays in each. Also noted are the factors beyond the teacher’s responsibility and set rules that include the school environment, district expectations, and supported teaching strategies for the schools.

The teachers expressed their view that technology is an important support for learning and that they used technology to accomplish many of the tasks related to supporting teaching and learning. As perceived by the teachers, a major component that surfaced as a result of the analysis was children’s technology use was most drastically influenced by the expectations of the instructional leader to develop and the need to foster 21st century learning strategies such as critical thinking skills, self-assessment, and problem solving. Therefore, the school environment and expectations of the administrative level of management in the school systems, made the most impact on the learning opportunities the students were afforded where technology was an appropriate tool for learning.
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CHAPTER 1

INTRODUCTION

1.1 Introduction to the Problem

There is a focus throughout the United States for students in our educational institutions to be prepared to be productive citizens upon graduation with 21st century skills. Education has not seen this dramatic a paradigm shift in education since the turn of the last century. Since the availability of personal computers at a reasonable cost and the creation of a web browser, students are changing their view of learning and therefore the face of education today. The vast majority of students live in their world surrounded by digital communications and entertainment. It is the need to provide this world of technology to others and the need to provide a workforce capable of interacting through this medium driving the demands by our economic and political leaders to encompass 21st century skills.

At the federal level the U.S. Department of Education through the No Child Left Behind (NCLB) Act of 2001, Title II, Part D and Enhancing Education Through Technology, EETT program monitors and receives reports on the implementation of educational technology (Texas Education Agency, 2011f; United States Department of Education, 2006, 2009). The EETT program seeks to “(a) to improve student academic achievement through the use of educational
technology, (b) to ensure that every student is technologically literate by the eighth grade, and (c) to encourage the effective integration of technology in teacher training and curriculum development to establish research-based instructional methods that can be widely implemented as best practices” (United States Department of Education, 2006, 2009, 2010).

Both the U.S. government and the state of Texas have reserved dollars for technology, software, hardware and infrastructure for the school districts in Texas. Systems have been developed by Texas Education Agency (TEA) to document and follow appropriated funds being spent with the approval and adoption of technology plans (Texas Education Agency, 2006, 2010a). Texas then uses online reporting resources available from TEA to gather data to examine the levels of technology use in public school received through the School Technology and Readiness, STR Chart tool. The findings are then reported to the state senate and NCLB. The Star Chart surveys for teachers, principals, and administrators (Texas Education Agency, 2011c) is a tool for planning and self-assessing the teacher, principal and district’s alignment with the Long Range Plan for Technology, LRPT.

Technology began to arrive in the public education classrooms 25 years ago. At that time, there were workshops available to teachers already in the field with their state certifications on the use of technology for the teacher and in the classroom. These classes were to improve teacher’s proficiency with technology software such as those for word processing and slide shows. The classes were
for using these programs for the production of teaching materials, and how to use
the programs purchased by the district as part of textbook adoptions. Also,
available were classes or workshops to instruct teachers on how to use the
digital grade book and attendance programs. Districts sometimes suggested and
sometimes mandated workshops for learning this medium.

Workshops available later taught faculty about *instructional technology*.
This is the use of technology to support learning. Workshops began to appear
showing the teacher ways that the computers and the software were available as
a resource to instruct students. Sometimes, there would be workshops on how to
create items that students could use to learn from with the computers.

The Intel Foundation promoted and recruited instructors beginning in 2000
(Leslie Harris Associates, Education Development Center, & Center for Children
& Technology, 2004). The focus for technology workshops in districts began
changing as implementation of the project, Intel Teach to the Future as training
module for technology integration. Some of the first learning opportunities for
teachers, nested within these modules, supported the use of technology focused
on student learning. It brought lessons to promotes problem-solving, critical
thinking and collaboration skills. This project, now a world-wide program, was
aimed at training teachers to integrate technology into a standards and project-
based curriculum. The lessons developed during the workshops were to “link
technology integration to effective instruction” … “aligned to their teaching and to
state learning standards” (Leslie Harris Associates et al., 2004, pp. 5-6). This is
when technology for educating students and not technology for instruction began to appear in my school district.

There is a major conceptual difference between the following two term *instructional technology* and *educational technology* (Reiser & Ely, 1997; Simonson, 2008). The difference is more than who is using the technology but involves a shift in teaching philosophy and educational environments (Boe, 2006; Luppicini, 2001; Recalde, 2008; Williams, Mehlinger, Powers, & Baldwin, 2002). Teachers with available technology began allowing students to use technology as a tool, just as a pencil and paper replaced chalk and slate at the turn of the 20th century.

A teacher’s change in philosophy is necessary for effectively using technology as a student educational tool (Recalde, 2008; Williams et al., 2002). To make this paradigm shift the teacher’s role of the giver of knowledge must become the guide to the student’s inquisitive nature, and desire to learn. The teacher must view technology as part of learning and not a separate curriculum to be taught independently (Swaminathan & Yelland, 2003), the training to be successful, and necessary resources (Ash; Williams et al., 2002).

1.2 Purpose

The purpose of this study was to determine what factors affect educational technology implementation in public school models within Texas. During previous personal observations in public school districts in north Texas, noted was the variation of educational technology consistency within public education. In the
classrooms, there are inconsistencies in student access to technology tools and teacher knowledge of technology implementation techniques. These two qualitative case studies positioned me to analyze interviews from purposefully selected schools and examine specific factors related to the impediments affecting successful implementation of educational technology use by students and the instructional technology implementation by the teachers.

During a personal analysis of the yearly mandated, Texas Campus State Technology and Readiness (STaR) Survey results for the school year 2009-2010, Ft. Worth ISD, a large school district in north Texas, the disparity of results at the campuses was noticed. The STaR chart survey has four levels of progress: early technology, developing technology, advanced technology or target technology (Texas Education Agency, 2001, 2010c). The range of levels of adoption in the four areas surveyed, teaching and learning, educator preparation and development; leadership, administration and instructional support, and infrastructure and technology lead me to inquire as to why there is such a wide disparity in all areas surveyed within one school district (Texas Education Agency, 2010c).

Through the lens of teacher perceptions, this qualitative multi-case study addresses technology within the realm of student and teacher use and the environmental factors within the school models. The topics of inquiry include:

1. Technology integration used in teaching strategies in tradition and innovative school models.
2. Technology integration available in student learning opportunities in traditional and innovative school models.

3. Environmental factors at the classroom, school, or district affecting technology use for educational purposes.

1.2 Significance

This study is significant because it contributes to the field of educational technology and links the factors, which effect successful implementation of 21st century skills in education. It is important for school leaders to have a background of data to use for documentation of variables affecting technology integration within 21st century skill development.

The generation of Texas students in our schools today is the student body always surrounded by technology throughout their daily lives. They have never lived in a world without it outside of the classroom and therefore I believe the separation of technology and education does not need to continue. If the educational institutions will begin to change some of the ideas blocking technology use by the students, our kindergarteners will be ready for the 21st century when they graduate in 2025.

1.3 Implications

As the second decade of the 21st century begins, it is important to note that a quarter century has passed since the personal computing devices entered
the public school setting, there remain small pockets of students using technology as a tool for learning. Integrated into the public school teacher’s appraisal system is the term instructional technology, but there is still little systemic drive for student educational technology use.

Technology is prolific in some communities within the United States and within Texas. Possible challenges affects, or will affect the gap between equity and equality for students joining the workforce of the 21st century. The students without the skills necessary for the workforce will create a wider gap of economic opportunity.

Teacher perceptions of their self rating of skills, the knowledge of the risks involved and their acceptance of those risks affect their choice in using technology in their classroom curriculum (Howard, 2011; Ivers, 2002). The acceptance of the risks and the application has a direct relationship to the teacher’s value of technology (Howard, 2011). As there are over 320,000 public school teachers, not including home school instructors and charter school instructors, this acceptance of the risks for technology in education will be as monumental as the first establishment of grade level education or implementation of state mandated curriculum.

1.4 Overview of Dissertation

This multiple case study examines seven interviews through exploratory analysis of the contents of videotaped interviews. Three themes emerged
through the qualitative data analysis of transcribed texts manually and through qualitative software NVIVO 9. The videotaped interviews were conducted in areas beyond students viewing and questions asked around the topics of the teacher’s environment in their classroom, school, and district; their definition of teaching and learning; and the role technology plays throughout. This multi-case study investigates the levels of technology integration in an innovative and three traditional model schools in Texas. It also contributes to research of school climate, district expectations, and teaching strategies for educational technology.

1.5 Definition of Terms

EETT – Enhancing Education Through Technology Act 2001 (Ed-Tech) State Program; Part D of Title II Statute – Preparing, Training and Recruiting High Quality Teachers and Principals. - The U.S. Department of Education provides grants to educational agencies at the state level based on the funding formula for their share of Part A of Title I dollars to improve achievement using technology in the elementary through secondary level of schools with the expectation that all students will be technologically literate by the end of eighth grade. The money appropriated is for teacher training and curriculum development to establish research based innovative instructional methods. (United States Department of Education, 2012).

E-Rate – A universal service system overseen by the Universal Service Administrative Company under the direction of the Federal Communications
Commission is part of the Telecommunications Act of 1996. This system is designed to “ensure that cutting edge telecommunications technology is available in schools—and classrooms in those schools—around the country on an ongoing basis” (Federal Communications Commission, 2004).

ETAC – Educational Technology Advisory Committee. This committee assists in technology planning for Texas schools. They were “charged with the development, implementation, and evaluation of the Long-Range Plan for Technology” (Texas Education Agency, 2011a).

ISTE – International Society for Technology in Education. An organization to advance effective use of innovative technology in teaching and learning throughout the world (International Society for Technology in Education, 2010).

LRPT – Long Range Plan for Technology. A plan written by ETAC (see above) to address the needs of education in Texas in the areas of teaching and learning; educator preparation and development; leadership, administration and instructional support; and infrastructure for technology to prepare for the future (Texas Education Agency, 2006).

NCLB – No Child Left Behind. The full title of this Act enacted by the 107th United States Congress on January 8, 2002, Public Law 107-110 is “An act to close the achievement gap with accountability, flexibility, and choice, so that no child is left behind (107th Congress, 2001).
PBL – Project or problem based learning. An instructional approach used by teachers to engage student interest and motivation to complete a project or solve a problem using authentic learning activities (Buck Institute for Education).

ST&RI Chart – School Technology and Readiness Chart. An assessment survey developed to document growth in the four areas of the Texas Long Range Plan for Technology: Teaching and learning; Educator preparation and development; Leadership administration and instructional support; and Infrastructure for technology. Also, the results used for reporting to NCLB (see above) improvement in areas funded by Title II, Part D (see below) (Texas Education Agency, 2011d).

NEA – National Education Association An organization founded in 1857 to voice the rights for educators and children and promoting educational needs for all children (National Education Association, 2012)

TEA – Texas Education Association. Texas governmental agency to “provide leadership, guidance and resources to help schools meet the educational need of all students” in primary and secondary public education. They manage textbooks, development of state curriculum and assessment, school ratings, monitoring for compliance of federal guidelines and the financial distribution of state and federal funds (Texas Education Agency, 2011e)

Title II, Part D - The state funding disbursement guidelines for Enhancing Education Through Technology as part of the No Child Left Behind act of 2001. See EETT above. (Texas Education Agency, 2011f)

1.6 Limitations

Several different environments were used to video tape the teachers during their interviews. While all the interviews were conducted without children present, some were conducted at the teacher’s campus and other interviews were conducted at the university. Not addressed as factor in this research is the inconsistency of the interviewing sites. The absence of this can add other variables to this research (Elwood & Martin, 2000) changing the results.

The research files were acquired from an archival server used for secure storage of the purposeful samples obtained from two separate case studies. The choice of video taped interviews was a random choice with no qualifications other than to have interviews from each case study. The choice of interviews from two separate case studies lead to an inconsistency of questions, interviewer personnel, grade level of students and interviewing. My own experience in education and strong beliefs for technology infusion in the educational communities was noted and efforts made to avoid personal interpretations. Further issues would occur for generalizability in that all teachers interviewed
were from the northern areas around the Dallas/Fort Worth, Texas metropolitan area.

Limitations of validity originate from the experiences of the teachers interviewed and of some of the interviewers. In addition, the design of these case studies entertained two different educational models thus forcing questions and questioning techniques to differ creating two different questioning protocols. The conversation flow and the need to elicit in depth responses to the interview questions made the questions within each research study to differ also. The questioning protocol showed inconsistency thereby reducing validity of content. Yet, as the instructional strategies and instructional design expectations in the educational environment of the teacher were not consistent, the inconsistency of the questions was recognized as necessary.

The state of Texas requires specific curriculum in the public schools, which make generalizing to other states and teachers somewhat limited. Each teacher in the Texas public school system is required to address the curriculum expectations from the Texas Education Agency. Yearly assessment of the curricula written for each grade level and subject area, the Texas Essential Knowledge and Skills (TEKS) and the achievements and growth documented for each child.

The purpose of this research is not to offer solutions for the issues stemming from the quality of instruction and presentation of tools necessary for learning with technology. Instead, it intends to share the experiences of teachers
as a means of better understanding how technology used today in the classrooms. It also does not address technology infrastructure or district support system in place in each district. However, from prior experience in the classroom using technology for instruction and educational experiences for children, this may be an important variable to address in future studies.
2.1 Introduction

The purpose of this study was to explore the themes present in the interviews of teachers from the Texas public education school districts and determine, if possible, if teaching and student learning opportunities have a technological component woven throughout. In addition, this study addresses these teacher’s perceptions of the role of technology in the schools.

The study addressed the following research questions:

1. What components of technology integration are evident in the teaching strategies for 21\textsuperscript{st} century skills in tradition and innovative school models?

2. What components of technology integration are evident in the student learning opportunities for 21\textsuperscript{st} century skills in traditional and innovative school models?

3. Do environmental factors at the classroom, school, or district affect technology use for students?

This chapter explores the underlying theories, concepts and history necessary to address these questions. This chapter includes sections on (1) 21\textsuperscript{st}
2.2 21st Century Education Expectations

The parents, students, and educators desire for education to enable learners to make real world connections and enables them to develop communication and analytical skills applicable to meet the demands of the 21st century (Kozma & Schank, 1998). Students today must be able to independently and in groups use tools which will enable them to access, search, and sort through a plethora of data and to incorporate the data, which has been analyzed, interpreted and communicated proficiently into new learning or new projects (Kozma & Schank, 1998).

The behaviors and capabilities of today’s students are extolled upon in many papers and publications such as Don Tapscott’s, *Growing Up Digital: The Rise of the Net Generation* (Tapscott, 2000) and *Grown Up Digital* (Tapscott, 2009). Some others are Marc Prensky (Prensky, 2001, 2004, 2008b) in articles such as “Digital Natives, Digital Immigrant: Do They Really Think Differently”; “The Emerging Online Life of the Digital Native” and “Turning on the Lights”. These all speak of students using technology throughout their lives with the majority of use predominately outside of school. The students, through their digital environments, are able to connect to the world through multimedia experiences and learn of the present and past. They do not need all the
information given to them but students do need information explained or tied to other knowledge or experiences and the chance to discuss and see how information in one area ties to another.

As more information appears, brought forth of the students interaction with technology at home, educators are feeling the push to provide this medium in the schools for learning success. The provision of technology tools is usually determined as a need for the students but also, the pedagogy used for the students is important also. Marc Prensky explains this well when he writes of the teachers need to move away “from the ‘old’ pedagogy of teachers ‘telling’ to the ‘new’ pedagogy of kids teaching themselves with teacher’s guidance” (Prensky, 2008a, p. 1). The pedagogy of students teaching themselves through inquiry is a “combination of student-centered learning, problem-based learning, case-based learning, and the teacher’s being the Guide on the Side” (Prensky, 2008a, p. 1).

The Digital Native students are using technology in their lives—almost entirely outside of school—and are generally more comfortable than their teachers in its use. The 2009 Neilson Report gives that there is a 63% increase since 2004 in the amount of time 2 to 11 year olds are online (Neilson Online, 2009). “There is a distinctive new generation of students in possession of sophisticated technology skills and with electronic learning preferences for which education is not equipped to support” (Bennett, Maton, & Kervin, 2008, p. 9) financially or pedagogically.

In an article review of David Buckingham’s book, Beyond Technology:
Children’s *Learning in the Age of Digital Culture*, Alevizou points to Buckingham’s theory that there is a “gap between young people’s everyday lives outside school and their experiences of schooling systems” (Alevizou, 2008). Don Tapscott, one of the leading authorities on innovation and technology published a book, *Growing Up Digital* in 2000 (Tapscott, 2000) which supports Alevizou’s theory of the differences in children growing up with technology. Now, ten years after Tapscott’s first book, the term he uses to describe these children, the Net Generation gains popularity. Tapscott uses the term, Net Generation to describe the people from the environment where technology is the social norm. Tapscott’s second book on this subject, *Grown Up Digital* discusses the new neurological findings which shows their digital environment to have a profound impact on the way this generation thinks, “even changing the way their brains are wired” (Tapscott, 2009, p. 10).

The move to a digital society creates a widening gap of opportunity for our students. Jane Gilbert theorizes that the gaps in test scores exacerbate with a lack of exposure to consistent digital literary culture (Gilbert, 2007). The exposure to new technologies is widening the social gap between those that have the benefit of technology and those that do not. Students that do not have the benefit of the digital world are at a great disadvantage (Colien, 2009).

To compound the issue of equitable distribution of technology is the fact that in the digital world of the learner with access to technology, the immersion they are experiencing, is changing the learning structures in the brain along with
their view of what learning should look like and what there part is in the process. Students want to learn, they are interested in learning and their attention spans have not shortened; only the definition of time has changed for them. In their “twitch-speed world” (Prensky, 2001, p. 5) they experience outside of school, these students expect information at high-speed Internet connectivity which is constantly increasing and satisfactory answers to their questions just as quickly. Their brain as it processes scanned data from search engines quickly finds the information necessary. The owners of these brains can find information efficiently and effectively if given the right tools. The digital world that these students crave is actually changing the way their brain organizes information in their learning (Prensky, 2001) as they have many small pieces of many things needing to be tied together.

The military is addressing this shift in student learning and have been transforming their training/teaching tactics to incorporate interactive computer assisted and simulation based training scenarios (Fletcher, 2009). Education is using some computer assisted instruction programs to increase teaching effectiveness and student achievement with significant gains in student achievement in areas such as early literacy skills in young children (Macaruso & Rodman, 2011). The handicapped students and other special populations such as second language learners are taking up the technique of training or educating through computer games and graphic learning (Cotton, 2006; Fletcher, 2009). Nevertheless, the educational arena, as a whole, is not embracing the digital age
quickly enough. The military and small pockets of areas in education are having great success with computer assisted instructional techniques and simulation training but it is slow to build in the public educational arena (Fletcher, 2009).

2.3 Technology in Education Through Governmental Agencies

The mission for Texas public education written in education code, §4.001, “is to ensure that all Texas children have access to a quality education which enables them to achieve their potential and fully participate now and in the future in the social, economic, and educational opportunities of our state and the nation” (State of Texas, 2003a). The state’s strategic plan also adds the need to prepare the students for success in a global economy (Texas Education Agency, 2006, 2010d). Though neither of these documents specifically address technology the federal and state education agencies have written technology plans to address preparing students for the future (Texas Education Agency, 2011f; United States Department of Education, 2010). The Texas Education Agency (TEA) compiles data on technology literacy improvements for the students and reports the findings to the Department of Education (DOE). The reports of the information arrive at their destinations but where is the responsibility of make sure it is at acceptable levels and is happening with increased fervor for all children. The federal government uses the tactic of withholding financial dollars allotted for technology if the implementation is not within certain boundaries of acceptance. The problem with this tactic appears when districts choose not to apply for the
additional dollars, therefore eliminating the need at the district level to comply.
Every level of government, from the United States federal level down to the
public school districts in Texas adopted to develop technologically literate
students ad there are reports written of the success of the implementation of the
state and federal initiatives. One issue noted in the reports written in that they do
not address the number of children not represented to those reading the reports.

The National Center of Educational Statistics, a department within the
U.S. Department of Education, distributed 4,133 questionnaires to a sampling of
full-time teachers and principals from 2005 public schools across the United
States and the District of Columbia. The overall response rate was at 64.5%
(average of weighted and unweighted) (Gray, Thomas, & Lewis, 2010, pp. 13-14)
resulting in approximately 2,666 responses.

The survey results shown in Table 1 and 2 show the number of computers
in the classroom is very high with 97% of teachers having one or more
computers in the room. 96% of the teachers reported using computers for word
processing, spreadsheets and 61% used computers for graphing. 80% used
software for student records, 63% for presentation creations, and 94% used the
computer for the Internet (Gray et al., 2010).

Of the teachers reporting, 61% also reported in the survey that their
students sometimes or often used educational technology during classes to
prepare written work. 69% reported using technology sometimes or often to learn
or practice basic skills.
Table 1
Percent of Teachers Reporting Frequency of Student Participation Using Educational Technology: 2009

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Prepare written text</th>
<th>Create or use graphics or visual displays</th>
<th>Learn or practice basic skills</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Rarely</td>
<td>Sometimes or often</td>
<td>Rarely</td>
</tr>
<tr>
<td>All public school teachers</td>
<td>24</td>
<td>61</td>
<td>27</td>
</tr>
<tr>
<td>School instructional level</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elementary</td>
<td>27</td>
<td>57</td>
<td>29</td>
</tr>
<tr>
<td>Secondary</td>
<td>20</td>
<td>67</td>
<td>24</td>
</tr>
<tr>
<td>Percent of students in the school eligible for free or reduced-price lunch</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than 35 percent</td>
<td>21</td>
<td>66</td>
<td>27</td>
</tr>
<tr>
<td>35 to 49 percent</td>
<td>23</td>
<td>62</td>
<td>29</td>
</tr>
<tr>
<td>50 to 74 percent</td>
<td>27</td>
<td>55</td>
<td>28</td>
</tr>
<tr>
<td>75 percent or more</td>
<td>28</td>
<td>56</td>
<td>26</td>
</tr>
<tr>
<td>Elementary-secondary teaching experience</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 or fewer years</td>
<td>28</td>
<td>53</td>
<td>27</td>
</tr>
<tr>
<td>4-9 years</td>
<td>27</td>
<td>58</td>
<td>27</td>
</tr>
<tr>
<td>10-19 years</td>
<td>22</td>
<td>63</td>
<td>30</td>
</tr>
<tr>
<td>20 or more years</td>
<td>22</td>
<td>64</td>
<td>25</td>
</tr>
</tbody>
</table>

NOTE: Response options in the questionnaire were not applicable, never, rarely, sometimes, and often. Responses for sometimes and often were combined in the table. Percentages are based on the teachers reporting that the activity applied to their students.

Table 2
Percent of Teachers Reporting Frequency of Students Performing Activities Using Educational Technology: 2009

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Conduct research</th>
<th>Solve problems, analyze data, or perform calculations</th>
<th>Develop and present multimedia presentations</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Rarely</td>
<td>Sometimes or often</td>
<td>Rarely</td>
</tr>
<tr>
<td>All public school teachers</td>
<td>22</td>
<td>66</td>
<td>23</td>
</tr>
<tr>
<td></td>
<td>21</td>
<td>31</td>
<td>25</td>
</tr>
</tbody>
</table>

School instructional level

<table>
<thead>
<tr>
<th>School instructional level</th>
<th>Conduct research</th>
<th>Solve problems, analyze data, or perform calculations</th>
<th>Develop and present multimedia presentations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elementary</td>
<td>23</td>
<td>64</td>
<td>21</td>
</tr>
<tr>
<td></td>
<td>20</td>
<td>69</td>
<td>25</td>
</tr>
<tr>
<td>Secondary</td>
<td>21</td>
<td>65</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td>22</td>
<td>69</td>
<td>26</td>
</tr>
</tbody>
</table>

Percent of students in the school eligible for free or reduced-price lunch

<table>
<thead>
<tr>
<th>Percent of students in the school eligible for free or reduced-price lunch</th>
<th>Conduct research</th>
<th>Solve problems, analyze data, or perform calculations</th>
<th>Develop and present multimedia presentations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 35 percent</td>
<td>21</td>
<td>67</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td>22</td>
<td>33</td>
<td>47</td>
</tr>
<tr>
<td>35 to 49 percent</td>
<td>22</td>
<td>65</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td>21</td>
<td>30</td>
<td>42</td>
</tr>
<tr>
<td>50 to 74 percent</td>
<td>21</td>
<td>65</td>
<td>19</td>
</tr>
<tr>
<td></td>
<td>21</td>
<td>30</td>
<td>47</td>
</tr>
<tr>
<td>75 percent or more</td>
<td>24</td>
<td>64</td>
<td>22</td>
</tr>
<tr>
<td></td>
<td>22</td>
<td>31</td>
<td>52</td>
</tr>
</tbody>
</table>

Elementary-secondary teaching experience

<table>
<thead>
<tr>
<th>Elementary-secondary teaching experience</th>
<th>Conduct research</th>
<th>Solve problems, analyze data, or perform calculations</th>
<th>Develop and present multimedia presentations</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 or fewer years</td>
<td>26</td>
<td>58</td>
<td>23</td>
</tr>
<tr>
<td>4-9 years</td>
<td>23</td>
<td>65</td>
<td>22</td>
</tr>
<tr>
<td>10-19 years</td>
<td>21</td>
<td>67</td>
<td>23</td>
</tr>
<tr>
<td>20 or more years</td>
<td>18</td>
<td>69</td>
<td>23</td>
</tr>
</tbody>
</table>

NOTE: Response options in the questionnaire were not applicable, never, rarely, sometimes, and often. Responses for sometimes and often were combined in the table. Percentages are based on the teachers reporting that the activity applied to their students.

The 42% of the teachers also reported the students developing and presenting multimedia presentations when the activity was designed for this type of student involvement (Gray et al., 2010). These are portrayed as addressing the needs of most of our students but the data is misleading.

The information provided to the Department of Education and by Gray et al. 2010, from the National Center for Educational Statistics included many reports, which resulting from the analysis of three surveys. The survey results were from the district, school, and teacher levels. The error rate of the results shown in Table 1 and 2 range from a low of .06 standard error for the percentage of teachers reporting on their students using computer for learning or practicing basic skills (Gray et al., 2010, pp. 43-44). The highest rate of errors occurred from the campuses having 75% or more eligible for free lunch in the reports of the students preparing written texts (Gray et al., 2010, p. 43) and from teachers in the three or fewer years of service range reporting on their students sometimes or often creating or using graphics or visual displays with 2.6 and 2.8 respectively (Gray et al., 2010, p. 43).

If this number was representative of the state of Texas independently, 64.5% of the 294,258 public school teachers in the state would mean this report is representative of 189,796 teachers (Strayhorn, 2006). Moreover, as the student to teacher ratio for public elementary and secondary schools population of 4,383,871 is 14:9:1, this means that 64.5% is representative of between 2,657,144 to 2,648,322 students.
Twenty-four percent of these students rarely use technology to prepare written texts. This represents 529,664 students underserved of the 64.5% reported. These children, our Digital Natives, live most of their lives in a predominately digital culture. Considering approximately 2,000,000 of our students not included as part of this report makes the picture more dismal.

Expectations for technology in education appear from the most global, wide reaching entities down to the school districts and each school in Texas. The expectations for technology in education show at the federal level in the National Education Technology Plan, No Child Left Behind (NCLB) Act of 2001, and the National Technology Standards. In Texas, the expectations for technology in the schools are written in the Texas Long-Range Plan for Technology 2006-2020, and the technology educational expected are addressed by many of the school districts in their district technology plan.

In Texas, The Long-Range Plan for Technology, 2006-2020 was written to support the Mission of Texas, education code, §4.001 by ensuring a relevant and future-focused education for Texas learners. This includes “preparing each student for success and productivity as a lifetime learner, a world-class communicator, a competitive and creative knowledge worker, and an engaged and contributing member of the emerging global digital society” (State of Texas, 2003a; Texas Education Agency, 2006).

The standards written for administrators, teachers and students start with international standards written by the International Society for
Technology in Education, ISTE. Although not a governmental agency, ISTE leads reform within the United States and has promoted 21st century technology skills to all levels of our educational governmental structure. ISTE has developed three separate standards for technology that are used as a model by the United States Government (International Society for Technology in Education, 2010). These National Education Technology Standards, NETS, developed by ISTE for students, teachers, and administrators became the model emulated by many state and local districts for technology in education. The standards written by ISTE guide effective teaching in our increasingly digital world and address the need to provide an environment allowing children to go beyond their classroom to learn and thus, empowering them to succeed in tomorrow’s world (International Society for Technology in Education, 2010).

The United States Department of Education wrote a National Education Technology Plan, NETP, in 2010 to promote applying advanced technologies to our educational systems. This plan recommends five essential components of learning powered by technology. The five recommendations for districts, states, the federal government, and other stakeholders are “learning, assessment, teaching, infrastructure, and productivity” (U.S. Department of Education 2010).

In the program description for the No Child Left Behind act of 2001, Title II, Part D. Enhancing Education Through Technology addresses
supplemental funds to be used to provide improved “student academic achievement though the use of technology” and “that the program is designed to assist every student in becoming technologically literate by the end of eighth grade” (Texas Education Agency, 2011f). The program encourages integration of technology resources, teacher training and professional development to establish research-based instructional models (Texas Education Agency, 2011f).

At the state level, Texas developed a plan for technology. The Texas education code, section 32.001, required the State Board of Education to develop a long-range plan for technology and to report progress to the Texas Governor and the Texas State Legislature biennially (State of Texas, 2003b). Texas Education Agency, TEA, has also established an Educational Technology Advisory Committee, ETAC, that is charged to provide districts with leadership for the effective integration of technology across the curriculum (Texas Education Agency, 2006). In Texas, implementation began of an evaluation process established to assess the schools technology readiness in Texas every year. The teachers and principals must complete the Texas Star Chart Survey to document their implementation of technology (Texas Education Agency, 2001). TEA also requires school district develop a plan.

The technology plan should document the necessary steps needed to accomplish the goal of giving every child the opportunity to become
technologically literate students, and teachers. This plan at the district level must be written and approved by their local school board and the Texas Education Agency every few years to receive the refund dollars from the federal government’s E-rate fund. E-rate, the Universal Service Fund, based on the Telecommunications Act of 1996, provides discounts to schools and libraries to assist in the funding of telecommunications and Internet services (Technology Planning E-Rate Support Center, 2012b). The districts’ approved technology plan is also mandatory to receive funds from NCLB Title II, Part D (Technology Planning E-Rate Support Center, 2012a).

NCLB requires a report of the technology implementation within the district as part of the refunding process for the federal government. To accomplish this in Texas, the teacher, campus principal and superintendent must complete the state’s Star Chart survey, referred to earlier as part of the state’s evaluation tool. A report to NCLB of the technology proficiency of eighth grade students from the districts each year documents technology proficiency within the school districts. This is required by NCLB to support their goal that “by the time the student finishes the eighth grade, regardless of the student’s race, ethnicity, gender, family income, geographic location or disability” ("No Child Left Behind (NCLB) Act of 2001," 2002, p. Sec. 2402 (2402) a).

The plans are in place. ISTE created educational technology standards for administrator, teachers and students to use as a roadmap for
“teaching effectively and growing professionally in an increasingly digital world” (International Society for Technology in Education, 2010). The U.S. Department of Education wrote the National Education Technology Plan (United States Department of Education, 2010), and No Child Left Behind (NCLB) (United States Department of Education, 2006) in part to address technology use for learning. NCLB provides funds to states for technology through Title II, Part D of the Enhancing Education Through Technology Act of 2001 to improve student academic growth through teacher training (Texas Education Agency, 2011f). The state of Texas, as mandated in the Texas Education Code, to have a Long Range Plan for Technology, LRPT, (State of Texas, 2003b; Texas Education Agency, 2006) and the districts must have a technology plan approved by TEA to receive funds from NCLB Title II, Part D (Technology Planning E-Rate Support Center, 2012a) or e-rate funding (Technology Planning E-Rate Support Center, 2012b).

Documentation of technology use in the schools is sent to NCLB and the Texas Legislature (Texas Education Agency, 2011d). This is done through the School Technology and Readiness STaR Chart surveys for teachers, principals and superintendent distributed by TEA (Texas Education Agency, 2011c). Now the wait has begun to see the technologically literate, brilliant students appear, ready for the 21st century of jobs and responsibilities.
2.4 Educational Institutional Models

At the core of instruction is the belief that the design and presentation of instruction will foster a learning environment beneficial for learning. The factory model and innovative model are dominant in north Texas and are distinctive in their approach to learning, approach to instruction, and administrative expectations. To understand this, there must be some understanding of instructional practices within learning environments.

The case study chosen was developed using two case studies from two different educational institutional environmental models upheld by the school’s vision of education. The vision of the school, the expectations of the teachers by the administration at the campus and from the district influence the environment of learning. The teachers in each model are evaluated based on the vision of the environment upheld at the campus making the change from one type of educational environment to another difficult if the entire environment is not cohesive in their belief. Understanding these concepts influence the results of this research and suggest further exploration.
2.5 Factory Model Schools

2.5.1 Factory Model Learning Environments

Educational learning expectations are the molds used to create the learning centers for our children. The learning environment set for the students to enter and grow in knowledge is setup and created by the economic expectation of our country. One could even say that the K-12 educational system was built to ensure that the graduates are produced to enable the perpetuation of our country’s economic performance in this world (Binder, 2008; Van Duzer, 2006).

As our country migrated from farming to the industrial centers to find work in the mass production factories at the end of the 19th century, the educational needs drastically changed. The assembly line, one of the most influential inventions in our country (Assembly line, 1999), created a need in the United States for a more specialized workforce. The success of this new mass production, the assembly line workforce was driving the United States of America to one of the most influential and successful economies of the industrialized nation (Binder, 2008).

At the end of the 19th century, as our industrialized nation was migrating to the factories, the need for workers became a demand for our country. As America reacted to this need, our country changed drastically with the rise of an industrial nation. Changes included were where people lived, the organization of businesses and many laws enacted and practices
of the government changed. One major changed in our country occurred as the success of the assembly line was projected to the educational environments. As this system of assembly line factory production was so successful, there was seen a promise of the same success if transferred to our school environments (Binder, 2008; Milliron, 2007; Van Duzer, 2006). Although the environment setup for the educational system in the United States mimicked the assembly line, mass production system, the schools would still use the agrarian calendar for the school year continuing as it had in the previous century.

It is estimated that in the early 1800s 3% of our nation participated in factory work leaving 84% of our nation in the agricultural industry. By the mid 1900’s, factory workers comprised 10% of the workforce. It was during the migration to factory work our school design and environment changed. Our schools still represent the factories design of the early 1900s (Binder, 2008). As students arrive at school, a bell rings to signal that work has begun. Then, they move around at specified times for breaks signified by the bell system and a bell releases them at the end of their workday. The bell system develops one basic employment skills necessary for the factories. The students practice punctuality through daily repetition of compliance to schedules to be a model employee for the factory. They are to show up on time, follow directions, do not question authority, and follow the examples of those before you.
An examination of the definition for assembly lines shows a strong resemblance to the environment seen in traditional model schools. An assembly line, or production line, is an "arrangement of machines, tools, and workers in which a product is assembled by having each perform a specific, successive operation on an incomplete unit as it passes by in a series of stages organized in a direct line" (Assembly line, 2003).

Replacing the word machine with the educational admonitions from federal to the campus, replace tools with curriculum, and teachers instead of workers, and each performing a specific, successive operation on the unit/student as it passes in a series of stages organized in a direct line, you have the perfect picture of our grade level system. The goal of this type of assembly line, factory system of education was created to produce a final product and that product, in this case a person, capable of working in a factory-dominated economy. This was a massive paradigm shift for our country at the turn of the 20th century. The design of education, the change in the implementation of the design and the design of the building to encase the design all had to change. The underlying belief for education changed to accommodate our quickly rising economy jump started by the invention of the assembly line, mass production factories.

One major concern that arose from this inflexible system is because it is so massive that to change the system would disrupt the flow of products to support the economic future of the United States. The products must be
developing or producing in the time allotted or our economy may falter. When transferred to our school system, the students must continue to flow out the doors of our institutions or risk disruption of the institution and the stability of the workforce needed for our economy. The child that does not read until the second grade or the student that excels in the literary genres of curriculum but struggles in the mathematics area are both successfully completing the mandatory testing system. While documentation for these children would success, they may not have the necessary foundation to proceed and be successful at the next level. The system is apt to trudge along allowing this student to continue without each piece of their education complete to not affect the speed of the production line and product production totals.

The human capacity or pace of learning is another issue to strain this environmental model. The assembly line may not move fast enough for some students leaving them uninterested and looking for ways to entertain themselves as they wait for everyone to reach a consensus level before moving onto the next stage. Compound this with the disadvantaged children who traditionally struggle to attain the required year’s cognitive growth and either pushed along unprepared or put through the level again to gain the missed information. This gives you pulling at each way within the system. Many realize that this system does not work for all (Elkin, 2001) and believe it is time for change.

The solution to this is not social or emotional promotion to enable
students to progress with their peers. The factory model system design will falter if the products/students is held back, and to hold back a majority of students because of testing requirements that are being used to qualify that the students is ready to move to the next state will create issues beyond the controls of the system. Also, those students that are held back are not increasing their success rate through the educational system (Van Duzer, 2006). It is not only the model of education that will not function with the retention of students but the product, retaining the student does not produce a finished product either. The students which are retained are 20 to 50% more likely to drop out and not finish high school (Jimerson, 2001, p. 433)

The other side of the issue of social promotion rears when educators in Texas speak of standardized testing and the state mandate for successful mastery of state mandated tests in certain grades for student promotion. Mark Wilson discusses throughout the book, Flunking Grades: Research and Policies on the policy of retention based upon mastery of standardized test as an unsuccessful alternative. This collection of research, edited by Shepard and Smith, states retention to be an “education treatment that is perhaps the biggest and bluntest” weapon in the administrators arsenal in their drive “make school children more alike and, hence, more amenable to systematization” (Wilson, 1990, p. 228). The cookie cutter model of the assembly line educational system needs to change with the needs of our culture.
As the industrial age ends, the information age is rising to the top. In the mid 1900s approximately 35% of America’s nonagricultural workers were producing products in areas such as manufacturing and construction and 65% produced services (Binder, 2008). By the year 2007, 84% produced services. The percentage is continuing to grow for the service industry and diminish for the nonagricultural product manufacturing. As more machines take over the manual jobs in the manufacturing industry of our nation, the need for communicative problem solvers is increasing.

2.5.2 Factory Model Instruction

Our traditional teaching model is a small variation from the teaching model used for decades. In a search for photos of classrooms, classrooms of the 1900s and classrooms of ancient Greece, there is a common element. Students are sitting quietly; facing the front of the room and listening to the instructor speak. There were some improvements during the 20th century in the public schools. Enhancements for educational experience of the students brought books into the classrooms. The ancient Greeks used books. These books seen in pictures of painting representing their classrooms were hand-written and very expensive, as this was before the invention of the printing press. The invention of the printing press in 1445 (Annenberg Foundation, 2012) changed the classrooms as more information was now available to the students and the cost of this information decreased.
The word textbook became a common word in education and was added to the English language reference sources in 1792 (Textbook, n.d.). Textbooks for children, within the countries where compulsory education was mandated, became the primary resource for students in the 19th century. The use of textbooks in America began with *The McGuffey Readers*, first published in 1833. The proliferation of textbooks throughout the learning environments has grown as the educational institutions have requested material with which to teach. As the students were now learning of more and more of the world through the visual aids of books, either textbooks or trade books, this expensive luxury became a tradition.

When television was invented and began appearing in homes and slowly replacing the reel to reel films in schools, I can remember how statements such as, “this is going to change education.” With the availability of so much visual information and movies, the students will be more informed and much more worldly. The growth of the multimedia, digital environment within the homes with the ability to see information with the spoken information almost as soon as it happened was breath taking.

The teaching techniques used in education was not changing even with all the new information the students were absorbing from their digital environment. The teacher was still the one to teach all the information by giving it judiciously to the students as the decision was made they were able and ready to learn and the student ready to being taught. The teacher’s
responsibility to provide the information worthy of learning while the children attend school seemed the goal of teaching. The students were in their rows, listening attentively while the teacher told them what they were to learn, how they were to learn and what they had to remember so that they could take a test and prove that they had learned.

This lecture, or the tabula rasa approach where they are blank slates and expected to absorb information passively (Philosophy of education, 2010) as they were seated in their desks is still a dominant teaching style within the factory model system of education. Beginning in the mid 1960’s, new research of pedagogy techniques began showing in journals for the teaching community. The study of teaching methodology, student learning preferences, and preferred educational environments began to proliferate the educational journals during the last few decades of the 20th century (Education, 2010).

Towards the end of the 20th century, another invention began reforming the classroom. In 1990, Tim Berners-Lee invented WorldWideWeb, later renamed as Nexus (Tim Berners-Lee, n.d.), which began to open the door for our newest paradigm shift from the industrial age to the information age. Then, with Marc Andreessen and his team at NCSA Mosaic introducing the graphical web browser, Netscape Navigator in 1993 (Andreessen, 2003), the changes in education began to explode. This
invention, the web browser, creates turmoil in the educational system as monumentally as the printing press or the assembly line.

The United States educators could see the changes beginning to occur. Researchers, practitioners and parents were already concerned about the educational environment for our students. In 1981, the Secretary of Education, Terrell H. Bell created the National Commission of Excellence in Education to provide leadership, constructive criticism, and assistance to the educational institutions in the United States (National Commission on Excellence in Education, 1983). The Secretary was concerned. His words to the commission were to investigate “the widespread public perception that something is seriously remiss in our educational system” (National Commission on Excellence in Education, 1983, p. 7).

Some of the items in this report showed that our students were not spending as much time in the higher-level mathematics courses as other industrialized countries. Note this report was before the web browser was developed or introduced to education. We were behind other countries before the bombardment of information began for our students.

In addition, the exams required for promotion or identification of successful completion have become tests to measure minimal skills and in some instances, when used as the measurement of success becomes the taught curriculum. Not surprisingly, the secondary school curricula has been
diluted and diffused to a point as to not have purpose (National Commission on Excellence in Education, 1983).

As a result of this report and other information from other influential parties, the United States, in 1994 signed into law the Goals 2000: Educate America Act. In Section 102, 3A states that by the year 2000 all students will demonstrate competency in the major subject areas that they will learn to use their minds well so they may be prepared for “productive employment in our Nation’s modern economy” (United States Congress, 1994). And after realizing that our students had not achieved all that Goals 2000 promoted to be achieved by the turn of the century, an act was passed by Congress to “close the achievement gap in our school systems with accountability, flexibility and choice so that no child is left behind” (107th Congress, 2001).

Plenty are noticing that our world is changing and our educational system is not adapting fast enough. Noticed is the move from an industrial society to an information age, the focus on global standards, and our world stretches flat through the invention of the Internet and the web browser provision of worldwide information. The last thirty years of reforms are not producing the results expected. Educational expectation are in our country are to provide our country with productive citizens to continue the economic growth and future of our country.

To prepare our students for their future world, some skills needed in the information age are the ability to acquire information, analyze the pieces,
and make decisions on the best way to use the information, or critical thinking. In educational journals, editorials, and government documents critical thinking shows in the first skills for the future listed. This term, critical thinking can and does show in the documents as a noun, a skill, and as a verb, for what these future citizens need as a tool, or skill.

Students will need the skill set to be able to determine the best way to learn what they need to learn (Milliron, 2007; Oblinger & Oblinger, 2005). Educators are not preparing students to perform in manufacturing jobs but in service-oriented jobs as that is the predominant job market of today. These positions, the jobs of the future will rely on data to see trends and determine outcomes. This requires curiosity and cognition. They will need to be curious enough to seek out the information and have the cognitive abilities to manipulate the information into something useful. The teachers of today and at the rate of change of the world today, do not know what those jobs will be.

Our students will need to be creative to be able to find solutions that are not available now and must have the communication skills to promote their solutions in a service oriented society if they want to have success (Oblinger & Oblinger, 2005).

If our educational environments that we have in place today are not working, it is not because we are not working hard enough. It is not because we are not cognizant of the need to address problems. It seems to be driving toward a change in the system. A change as dramatic as the change from
agricultural one-room schoolhouses to the assembly line instructional environments we have today. The curriculum we teach needs to change. This should include the way learning happens and how we document and promote successful learning. Having more to learn is not the solution now. If we continue to add onto the standards in our standards-based curriculum model, we are setting up a scenario where most of the students will not be able to master the minimum expectations, much less the high expectations that is seen as necessary for our working class of the future.

2.6 21st Century Learning

2.6.1 21st century Learning Environment

In the dominant factory model of educational learning environments, the teachers are the givers of information and the students' primary source of information and the textbooks, which are purported to cover thoroughly the standards presented by the ruling bodies, map the semester or year-long course (Binder, 2008; Van Duzer, 2006). There is a growing population that has begun to recognize the need to address 21st century skills needed by our students to be successful learners as covered in section 2.2.

The skills needed are those such as problem solving skills, communication skills, interpersonal skills, ability to self-direct learning and the ability to use the tools available in our society today (Kozma & Schank, 1998; Riordan, 2005). These are not new skills but are skills that build on the
knowledge learned in our knowledge based learning environments but must go further as a drive for lifelong learning (Collins, 2009). There is a problem in addressing these skills. These skills are not skills that are tested in the state mandated tests. They are difficult to assess and difficult to set standards acceptable at any grade level, as our system is designed now.

The state of Texas education standards incorporate the skills of the 21st century yet are not tested and therefore not focused on in the lower grades. There are some courses in the high school and middle school levels students can choose from as an elective such as speech, drama, and computer science courses. In addition, to break the cycle of pedagogy is difficult and time consuming. The teachers coming into the teaching field after 2010 have lived in a world where technology has always been present. They may not have always had access to this technology but it has always had a presence. These teachers, as they go out into the field after graduation are presented with the mammoth monster of the factory model institutions. Meeting the challenge of change will require determination, and teacher awareness of the need for teachers as facilitators of learning as students learn to take on their role as learner and not students that have been taught (Collins, 2009).

The solutions for our student’s success in our world do not involve only knowledge skills. The key to our student’s future is now the 21st century skills. The ability to teach the knowledge skills is out there and there are
plenty of examples and very successful mentors for new teachers to model after. These new teachers are beginning to populate the teaching profession and will have to fight the statements of, ‘that’s the way it’s always been’ and to be able to communicate what they have learned as necessary for our students to succeed. The change will not only be what the teachers going into the field have been taught but the instruction that will need to happen to change the pedagogy within the current system. The administration will have to accept and embrace innovative teaching practices that have been outside of the norm in the present factory model schools (Jukes, Dosaj, & The InfoSavvy Group, 2006; Prensky, 2008a; Stuebing, 2004).

As the teachers are monitored and evaluated through teacher appraisal systems, The administrators will need to look beyond the check-off list of current appraisal instruments and look into what is happening in the classroom, not only what the teachers are doing. The appraisal systems will also need updating to show teacher use of 21st century skills, as the appraisal systems and the forms incorporated are the instrument used by administrators to document teacher skills in the classroom. Sprinkled through the learning communities are administrators letting the new pedagogy necessary for implementation of the 21st century learning skills thrive (Oblinger & Oblinger, 2005; Pearlman, 2010; Tapscott, 2009).
2.6.2 Project-Based Learning

One models used to address 21st century learning skills is the use of the project-based learning. Project-based learning and problem-based learning are theoretically different learning approaches (Buck Institute for Education, 2012a; Hmelo-Silver, 2004) yet the acronym, PBL is used interchangeably by many teachers. There is a system of schools that have embraced the project-based model of learning and are showing great success with the students achievements on standardized tests and the students moral and enthusiasm toward learning (Pearlman, 2010). PBL is a thorough and systematic teaching pedagogy where the students, through inquiry learning, address an authentic problem that engages the students in critical thinking skills and analysis to present a solution (Callison, 2006; Cobban, 2010; Solomon, 2003). It is an extended inquiry process created through the introduction of a complex problem or question (Buck Institute for Education, 2012a; Larmer & Mergendoller, 2010; Piers & Donald, 2006). The teacher moves away from the lecturer and becomes a facilitator encouraging learning of academic content through collaborative, interpersonal and communication skills and the available tools of the 21st century (Breivik, 2005; Page, 2006). As the teacher releases the front of the room, the classrooms rearrange themselves into learning areas for group work or independent work. The focus in the schools is on learning and not on the individual minute skills and memorization of facts. Most importantly, the
students become self-directed, engaged learners using critical thinking skills and problem solving skills while collaborating and learning (Breivik, 2005; Page, 2006). A visual provided by the Buck Institute for Education outlines PBL as rigorous, meaningful and effective with many 21st century components (Buck Institute for Education, 2012b).

Prakash Nair mentions in his article in Education Week, Published online, July 29, 2011, mentions that “the classroom is obsolete” and “a relic left over from the Industrial Revolution” (Nair, 2011). There is a new model of school cropping up throughout the United States following the 21st century model of schools. The innovative model’s focus for curriculum is on PBL. The curriculum at new technology high schools follow the 21st century knowledge and skills outline of expectations by focusing learning on projects based on authentic experiences (Pearlman, 2010).

The incorporation of 21st century skills and learning opportunities for students to succeed in the economy of the future is driving the need for more innovative design schools. The use of PBL is time consuming for teachers and curriculum writers to design for the millennial students learning style (Dede, 2005), which is one of the problems holding teachers back from implementation of this type of learning. It is a complex change that will initiate a paradigm shift within the educational structure. This shift will cause some challenges from educators and parents and those taking on this challenge must believe and understand the researched benefits of this learning model.
Moreover, possibly most important is to have an administration that will allow for the shift in models within their school. The teachers today cannot teach their students of the technological advances not yet seen or the knowledge not yet invented. The teachers will need to implement 21st century skills to prepare our students for a life where the shelf life of knowledge is getting shorter (Law, Lee, & Chow, 2002) and where student centered learning methods such as PBL create the communicative, problem solving environment they need for success in the predicted service industry economy of their future.
CHAPTER 3
RESEARCH METHODOLOGY

3.1 Introduction

Two archived research studies from an emerging university in southwestern United States that focused on teacher and student perceptions of technology in the school. The purpose of these studies was to produce a documentary research film focused on the teacher and student perceptions of technology in their schools. The first research proposal is to film undergraduate teachers candidates with 1 year, 5 years, and over 10 years of experience about their school environment and how technology plays a part in their teaching at the end of the 2010 school year. The second proposal is to create a film at a high school implementing innovative projects and problem-based learning methods which leverage technology to teach at the end of the 2011 school year.

Over a 2 year period, many interviews were recorded and personal experiences noted. For the purpose of this research, only interviews are included. The interviews included 7 public school teachers during 8 interview sessions from 3 traditional setting schools and a school using the New tech high school program model. The public school teacher’s interpretations captured using digital video equipment, microphones, and secured areas to tape recorded interviews answered questions created by the research teams as to the state of
technology use by teachers and students in their school, their view of teaching and learning and a description of the normal activities experienced during the school day.

The research software program, QSR NVivo 9 assists the researcher to process, transcribe, and analyze the data that evolves from the transcribed interviews and the research media available. Constant comparative analysis of transcripts, interviews of faculty members, and web site information for the schools developed themes relating to teacher’s techniques for student use of technology and the environments where student use of technology as a tool for learning is successful.

3.2 Research Design

This case study is compiled from two research studies designed as qualitative in methods and content analysis which Yin, 2003 states as the preferred strategy when answering questions using when, how, or why and there is little control of the boundaries of the answers to the current situation (Yin, 2003). The design of each research study included in this study was written for a qualitative method with purposeful instance questioning to allow for later generalization of findings (United States General Accounting Office, 1990). The interview questions asked during the research studies were open-ended allowing the teachers to freely respond. These types of questions allowed for important broad perspectives to be examined (United States General Accounting Office,
1990). One research study was originally written as a critical CinéEthnography. Yet, if the researcher is not immersed throughout the process, this strategy is not appropriate to use explicitly (Gerring, 2007; Yin, 2003). The use of ethnographic research within education allowed for the interviewers to share their stories of teachers and their learners (Gratch et al., 2011; Warren et al., 2011). One area of the ciné-ethnographic research methods noted is an understanding of the researcher’s attitude and interest in the research. If immersed in the educational field, a careful critique is necessary to not allow personal attitudes to interfere with methods used (Warren & Gratch, in press). However, personal experiences in education will also allow the writer of this paper to study the inequalities or variances within the educational systems being studied.

3.3 Participants

The analysis consisted of data collected from eight interview transcripts from teachers contracted to work in a north Texas public school. The school environment these teachers worked with was organized into two groups, one group of 3 teachers which used the traditional approach to learning and the other five teachers which used either a problem or project-based approach to learning.

This analysis consisted of 8 teachers from 3 different school environments. One environment, which used PBL as the school expectations for instruction, was the location and place of employment for 5 of those interviewed. The writer of this paper assigned the research study numbers and pseudonyms
for the participants of these interviews. They were N1-Alan, N2-Beverly, N3-Denise, N4-Evelyn, and N6-Jon. The other three teachers interviewed, S1- Mary, S2-Terry, and S3-Yvonne were from schools using the traditional approach of instruction throughout the 20th century. Two teachers worked at the elementary level of instruction and one worked at a middle school, disciplinary placement school. Combined, all levels of instruction, elementary, middle and high school are included. This configuration of data includes two instructional strategies, innovative/PBL environment and the factory model/traditional environment.

Table 3

<table>
<thead>
<tr>
<th>Data Label</th>
<th>Gender</th>
<th>Years of Experience</th>
<th>Certification Type</th>
<th>Highest Educ. Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>N1-Alan</td>
<td>Male</td>
<td>8-15</td>
<td>Traditional</td>
<td>Graduate</td>
</tr>
<tr>
<td>N2-Beverly</td>
<td>Female</td>
<td>1-3</td>
<td>Traditional</td>
<td>Graduate</td>
</tr>
<tr>
<td>N3-Denise</td>
<td>Female</td>
<td>8-15</td>
<td>Traditional</td>
<td>Graduate</td>
</tr>
<tr>
<td>N4a&amp;b-Evelyn</td>
<td>Female</td>
<td>4-7</td>
<td>Traditional</td>
<td>Graduate</td>
</tr>
<tr>
<td>N6-Jon</td>
<td>Male</td>
<td>15+</td>
<td>Traditional</td>
<td>Undergraduate</td>
</tr>
<tr>
<td>Mary-Mary</td>
<td>Female</td>
<td>1-3</td>
<td>Traditional</td>
<td>Graduate</td>
</tr>
<tr>
<td>S2-Terry</td>
<td>Male</td>
<td>15+</td>
<td>Traditional</td>
<td>Undergraduate</td>
</tr>
<tr>
<td>S3-Yvonne</td>
<td>Female</td>
<td>1-3</td>
<td>Alternative</td>
<td>Unknown</td>
</tr>
</tbody>
</table>

Table 3 shows the gender distribution consisted of two male teachers at the high school level and one at the elementary level. The female teachers distributed with one at the elementary, one at the middle school and four at the
high school environments. The educational attainment of the interviewees had five teachers with Masters degrees. Four of these teachers with master’s degrees worked at the high school level. Of those with the master’s degree, three were female and one male.

There was not an even distribution of years of service. Although the years of service was spread with three having from 1 to 3 years of service in public education, one at 4 to 7 years of education, and two at 8-15 years of service, the two interviewees with over 15 years of service in public education were both male. This configuration caused a skew in data relating to gender differences in opinion.

Three of the interviewees did not mention a master’s degree. Having 3 of the 8 not having master’s degree is not of concern for distributions in this study. However, of the 3 without a known master’s degree, 2 participants are male interviewees and 1 female. One male interviewee mentioned master’s level coursework but did not mention a university attended for the master’s program or conference of a degree. The 1 female person without a master’s degree or an undergraduate degree was the only person to be working through an alternative certification program. Yvonne had begun her course work at a four-year college and then made the decision to use the regional service center to pursue the alternative certification available there. At the time of the interview, she was in her first of two years of her field experience requirement. All the other interviewees had completed an undergraduate degree at a four-year college.
Only the male interviewee, Terry, from the traditional setting, data set would not have had to challenge and pass the Texas Certification Exam. At the time of his certification, the Texas State Board of Certification granted certificates based on the College or University recommendation.

3.4 Setting

The interviews were from two educational models, traditional and innovative as explained in chapter 2. The first instructional model, the traditional, is seen with the box shaped rooms having one door. The classrooms have a desk for each child with the desks organized in straight rows and columns facing the front of the classroom. The teacher has an area in the front where the lecture is performed with writing areas behind and possibly around the sides to use for demonstrations and explanations of the assignments. The second instructional model, the innovative model has classrooms where students move their desks around the room as necessary. The teacher works as a facilitator to the learning. There can be lecture areas available but it is not set as a daily used defined area.

The interviews conducted at innovative campus with Alan, Beverly, Denise, Evelyn and Jon, occurred during the school day in a classroom specified by the principal. The interviews conducted with Mary, Terry, and Yvonne, from the traditional school model occurred in various locations available for the interviews and comfortable for the participants. All the interviews conducted used private areas without children present.
3.5 Instrument

The questions asked during the interviews within this multi-case study centered on the theme of the uses of technology in the public schools. The questions asked at the traditional campus models strongly focused their inquiry of technology use by the teacher and by the students. In addition, questions of district and campus support available for the integration of technology into the teacher’s educational environment and the instructional techniques and communication style used by teacher are consistent within the three cases.

At the innovative campus, questions and conversational elicitations focused on the campus environment including the instructional expectations of the teachers and communication between the staff and with students. There were also questions of student activities, support from the district for technology integration and explanations of student projects.

The questions from both of the case studies did show through interpretation of the transcripts to categorize into three themes. All the questions flowed into the areas of student expectations, teacher expectations and environmental influences. Tables of the interviewer’s dialogue and questions, and how they combined into the themes to establish consistency between the two research studies, are available in the appendix.

3.6 Procedure

The first case study research, which provided archived video data for this
paper, was conducted through an emerging research university in the southwestern United States. The study, Exploratory Documentary Research Analysis on Technology Use for Teaching and learning in Educational Settings, occurred during the 2009-2010 school year in late April and May. The convenience sample the research team chose pre-service teacher candidates, 2 first year teachers, 2 fifth year teachers, 2 teachers with ten or more years’ experience, and 1 university professor and a community college instructor. The research study was to use videotaped interviews, Internet surveys, and observations, and other items necessary to better understand the restrictions and affordances of technology use within the school settings.

The archived video data for from second research study conducted at an emerging research university in the southwestern United States was originally filmed during the school year of 2010-2011. The title of this study was a Critical CinéEthnographic Documentary Research on the Use of Innovative Instructional Methods and Technology Use in a Secondary Setting. The purpose of this study was to create a documentary based on the video recorded interviews, observations, and student participatory filming of peers, teacher and administrators at a high school using innovative instructional practices with technology infused throughout. The convenience sample of participants of this study was three to ten teacher participants, thirty to sixty student participants, and administrators from the school and district level along with parents of students.
To allow for consistency this multi-case study used only transcribed videotaped interviews and no other data collected during the research projects. Personal prior experience in public education and observations at the innovative high school were available for analysis but not used.

3.7 Data Collection

The interview selections from the archived videos were blind, random from the two research studies mentioned above; the Exploratory Documentary Research and Analysis on Technology, and the CinéEthnographic Documentary Research.

NVivo 9, a tool for qualitative data analysis, was used to import and view the videotaped interviews and used in systematically transcribing the interviews. This software enables the transcriptions to be marked with time stamps available for verification and validation of transcribed interview information. The data from Nvivo 9 of the transcribed interviews, exported into Microsoft Word to a table format enabling the addition of a column in the front of each line of time stamped entry. This column provided room for information to clarify the lines of interviews necessary for differentiation. Once the importation of the transcripts back into the software completed the coding and analysis began. The system of identification includes a Q added at the beginning of each entry, which notes the interviewer asking a question and an A designates the teacher’s responses. To allow for data verification and inspection, the use of N1, N2, N3, N4, N6, Mary, S2, or S3
placed behind the Q and A at the beginning of each line denotes the changes in
speakers from the interviewer and the interviewee.

N represents the interviews transcribed from the innovative school model
using the PBL approach to instruction. N1 denotes the first interview transcribed
from the innovative school model with Alan, N2 given to the second interview
transcribed for Beverly, N3 the third with Denise, N4 the fourth with Evelyn, N5
the fifth, and N6 the sixth with Jon. During the first transcription, coding N5 was a
determined to be a continuation of N4 and therefore combined to create N4a&b.

S represents the standard or traditional factory model environment present
in most of the public schools in north Texas. Mary represents Mary, the first
interview transcription from the traditional school using the traditional model, S2,
Terry, the second interview and S3, Yvonne, the third interview.

The original digital video interview transcripts are stored on a separate
server as documented in the research design. One copy of each of the interviews
were placed on a removable storage device and hand transported to computer
for transcription. The interviews chosen for the case study were at random from
the digital files stored on that server and the numbering system is not
representational of a hierarchical system but only of the order chosen for
transcriptions.

During the first listening of the seven teacher interviews themes began to
develop. During the second listening and the transcribing process of the
teacher’s interviews, the three themes again stood out. The themes related to
teacher perceptions of appropriate technology use for education, teaching strategies currently using and the perception of school environmental expectations and restrictions for technology infused learning began to develop as major factors.

3.8 Interview Measures

The interviews were held at the end of the year, during late April and early May. The teacher's interviews were captured using two digital recorders. Interviewers used a list of topics and questions that each of the teachers were asked. Some variance was entertained to establish a flow and camaraderie with the teacher. The variance in questions allowed the teacher a more comfortable, conversational atmosphere, which produced a smooth flow of conversation. Some of the questions were open ended to allow the teachers to form their opinions and respond as appropriately as they felt comfortable sharing. There was some prompting from the researcher to elicit complete responses or help the teacher understand the question asked. Copies of the interviewer's questions are available in the Appendix. Each line denotes a conversation from the interviewer with the specific questions noted in bold text font.

3.9 Data Analysis

Components employed from a grounded theory approach allowed research questions to emerge from the data. In Creswell’s book, *Qualitative*

The open coding phase of data analysis began with the video taped interviews imported into the qualitative software NVivo 9. Other researchers stress that the production and use of transcripts are research activities and to approach them as such (Bucholtz, 2007; McLellan, MacQueen, & Neidig, 2003; Mergenthaler & Stinson, 1992). The open coding phase of analysis of this study would use the transcripts created from the video interviews.

In Mergenthaler and Stinson’s 1992 article of transcription standards needed in qualitative research, they emphasized the importance of rules or guidelines as essential and were supported by McLellan, MacQueen, & Neidig’s in their 2003 article on qualitative interviewing (McLellan et al., 2003; Mergenthaler & Stinson, 1992). The seven rules or guidelines created provide a basis in establishing consistency between the interview and the transcriptions. The use of the transcription standards with qualitative software proved invaluable in providing consistency between the two research studies chosen for this multiple case study.

The seven rules written are for another field of science yet each step provided an appropriate guide for the field of educational research.

1. Preserve morphologic naturalness of transcription. The graphemic presentation of word forms, the form of commentaries, and the use
of punctuation should be as similar as possible to the presentation and use generally accepted in written text.

2. Preserve naturalness of the transcript structure. The printed format should be as similar as possible to what is generally accepted, like the printed versions of radio plays or movie scripts. The text must be clearly structured by speech markers.

3. The transcript should be an exact reproduction. The loss of information resulting from the transition from a visual and/or acoustic to a written record of the interview should be as small as possible. A transcript should not be prematurely reduced but should be kept as a raw data form.

4. The transcription rules should be universal. The rules governing transcription should, as much as possible, make the transcripts suitable for both human and machine use.

5. The transcription rules should be complete. It should be possible for the transcriber to prepare transcripts using only these rules based on his or her everyday language competence. Specific knowledge, such as codings stemming from various linguistic theories, should not be required.

6. The transcription rules should be independent. It should be possible to transcribe various kinds of therapeutic discourse with the same set of rules. Transcription standards should be independent of the transcriber, understandable and applicable by secretaries and scientists.

7. The transcription rules should be intellectually elegant. The transcription rules must be limited in number, simple, and easy to learn. (Mergenthaler & Stinson, 1992, pp. 129-130)

The interviewed teachers were not available for validation of their interview (Creswell & Miller, 2000; McLellan et al., 2003). Therefore, a peer-briefer was employed which did not have a background as an educator for grades K-12 to add credibility to the interview transcripts. This investigator triangulation was critical in that it would increase the validity and reliability of the transcripts and also decrease any bias on the part of this writer during the
transcription of the interviews (Thurmond, 2001). Groups of ideas or categorical
themes began to form for this researcher as the interviews were transcribed. One
broad category and three sub categories was determined allowing open coding,
the next phase of analysis, to begin.

The transcriptions uploaded as documents into NVivo 9 for axial coding
began the second exploration for themes to connect and support the categories
found during open coding. This began with the separation of teacher and
interviewer conversations into nodes, category holders in NVivo. Query runs
available in Nvivo 9 found supporting themes or sub categories for the previous
themes. Using analysis of the results from the axial coding process, a more
selective coding process began.

NVivo allowed creation more refined nodes to query for connections, if
any, between the sub categories. The selective coding phase determined support
for the statements or questions created during the open coding. Nvivo’s cluster
analysis of word similarities validated the coding conducted to support the results
as reported in Chapter 4.
CHAPTER 4

ANALYSIS

4.1 Introduction

The teacher interviews for this case study are from two research projects from an emerging research university in the southwestern United States designed to explore technology integration within public education. One research project written included the interviewing of teachers who taught in a traditional school design and another project written included interviews from innovative pedagogical model and accompanying educational design known as New Tech Schools. All the teachers interviewed worked at a public school setting from school districts within the north Texas area at the time of the interviews.

Interviewees were from two different learning environments, traditional models and an innovative model. The seven adults interviewed were comprised of male and female, teachers new to the classroom though experienced teachers with 30+ years of service. The educational level which they instructed were varied also as they ranged from fourth grade teachers to teachers of seniors in high school. The school districts within this study spread through a wide range of economically disadvantaged ratios, ethnically diverse population spreads. The classroom to teacher ratio held to a 15 or 16 to 1 ratio for all the teachers but one
who was from a special situation in a center for alternative educational opportunities for students.

4.2 Categories of Analysis - First Exploration

The first coding instance occurred during the transcription of the videoed interviews. Three themes became apparent for analysis. The themes chosen appeared as each of the research interviewers asked questions within the theme of the teacher’s perception of teaching, the teacher’s perception of learning, the expectations of the learning environment which they were teaching and the role of technology throughout each.

The themes focused on for the first coding were as follows:

1. Perception of teaching.
3. Expectations within the learning environment for normal daily learning and teaching.
4. Role of technology within the school and district.

The questions varied some during the interviews to create flowing conversation or to elicit descriptions that are more thorough. This technique can lead to generalizability and validity issues as discussed later in this paper, but the answer elicited from the teachers interviewed fell within the four general themes listed above.
The methodology for analysis of themes began with the transcription of interviews. After importing, the video data to Nvivo 9 allows transcription creation while video or audio files are playing. During this process, the software will create time spreads to correspond with the transcriptions by allowing the transcriber to delineate the interviewer and the respondent’s conversations on separate lines within a table that could be used for validation during transcriptions or coding. The validity of the interviews transcribed using NVivo 9 qualitative software manual inspections proved valid using a peer review as accurate. During the transcription process, three dominant themes emerged.

To validate the first coding themes NVivo required the transcriptions to be available for coding. The transcriptions were exported from NVivo to a word document, which created a table, within the document with the line, the time stamp and the transcription in three separate columns. Each line was a row showing the start and stop time of the transcription statement. One major item completed was the cutting of the interviewer conversations and questions from the interviews. The replacement of the interviewer names and the deletion of the salutations and thank you conversations occurring at the end of each interview made possible setup the information for the next procedure. Completing these steps allowed exploration of the data using query runs in Nvivo from pure interviewee conversations. A copy of the original transcriptions with the researcher’s communications is available in Appendix B.
A word frequency exploratory query available within the NVivo 9 program validated the first exploration of coding themes using the pure teacher interview responses. The query parameters used in the runs were set to; the top twenty-five words used in the sources, elimination of all words less than five letters in length, and the root or stemmed word for the traditional schools, the innovative school and combined.

First analysis conducted looked for themes related to the preliminary themes and the second was to determine if there were any underlying themes or anomalies. The procedure used queried for the top ten words and their synonyms using a word frequency exploratory query. This procedure produces a visual analysis of the words used through word cloud examples and frequency charts.

One item showed very predominant in all query results. The word *know* appeared 336 times as the number one item on the frequency list. This was 170 more times than the next item on the frequency list of learning. Upon further exploration of this, it was determined that the use of this pragmatic force multiplier of the English language (Chia-Yen, 2010) was not intended as a root word for knowledge or that anyone knew any piece of information. 167 instances of this language device confused the results. Each instance was inspected and if the word was used with the word *you* to create the, you know, modifier, the phrase was changed to *you know* in the interview transcript. As the phrase is a modifier to give emphasis or force with others in conversational discourse or
thought and not as an object of knowledge, the elimination of these phrases will not alter the meaning. Leaving the replacement of yxx kxxx or kxxx will allow a reader of the transcript to interject the teacher’s emotional intensity and, or connection to the response (Chia-Yen, 2010). The Table 4 shows the numbers of instances of the word know, changed in each transcription.

Table 4
Language Idiom Replacement know replaced with kxxx

<table>
<thead>
<tr>
<th>Name</th>
<th>Before</th>
<th>After</th>
</tr>
</thead>
<tbody>
<tr>
<td>N1-Alan Transcription</td>
<td>72</td>
<td>36</td>
</tr>
<tr>
<td>N2-Beverly Transcription</td>
<td>22</td>
<td>9</td>
</tr>
<tr>
<td>N3-Denise Transcription</td>
<td>22</td>
<td>11</td>
</tr>
<tr>
<td>N4a&amp;b-Evelyn Transcription</td>
<td>41</td>
<td>27</td>
</tr>
<tr>
<td>N6 Transcription</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Mary-Mary Transcription</td>
<td>42</td>
<td>18</td>
</tr>
<tr>
<td>S2-Terry Transcription</td>
<td>49</td>
<td>21</td>
</tr>
<tr>
<td>S3-Yvonne Transcription</td>
<td>84</td>
<td>41</td>
</tr>
<tr>
<td>Totals</td>
<td>336</td>
<td>167</td>
</tr>
</tbody>
</table>

The exploratory word frequency queried the traditional schools and the innovative schools separately and combined to justify the results. This first step showed five dominant themes to appear. These were students, teachers, learning, knowing and school. The original list of frequently used words and their stems listed *students*, they’re separately, and similarly listed *teachers* and *we’re* separately. These combinations are speaking of the same people combined moved their frequency to the top of the list of most used words. In the list below
the combinations mentioned above are listed as student, shows the combination of student and they’re, and the word teacher shows the combination of teacher and we’re. The questions for the teachers were designed to address what they do in the classroom with the students. Therefore, these two terms, as expected, appear at the top of the list. They did appear at the top of the list, but as they appear throughout all conversations and the focus for these interviews, did not show as relevant for content. The relevancy of these two categories, teachers and students, is only exhibiting the interviews were successful in gaining information of teachers and their students.

Knows and similar words such as know and knowing had a combined weighted percentage of 99% and showed 167 occurrences in all sources combined. Learning with similar words such as learn, learned, and learns appeared with a 97% weighted percentage and 163 occurrences. School showed at 96% with 161 instances including similar words such as schooling and schools.

Of the 167 instances of know, knowing or knows, ninety-two instances were from the innovative school model and seventy-five were from the traditional school model. Knows ranked sixth on the list for the innovative school model. Project or projects is the term that replaced knows into the top three words used in the innovative model school’s list. Discussion of this factor is contained in the analyzation of the innovative school model later in this chapter.
Learning and its similar words showed with 140 of its 163 instances occurring at the innovative model school though not enough instances to appear on the list of the top twenty-five frequent words for the traditional school model. The instances for the word school and its similar words showed 105 instances for the innovative school and fifty-six at the traditional school.

*Figure 1. Word frequency comparison of education environments.*

The intent of this case study was to explore research conducted as to the use of technology in the schools by the teachers and their students. The three interviews of the traditional model school showed technology and computer with fifty-two instances and twenty-one instances. As the interviews purposefully contrived to delve into the use of these tools specifically, as expected, they did appear on the list in the top twenty-five frequently used words for the traditional school. The words computer, computers and technology, if combined would have
made this the top frequent word on the list. Yet, as the questions of their interviews focused on this topic, and that it was not on the list for the innovative schools, and did not show as one of the top five shows this as relevant to all areas as student and teacher, mentioned earlier.

Through the word lists and the word cloud, a visual provided by NVivo 9, each word from the word frequency can be further explored for relationships using this simplistic tool. Each word in the cloud example, shown in Figure 2 will also show where each word was coded from and will show the text on each side if the researcher deems it necessary to further analyze the report.

![Figure 2. Visual representation of frequency analysis.](image)

Exploring another anomaly in the word frequency report, focus inspection of the word think showed a view of the word usage for each instance with the words before and after in a word tree or highlighted throughout each source of data which it was pulled. What was determined was the word think though used many times throughout all the sources were from the respondent uttering
responses such as, “I think.” As all coherent humans think every day, this was
determined to be irrelevant for this study and deleted from the word cloud.

Table 5
Word Frequency Table

<table>
<thead>
<tr>
<th>Case Study Word Frequency Top 25 Stemmed</th>
<th>Traditional Schools Word Frequency Top 25 Stemmed</th>
<th>Innovative Schools Word Frequency Top 25 Stemmed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Know</td>
<td>167</td>
<td>Know</td>
</tr>
<tr>
<td>Learn</td>
<td>163</td>
<td>Would</td>
</tr>
<tr>
<td>School</td>
<td>161</td>
<td>They’re</td>
</tr>
<tr>
<td>Work</td>
<td>144</td>
<td>School</td>
</tr>
<tr>
<td>Project</td>
<td>121</td>
<td>Students</td>
</tr>
<tr>
<td>More</td>
<td>117</td>
<td>Technology</td>
</tr>
<tr>
<td>They’re</td>
<td>112</td>
<td>More</td>
</tr>
<tr>
<td>When</td>
<td>111</td>
<td>Well</td>
</tr>
<tr>
<td>Teach</td>
<td>106</td>
<td>Work</td>
</tr>
<tr>
<td>Would</td>
<td>104</td>
<td>Teacher</td>
</tr>
<tr>
<td>Student</td>
<td>102</td>
<td>Computer</td>
</tr>
<tr>
<td>Well</td>
<td>94</td>
<td>Classroom</td>
</tr>
<tr>
<td>Difference</td>
<td>93</td>
<td>Something</td>
</tr>
<tr>
<td>Other</td>
<td>92</td>
<td>When</td>
</tr>
<tr>
<td>We’re</td>
<td>90</td>
<td>Teach</td>
</tr>
<tr>
<td>Teacher</td>
<td>87</td>
<td>Need</td>
</tr>
<tr>
<td>Kind</td>
<td>84</td>
<td>Using</td>
</tr>
<tr>
<td>Need</td>
<td>81</td>
<td>Class</td>
</tr>
<tr>
<td>Want</td>
<td>81</td>
<td>Kind</td>
</tr>
<tr>
<td>Classroom</td>
<td>76</td>
<td>Talk</td>
</tr>
<tr>
<td>Technology</td>
<td>76</td>
<td>Other</td>
</tr>
<tr>
<td>Something</td>
<td>68</td>
<td>Where</td>
</tr>
<tr>
<td>Where</td>
<td>68</td>
<td>Problem</td>
</tr>
<tr>
<td>Doing</td>
<td>67</td>
<td>Learn</td>
</tr>
<tr>
<td>Talk</td>
<td>66</td>
<td>Doing</td>
</tr>
</tbody>
</table>

| Know                                   | 75                                               | Learn                                           |
| Would                                  | 65                                               | Project                                         |
| They’re                                 | 57                                               | School                                          |
| School                                 | 56                                               | Work                                            |
| Students                                | 56                                               | Knows                                           |
| Technology                              | 54                                               | Differently                                    |
| More                                    | 51                                               | When                                            |
| More                                    | 50                                               | Teach                                           |
| Work                                    | 43                                               | We’re                                           |
| Teacher                                 | 41                                               | Other                                           |
| Computer                                | 40                                               | More                                            |
| Classroom                               | 37                                               | Want                                            |
| Something                               | 37                                               | Here                                            |
| When                                    | 36                                               | Kind                                            |
| Teach                                   | 34                                               | They’re                                         |
| Need                                    | 30                                               | First                                           |
| Using                                   | 18                                               | Need                                            |
| Class                                    | 27                                               | Group                                           |
| Kind                                    | 27                                               | Make                                            |
| Talk                                    | 26                                               | Students                                        |
| Talk                                    | 22                                               | Teacher                                         |
| Where                                   | 24                                               | Doing                                           |
| Problem                                 | 24                                               | Giving                                          |
| Doing                                   | 23                                               | From                                            |
| Doing                                   | 22                                               | Those                                           |
The analysis of the first query results using a word frequency query showing the top twenty-five words and their stems, and only showing words with greater than three letters, validated the themes from the primary coding during the transcription coding and brings up more ideas for exploration as to the differences in the frequency lists.

The data exploration continues with the differences in perception in the responses from the traditional factory model teachers and the innovative school design used by the New Tech High School Model teachers.

4.3 Traditional School Model
Case Mary-Mary

The students in the traditional model were students from fourth, fifth, seventh, and eighth grades. In Case Mary, Mary taught fourth grade math and science in one of over fifty elementary schools from a large TEA Recognized district in north Texas. The average student to teacher population in this district was sixteen to one but the class population spoken of in the interview was the traditional twenty-two children in each classroom (the state allows no more than twenty-two students in an elementary classroom from prekindergarten through fourth grade). The campus population, though varying throughout the year, reported at an average of 580. During the 2010 school year the school’s ethnicity breakdown was 23% African American, 56% Hispanic, 18% White, and 25% other, and the percentage of economically disadvantaged was the highest of the
cases at 93%. This information was retrieved from the campus website and a citation was intentionally not added to the references to protect the privacy of the school district, school, and the children.

The average ACT scores in Texas for the year 2010 was 20.8 of 36. While this was just below the national average in 2010, this school district’s average ACT score was 22, just above the state average. The SAT score average for the district was 1035 for all tests from a possible 2400 and below the state average in 2010 of 1362. These scores came from the 60% of the students tested for college.

In this school district, the average revenue per pupil was $8,453 and their instructional expenditure per pupil was $7,811. Of this expenditure, 3% came from the line item for career and technical education and this campus had separate classrooms that held their computer lab. The purchase of technology equipment does not usually fall into this budget but the amount of 3% was a common percentage among three of the four schools studied. The information on instructional expenditures per student, Career and Technical Educational percent of budget, revenue per pupil, average SAT and ACT, percent tested for college, and the student-teacher ratio showed on the district’s publically available Snapshot 2010 District Detail Report from TEA and intentionally eliminated from the references to protect the privacy of the school, district, school and the children.
Mary stated that her children “went down to computers” which is taken to mean that the computer lab was in a different room than their classroom. This first year teacher did not mention any computers in the classroom for student use but did mention that during the year she used a computer and a projector for her lessons.

Case S2-Terry

Terry taught a fifth grade classroom in one of fifteen elementary schools within a rapidly growing district in north Texas. The average student to teacher population in this district was 16 to 1 but the class population spoken of in the interview was the traditional 22 children in each classroom (the state allows no more than 22 students in an elementary classroom from prekindergarten through fourth grade). The campus population, though varying throughout the year reported a student average of 650. During the 2010 school year the school’s averaged ethnicity breakdown showed 3% African American, 30% Hispanic, 64% White, and 3% other, and the percentage of economically disadvantaged was in the mid range of all the campuses at 38%. This information, found on the campus website intentionally not cited or added to the references to protect the privacy of the school district, school, and the children.

The average ACT scores in Texas for the year 2010 was 20.8 and eight out of 36. While this was just below the national average in 2010, this school district’s average ACT score was 23, just above the state average. The SAT score average for the district was 1012 for all tests from a possible 2400 and
below the state average in 2010 of 1362. These score came from the 44% of the
students tested for college.

In this school district, the average revenue per pupil was $10,006 and their
instructional expenditure per pupil was $4,516. The information on instructional
expenditures per student, Career and Technical Educational percent of budget,
revenue per pupil, average SAT and ACT, percent tested for college, and the
student-teacher ratio were obtained from the district's publically available
Snapshot 2010 District Detail Report from TEA and intentionally eliminated from
the references to protect the privacy of the school, district, school and the
children. Of the expenditures, 0% of the expenditures was set aside for career
and technical education.

The campus did have a separate classroom that held their computer lab.
The purchase of technology equipment does not usually fall into this budget but
the amount of zero percent was important, as it was the only district of the four
studied which did not report any expenditure in this area. The teacher did
mention that the district is building approximately one school per year, which
could affect this.

Terry mentioned that the children “went down to computers” which is
taken to mean that the computer lab was in a different room than their classroom.
The teacher did mention also have some computers in the classroom for student
use.
Case S3-Yvonne

Yvonne’s teaching environment was different from the other traditional model cases. She taught seventh and eighth grade students in an alternative educational school for middle school children in a large district in north Texas. The average student to teacher population in this district was fourteen to one but the class population spoken of in the interview was between 0 and 30 were possible in the classroom. During Yvonne’s first year in the classroom, there were between seven and ten throughout the year. The campus population varied throughout the year but was reported on their website at approximately 100. Since the school’s population is very mobile, the ethnic breakdown was not available for this campus. With this being the case, the ethnic break down will be for the school district as a whole. The 2010 district’s ethnicity breakdown was 25% African American, 30% Hispanic, 31% White, and 8% other, and the percentage of economically disadvantaged was very low at 5%. This information was retrieved from the campus website and a citation was intentionally not added to the references to protect the privacy of the school district, school, and the children.

The average ACT scores in Texas for the year 2010 was 20.8 of 36. While this was just below the national average in 2010, this school district’s average ACT score was 23, just above the state average. The SAT score average for the district was 1043 for all tests from a possible 2400 and below the state average
in 2010 of 1362. These scores came from the seventy-five percent of the students tested for college.

In this school district, the average revenue per pupil was 10,015 and their instructional expenditure per pupil was 8299. Of this expenditure, 3% was in career and technical education. The information on instructional expenditures per student, Career and Technical Educational percent of budget, revenue per pupil, average SAT and ACT, percent tested for college, and the student-teacher ratio were obtained from the district’s publically available Snapshot 2010 District Detail Report from TEA and intentionally not cited or added to the references to protect the privacy of the school, district, school and the children.

The purchase of technology equipment does not usually fall into this budget but is indicative of the district’s support of technology education. The campus did have a separate classroom that held their computer lab as Yvonne did mention that the district is building approximately one school per year, which could affect this.

Yvonne mentioned that the children could “go to computers” which is taken to mean that the computer lab was in a different room than their classroom. The teacher did mention also have two computers in the classroom for student use.
Traditional Model Case Comparisons

**Figure 3.** Traditional model cases ethnicity by case.

**Figure 4.** Traditional model cases percent of economically disadvantaged

**Figure 5.** Traditional model cases: Comparison of district revenue and instructional expenditures per pupil.
Figure 6. Ranking of factors influencing instruction for traditional model school districts.

The average ACT scores in Texas for the year 2010 was 20.8 of 36. While this was just below the national average in 2010, this school district’s average ACT score was 26, above the state average and highest of all cases studied. The SAT score average for the district, also the highest of all case districts, was 1156 for all tests from a possible 2400 and below the state average in 2010 of 1362. These scores came from the 86% of the students tested for college.

In this school district the average revenue per pupil was $10,076 and their instructional expenditure per pupil was $8,415, 84% of the revenue. Of this expenditure, 3% was in career and technical education. The information on instructional expenditures per student, Career and Technical Educational percent of budget, revenue per pupil, average SAT and ACT, percent tested for college, and the student-teacher ratio were obtained from the district’s publically available Snapshot 2010 District Detail Report from TEA and intentionally not cited or
entered into the references to protect the privacy of the school, district, school and the children.

The digital access for these students was a unique factor for this multi-case study. This campus was a one-to-one campus with students using laptops provided by the school or their own for during the school day. The campus provided wireless Wi-Fi access throughout the campus.

4.5 All Cases Compared

<table>
<thead>
<tr>
<th></th>
<th>S1</th>
<th>S2</th>
<th>S3</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rank of Revenue</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>Lowest</td>
</tr>
<tr>
<td>Rank of Instructional Expenditures per Pupil</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Rank of Economically Disadvantaged Population</td>
<td>Highest</td>
<td>3</td>
<td>4</td>
<td>4</td>
</tr>
</tbody>
</table>

*Figure 7. Ranking of factors influencing instruction for all cases.*

The visual provided by Figure 7 shows that the innovative schools had the highest revenue, highest expenditure per pupil, and their percentage of economically disadvantaged was equal to that of Terry’s district. The importance of this information is discussed further in the next chapter.
4.6 What is Teaching

This question asked of seven of the eight teachers interviewed, what is teaching. The teacher responses formed three themes within this category. The theme categories included compassion for students, the concept of teaching, and the content taught to the students.

In the theme of compassion for the students, the traditional model school coded three times for Mary and five times for Terry. The responses included those such as: “it’s constantly caring about kids,” “our kids came with so much going on at home that you had to really address their needs before they could think about how to do long division,” when you look “at them as individual, they are more inclined to give everything back in that classroom,” “The better … the relationship that I build with my students, uh, the more that I get in return,” and “it’s not just teaching them the curriculum.” There was only one response from the innovative school model addressing creating relationships with the students.

The theme related to the concept of teaching the innovative school model had the most responses. Five of the nine responses which fit to this category were; “I needed to become more up to date and less of a dinosaur of a teacher relying on that trusty file cabinet,” “providing the tools and your expertise to get them to that place and to give them a direction when they are totally floundering,” “making sure that everybody is learning how to apply learning to themselves,” “moving into the 21st century,” and “being a little bit of a commander of a ship of learning.”
The traditional model school teacher responses were such as; teaching is looking “at them as an individual…the better the relationships that I build with my students the more that I get in return,” “it’s not just about teaching them the curriculum.” “we want to better prepare them for what they’re about to encounter in real life,” “just doing the best that you can for kids and believing in every kid and that they can be successful and giving them the tools to be successful” and “it’s like the hardest job and the most important job.”

All the teachers recorded a passion for teaching and concern for the students. They all were concerned with providing the students the opportunities of learning to succeed in life.

4.7 The Teacher’s Role in the classroom

4.7.1 Traditional Model

These statements taken from the teacher’s interviewed at the traditional factory model school and the innovative model school are from statements made in reference to their feelings about teaching at their school, or what they normally teach during the day as shown in Table 6. The teachers mentioned very little problem-based learning and from the statements of what they were doing with the students but did mention about their style of teaching throughout most of the year. They also mentioned being concerned with the students following the procedures and rules established for their classroom.
<table>
<thead>
<tr>
<th>Yvonne</th>
<th>Mary</th>
<th>Mary</th>
<th>Terry</th>
<th>Yvonne</th>
<th>Mary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kindles are lightweight, the iPads are lightweight, you can access the Internet from them, you can read books, you can listen to things. I mean, everything that you would need to learn anything about anything would be right there. So</td>
<td>I would just introduce. It was broken down into small lessons, so we would introduce the lesson, usually review what we'd done the day before … then do kind of the same process the next day with the next lesson on that?</td>
<td>I believe that they need to be taught explicitly and independently a lot of times this year it just was stuff as it came up.</td>
<td>looks out and tries to find new ways to incorporate technology</td>
<td>I, honestly believe that most of the things that they have listed in the TEKS, the students really do need to know.</td>
<td></td>
</tr>
<tr>
<td>Mary</td>
<td>Yvonne</td>
<td>Mary</td>
<td>Yvonne</td>
<td>Mary</td>
<td></td>
</tr>
<tr>
<td>they step out of line they lose the privilege.</td>
<td>- I honestly believe that most of the things that they have listed in the TEKS, the students really do need to know.</td>
<td>a fourth grader. I don't think that's where they should be.</td>
<td>They can hear me talk about it, they can ask questions, they can take notes.</td>
<td>I couldn't count regularly on them using technology every class period every day. It couldn't be done.</td>
<td></td>
</tr>
<tr>
<td>Yvonne</td>
<td>Mary</td>
<td>Mary</td>
<td>Yvonne</td>
<td>Yvonne</td>
<td></td>
</tr>
<tr>
<td>I, honestly believe that most of the things that they have listed in the TEKS, the students really do need to know.</td>
<td>The are those TEKS in there that say, &quot;the student should be able to find research online.&quot; and um, there's even social skills TEKS in there. But, you don't ever, those aren't tested so you don't teach those.</td>
<td>They can hear me talk about it, they can ask questions, they can take notes.</td>
<td>- I think that we should get rid of every textbook in every classroom and buy every student, or buy every school enough Kindles or iPads for the students to use.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yvonne</td>
<td>Mary</td>
<td>Terry</td>
<td>Yvonne</td>
<td>Mary</td>
<td></td>
</tr>
<tr>
<td>- I've heard that some districts will cram the way you are going to teach it down your throat and you must teach this on this day, in this way. Now, I have a problem with that.</td>
<td>I think is important to teach the kids is the concept that just because it's online doesn't mean it's true</td>
<td>Fifth graders love to get on the computer</td>
<td>think that we should get rid of every textbook in every classroom and buy every student, or buy every school enough Kindles or iPads for the students to use.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mary</td>
<td>Terry</td>
<td>Mary</td>
<td>Mary</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- There are those TEKS in there that say, &quot;the student should be able to find research online.&quot; and um, there's even social skills TEKS in there. But, you don't ever, those aren't tested so you don't teach those.</td>
<td>think is important to teach the kids is the concept that just because it's online doesn't mean it's true</td>
<td>the lesson is what can engages them</td>
<td>if they're not engaged then they're not interested</td>
<td></td>
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</tbody>
</table>
The availability of statements pertaining to the teacher’s role in the classroom was limited, as the questions asked did not fit the format for this response. The responses in Table 6, found responses answering this question embedded within their statements of the procedures and events of daily classroom activities.

In the traditional model schools the teaching in the classroom was focused on skills and teaching the state standards. Mary and Yvonne used some technology learning tools with their students. When the students were able to use technology, the class would be required to walk to a computer lab in another classroom that required a reservation before the lesson. There were not any impromptu instances mentioned of students using technology to enhance their learning and the teachers did not ask for home work to be completed at home using a computer for research or production of a project as the majority of the students did not have access to technology at home.

Mary and Yvonne spoke about using the instructional process of a hook or introduction, lesson, guided practice, and independent practice. For example, in Mary’s math and science fourth grade classroom, she began the lesson with an introduction and “then some sort of a hands-on activity.” Then, there would be “time for them to do kind of pairs work, though using sometimes the text book, sometimes another worksheet” while she pulls small groups. The routine was very repetitious, as they would have “kind of the same process the next day with the next lesson on that.” This was her procedure during math, the primary focus
through April, or until the completion of TAKS testing, as “there was a big push to get our kids ready for that test so science fell to the wayside a little bit.” The teaching of science allowed after the TAKS test in April and contained some instruction using science labs, also in another room separate from the classroom.

Terry spoke a lot about the students using technology in the classroom. The students were mentioned using technology for Internet research, writing using Word formats and using PowerPoint for presentations. In this classroom were six computers in the classroom and two computer labs for checkout. Terry mentioned some individual and group projects which he would start in the computer lab using traditional teaching strategies of lecture and demonstration and then the students could complete the assignments as time permitted in the classroom. There was no mention of class time other than to say if someone were having difficulty in the computer lab, the teacher across the hall would monitor the classroom until his return.

4.7.2 Innovative Model

The innovative model interviews each made statements of their perception of the teacher’s role in teaching and learning for their classroom. Each teacher interviewed mentioned that his or her approach to learning was, in a word, different. They saw their role in the classroom as facilitators. To facilitate involved teaching and guiding students, to releasing the controlling practice seen in lecture based classrooms. Giving up control was the “number one thing that
teachers struggle with their first year in a twenty-first century school.” The teachers did have some lecture but their dominant place in the classroom was as a facilitator. Evelyn, an interviewee from New Tech High School said, “being a facilitator is awesome.”

It is “about forming relationships with students, and teaching kids how to kind of function, and how to grow up and so much more” was the response from Alan, from New Tech High School. Also, mentioned by the interviewees at the high school is their role as the teacher/facilitator is to work with the students on “how to be/work with others and learning how to think and problem solve;” that teaching is “more than just about memorizing things for tests” and that it involved “working with kids to teach them how to go through a process to get a product or get somewhere we want them to be.”

During the interview with Alan, one statement he made collates the topic from the other interviews. Alan speaks of their campus philosophy of not always being the “sage on the stage” but the “guide on the side” when it comes to learning. The guide on the side is trying to direct the students “to the right places and see if they can discover that on their own. Sometimes, they don’t and when they don’t that’s where we have to kind of step in and get them in the right direction.” Another response from Alan, “we feel our main goal is not to prepare our kids to become great test takers…its so much more than just taking tests.”
Table 7 shows the responses from the innovative model interviews and shows the consistency and depth of intensity the instructors at the innovative school felt towards their role in the student’s education.

### Table 7

**Statements of Learning in the Innovative Model Interviews**

<table>
<thead>
<tr>
<th>Evelyn</th>
<th>Alan</th>
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<tbody>
<tr>
<td>Because we approach learning in a different way. We’re not all about books or all about worksheets or running to a locker. We’re really about figuring out what makes the kids tick. Figuring out how, what we’re doing is going to help them get along in life.</td>
<td>They say the guide on the side type teaching and we really just try and direct them to the right places and see if they can discover that on their own. Sometimes they don’t and when they don’t that’s where we have to kind of step in and get them in the right direction.</td>
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<tr>
<td>Alan-help them find success is how they act with other people, how they interact and do those kinds of things. “looks</td>
<td>Alan-teaching looks different in my mind as well. Because it’s not just about the content, again, it’s really about forming relationships with students and teaching kids how to kind of function. And how to grow up and so much more of that is</td>
</tr>
<tr>
<td>Alan-all those learning outcomes that we have, the oral communication, the collaboration, the critical thinking skills, the global awareness, all those other things that we measure students on in this school, they’re so important.</td>
<td>Alan-we don’t even call ourselves teachers.. We’re facilitators. And so, you know, when you use that word our.... Our role is to facilitate the learning. Sometimes that looks like a traditional classroom. Sometimes you will come to our class and one of us will be lecturing. But,</td>
</tr>
<tr>
<td>Denise-the boundary lines are a lot different between student and teacher in this school and the structure is completely different. Alan-the idea of letting kids go out and get information on their own</td>
<td>Alan-Teaching is.. it looks different here. So..</td>
</tr>
<tr>
<td>Alan-teaching looks different in my mind as well. It’s not just about the content. Alan-working with kids to teach them how to go through a process to get a product or get somewhere we want them to be. and we really want them to get there on their own. We want them to learn the material on their own</td>
<td>Alan-teaching looks different in my mind as well. Because it’s not just about the content, again, its really about forming relationships with students and teaching kids how to how to kind of function. And how to grow up and so much more of that is</td>
</tr>
<tr>
<td>Alan-It was a good real world connection that they can see people getting paid</td>
<td>Alan-We feel our main goal is not to prepare our kids to become great test takers</td>
</tr>
</tbody>
</table>

*(table continues)*
Evelyn-I am no longer the person that has to close the door and I’m by myself. I have a collaborative group that I consider my close friends now. Um, I can go to them about anything. We can discuss any type of topic to do with PBL. It can be about classroom culture. It can be about management. Anything I feel like I'm struggling with I can go to anyone of my peers and have a collaborative environment and that is a really cool environment.

Beverly-I think that it is a creative learning environment that has lots of freedom

Denise-They have to have it (communication and collaboration).

Denise-I think it gives a lot of kids um a way to um, learn in a different way that they don't learn in a normal classroom

N6-we have an open line of communication. Um, they know they can email me at any time. Uh, I really try to maintain good communication with my students.

Evelyn-the biggest part that we do past that point is communication and reflection time.

Evelyn-do think we are helping them prepare themselves to leave our environment and be successful. Um and improve the skills that they have, you know, brought to us.

Evelyn-You have to have the ability to make decisions. Um, that's essential.

Beverly-think there's other values and other life situations that you spend more time dealing with because you have more of a relationship with the kids and hopefully that you are able to motivate them in ways that other classroom environments might not be able to

N4-we believe that if I leave that meeting and I didn't agree with that and it was passed anyway, I'm not going to enforce that rule.

Denise-this had a whole new dimension because you had the laptops

Evelyn-we do force them to really think outside the box

N6-when you give up a little of that control and you actually trust your student or your learners

Evelyn-Our rules are pretty broad. So what that allows me as a classroom facilitator is I can make my own expectations for my own classroom

N6-I'm still the captain of the ship but they have a say,

Evelyn-I also think that as we're growing and we're constantly pushing ourselves to be better educators, we're learning how to take their advice and having them help build projects.

Evelyn-We believe we need to build in that school culture as much as we can.

(table continues)
Table 7 (continued).

- Evelyn: we're learning as we grow, how do we make that happen and still stick true to PBL and the content and all those other things that we have to do as educators here.
- Evelyn: That is a way to build school culture. We do lots of goofy things, like amazing race to introduce our community service where kids are running around the building. We do those things that you need to do because we approach learning in a different way. We're not all about books or all about worksheets or running to a locker. We're really about figuring out what makes the kids tick. Figuring out how, what we're doing is going to help them get along in life.
- Evelyn: Absolutely, this is the way education is going.
- Evelyn: And being a facilitator here is awesome. In some ways in can be very humbling in some ways.
- Evelyn: Absolutely, this is the way education is going.
- Evelyn: It's ok if they mess up because we're still going to love them no matter what.
- Alan: The idea of content being the only thing that we teach is just I think that is one of the problems with schooling. We worry too much about content over just life skills. And learning how to be/work with others and learning how to think and problem solve. And do those kinds of things.
- Alan: Show kids that its more than just about memorizing things for a test or preparing for an AP exam or the SAT or something like that. …What's really going to get our students, you know, help them find success is how they -how they act with other people, how they interact and do those kinds of things.
- Beverly brings a summary to all the responses when saying, “in its most simple form it’s everything that might be in a traditional environment and a whole lot more.” “It’s about freedom. I feel we have a lot of freedom here and lot of different ways with teachers, for students, a lot of different ways.”

4.8 Teaching Techniques in the Classroom

4.8.1 Traditional Model

In the traditional model schools the teaching in the classroom was focused
on skills and teaching the state standards. When the teacher had prepared for
the students to use technology, the class had to walk to a computer lab in
another classroom that required reserving before the lesson. There were not any
impromptu opportunities mentioned of students using technology to enhance
their learning and the teachers did not ask for home work to be completed at
home using a computer for research or production of a project as the majority of
the students did not have access to technology at home.

Mary and Yvonne spoke about using the instructional process of hook or
introduction, lesson, guided practice, and independent practice. For example,
when Mary spoke of her math and science fourth grade students, she mentions
she likes “to introduce it and then some sort of a hands-on activity.” Then there
would be “time for them to do kind of pairs work, though using sometimes the text
book, sometimes another worksheet” while she pulls small groups. Then, “kind of
the same process the next day with the next lesson on that.” This was her
procedure during math and the primary focus through April, or until the
completion of the TAKS test. An explanation of the focus for her students
learning relayed to her from the principal as “there was a big push to get our kids
ready for that test. Science taught after the TAKS test in April, contained some
instruction in the classroom and some in the science lab located in another room.

Terry spoke of the students using technology in the classroom more than
the other traditional style teachers. The students were mentioned using
technology for Internet research, writing using Word formats and using
PowerPoint for presentations. In this school, there were six computers in the classroom and two computer labs for checkout. The teacher mentioned some individual and group projects which he would start in the computer lab using traditional teaching strategies of lecture and demonstration and then the students could complete the assignments as time permitted in the classroom. There was no mention of class time other than to say if someone were having difficulty in the computer lab, the teacher across the hall would monitor the classroom until his return.

4.8.2 Innovative Model

In the innovative model, the teaching procedures did incorporate some traditional methods of instruction. The facilitator, as they all referred to themselves would, at times be required to stand at the front of the room and give detailed instructions in a lecture. The lecture could be to “teach them how to go through a process to get a product or get somewhere we want them to be.” or to teach a specific skill requiring minute steps or difficult concepts.

This traditional lecture method from the front of the room, used as the primary teaching method in the traditional model schools, was mentioned by all, except Denise, the math instructor as a part of their problem-based teaching model of instruction. Denise did not reference PBL lessons for the class during the short interview. She mentioned the class focusing on acquiring the skills necessary as the students were required to participate in three standardized
tests, the TAKS, SAT, and ACT which all have a heavy influence on college choice for the students.

One featured component for this campus was community service and a requirement for all students for graduation. The campus decided at the beginning of the year what community service industry or project to support through the student projects. In case N6, Jon mentions his Spanish Classes’ service project to support an elementary school’s Spanish program by creating books and going to that school to share the books with the students. Evelyn addresses the school focus toward the community incorporated within the PBL units when she says, “community service is such a huge component of what we do here.” A community service project is chosen each year by the grade level class for their Gives Back component of their school.

There were many PBL units conducted during the year and were referred to but not mentioned explicitly but by one facilitator. Four of the five facilitators mentioned specific PBL project conducted during the year. Denise did not mention one specifically but did discuss the process she had experienced as she had planned her units. She did mention having “to pretty much do everything from start to beginning” and as the focus is on projects “we don't have any resources or anything that we want to pull or use. We pretty much have “to write the projects, plan the projects, teach, facilitate, assess, grade, all these different things that uh, add to the project that you don't do in the traditional classroom that take hours, and hours, and hours of time.”
The other teachers interviewed all spoke to teaching being “different.” Alan said, it “looks different here”, “we’ve gone through a lot of different steps to not do as much direct lecture”, “learning looks different”, “looking at projects to come up with different ideas”, learning just looks a lot different in our model”, “there are different ways to approach” group members. The interviewed ended with the statement that “we know what we’re doing is different and so the kids know that what they do is different.”

Beverly ended her interview with a statement of her opinion of what makes their school unique with; “there is a lot of freedom here and lots of different ways for teachers, for students, a lot of different ways.” This continues in each interview with statements of how they plan differently, they expect different things, and that they are different.

The teaching scenarios group into three different categories at this high school. There is a project launch day where the teacher is very much the leader of the class and giving instructions, discussing requirements needed for the project, answering questions, outlining goals, and finding out what the students need to know. The second type of day is the workshop. The teacher organizes instruction given either by themselves, another facilitator, other students, or through the organization and introduction of learning resources for their project. The third type of instruction is the workday. On the workday, the facilitator monitors and communicates with the students on their progress. These days, the
students control their schedule for work, collaborating with their group to design, plan, and completing their project or solving their problem.

One area, important for this educational model, is the teacher peer communication and support for each other. Project reviews must occur with the other facilitators, to ensure quality projects. During these meetings, conversations on possible improvements or modifications for the project happen to ensure quality of the project before implementation with the students. One aspect mentioned as important by most interviewed at this campus is for PBL to contain reflection time for the students and for the facilitators.

4.9 Content Taught in the Classroom

4.9.1 Traditional Model

Mary teaches in a 4th grade classroom and the content focus for this teacher was math and science content. As most teachers are aware, teaching the content assigned is not the only teaching that occurs in a classroom. Along with content, she taught lessons on how to correct their behavior to allow for their environment to work, socially acceptable behavior for getting along with others, and application of concepts from one discipline to another. This case was very traditional in that the students sat in their chairs while the teacher gave instruction and then monitored their work. The classroom environment is very structured and routine oriented. Her classroom management style was to give them instructions. This teacher felt it was necessary to give the students
instructions very often and have control of the classroom. She said it felt like she was telling them what to do "99% of the day, even things that seemed so easy like, come in and sit down, take out this books, get in a straight line, or turn your books to page...." She said that they "kind of went, you know, if you gave them a little wiggle room...they needed a lot of structure and they took advantage of any wiggle room you gave them." Mary also said that the students did not move to another room for work on a computer lab as it created a greater potential for discipline problems by leaving their classroom and their established routine. She knew her children were more successful with hands-on learning and that "contextual stuff...just didn't cross over." Mary commented also on the student’s concept of learning. She said that students thought that learning was showing that "you know it on a multiple choice test and...it’s not relevant to their everyday life."

Mary’s routine for instruction was using a computer and projector to introduce the lesson and then the concepts that were “broken down into small lessons. We would introduce the lesson, usually review what we’d done the day before” and then the students would work to complete examples that are set for them to finish. In this school environment for math there was “a big push there to get our kids ready for that test” and to “really stick to instruction and focus hard on just the TAKS skills” this meant that “science fell to the wayside” until after TAKS.
Mary taught them math TAKS skills and some science. She spoke of two science labs. One lab the students worked with electrical current enabling a light bulb to illuminate. For the second lab, she described the group activity of creating holders for eggs so they would not break in a fall. They did have a small amount of communication practice but only between the teacher and the students of the environmental effects after a large oil spill in the Gulf of Mexico.

Also taught were life skills such as organization and character building. The parents of these children were expecting more independence on their children’s side and that she thought, “they’re not quite ready to take charge of their own lives yet.” She taught them lessons on how to appropriately get attention, seek assistance from others including the teacher and the importance of humbleness.

Terry taught a 5th grade traditional model class in a school of a self-contained classroom. The interview with Terry was strongly sided with computer use in the classrooms. There were some comments made during this interview that shed some light on the content, social skills, life skills, and behavior beliefs. Terry, a more experienced teacher used a different classroom teaching style than Mary, a first year teacher. Terry spoke of the students using computers to conduct research for projects, creating slide shows, and problem solving activities inherently producing a less controlling teaching method.

At the time of the interview, Terry mentioned that the students were “more active at this time” as it was the end of year and that more active learning was
necessary. A lot of the interview asked about his computer projects with the students. He worked with the students on problem solving using collaboration, making decisions, narrowing choices, and in understanding their Internet presence.

Terry also mentioned that there was quite a bit of review that they were teaching and he mentioned some activities involving “problem solving activities, group-wise and individual-wise, we do a lot of riddles and drills and mysteries” for the students. They would complete these in collaborative groups using tools such as word processing programs to write information, recording digital interviews, creating digital slide shows, and focusing on citation of sources used for the projects. Terry spent some time discussing with the students the use of social media and the student’s use of technology outside of the school. He thought the students did not “realize that what they put out there and say and how they can put something out there” has consequences. He also mentioned that he did not “think they realize the responsibility of one (uploading a picture to the Internet) when they display it, how many people can see it.” He spent time discussing this with the students and thought it an important lesson for them, as they would be moving up to the Middle School and 6th grade next year.

The student’s behavior was a topic at one point when Terry said that the students could be a “little more hidden in when they’re working on the computer” yet “very demanding.” The students would be so engrossed in their work, that when they needed help, the students would feel that the help must happen “right
then and there.” He thought that this type of behavior necessitates a teacher actively “monitoring them as they’re working.” Terry did not mention problems with behavior but did mentioned that if there are behavior problems, “set parameters for them that are very clear as to what they are supposed to accomplish” that problems of inappropriate activity during computer use can be avoided.

Case S3 interview with Yvonne was unique for her environment was a traditional model classroom within a non-traditional educational setting. The student to teacher ratio at this alternative educational placement, usually so small that teaching the classes through whole group instruction could compare to the other six cases studied as small group instruction. Yvonne taught English and shared the same teaching style as Mary. Yvonne had a routine she followed daily and through repetition, the students knew the routine and could follow. The students would always “have a warm-up to do, either a journal writing or some exercise” when the students arrived projected on the screen as she felt that if “they can hear it, see it, Power Point works well for them.” They would then work independently on their work and sometimes use a computer. Yvonne mentioned the children going to the library for instruction on validation of web information but that was the only mention of students going to a computer lab.

Yvonne did mention a few specific lessons, which occurred during the year in her classroom. One lesson mentioned was they watched a movie and “studied the Lion King to pick out the archetypes in the movie.” She also
mentioned studying mythology and watching “a film to study character or something like that.”

Yvonne mentioned teaching the skill of how to write a research paper where the students could use technology but she did not expound upon the experience during her interview. The two computers in her classroom were away from the usual teaching area against the windows. She referred to the computers across the room and that having to stand there to monitor and teaching would be difficult. From this response, it can be determined the lecture model of teaching was the dominant style for this classroom. Yvonne did let the students use the computers at times as she spoke of her responsibility to give them “parameters as to what sites they can and can’t go to,” and “which would be better or worse for them to go to.”

Yvonne did not mention any concepts she was trying to tie into their previous learning or other disciplines or any mention of life skills such as problem solving, organization or character building. She mentioned that she enjoyed the seventh graders since they “are easy to work with because they’re just out of elementary school and still have that desire to learn.” She did not have such a positive view of the 8th grade students. Yvonne did say they were “hormonal and they’re moody. She interpreted their emotional behavior to them “transitioning from little kid to ‘I want to be an adult and I don’t really know how to do it.’” In another comment of their personality, she mentions that the students were “pretty
savvy at a pretty young age now as far as technology goes,” “most of my students are so technologically advanced now.”

The environment throughout this classroom and school established conformity of the teachers and the students. The regimens were strictly enforced. The students checked in everything when they came in the school. The students could not keep cell phones, jewelry, computers, or any digital media devices including mobile gaming devices or tablets with them after entering the front door of the school. The student expectation included checking in their lunches if brought from home and their backpacks or purses.

4.9.2 Innovative Model

The most common word mentioned by the teachers at New Tech High School, throughout the coding in the theme of what was taught in the classroom, was predictably learn or learning. Each interviewee from New Tech High School mentioned this as expected but all used almost the same vocabulary in their responses. The teachers shared a common ideology in their approach toward learning for their students differently than the normal community expectation of learning and that learning was not always about the content. Denise said that it is very “different from being a teacher at any other places I’ve worked.”

Another featured component for this campus was community service. The campus collectively decided at the beginning of the year which community service industry or project to support through the student projects. There were many PBL units conducted during the year and were referred to by all
interviewees except Denise. She did not mention one specifically but did discuss the process she had experienced as she had planned her PBL units. She did mention having “to pretty much do everything from start to beginning” and as the focus is on projects “we don't have any resources or anything that we want to pull or use. We pretty much have “to write the projects, plan the projects, teach, facilitate, assess, grade, all these different things that uh, add to the project that you don't do in the traditional classroom that take hours, and hours, and hours of time.”

4.10 Computer Use in the Classrooms

Computer use discussed in the interviews for the innovative school model and the traditional school model. The difference reported in the interviews is the organization of learning opportunities for the students and in the teacher’s strategy for learning. The traditional model interviews each mentioned the students using technology if a lab was available or the lesson allowed the use of the two to six computers in their classroom. To allow the class to use technology for their learning meant that the class had to move to another room with a computer lab, reserved or checked out prior to class.

The use of the computer lab was a special treat for the students in Mary’s classroom. As the use of computers by the students did not have a place in their regimented learning schedule, the enthusiasm the children in Mary’s room exhibited made the teacher leery to attempt this activity. As she said, “I think
there's the potential for a lot of that (discipline problems to arise by taking them to the computer lab) to happen...they are so excited when they get to do something new and exciting...using the computer.” These same students did use technology with another teacher where they keyed in text and attached graphics to produce a book.

The teacher was aware of the state TEKS saying that “the students should be able to find research online” but goes on to say that these TEKS “aren’t tested so you don’t teach those.” The students did not have technology resources at home to use as an assistant, but did have some toys, which would be “a distraction and keep them off task” when brought to school. Therefore, assigning homework incorporating technology did not occur.

Mary did understand the importance of computers as they had a “big role” in her life and that part of the discipline issues with technology is from the lesson or activity. Mary said that it is “the lesson that engages them” and the tool’s novelty “that wears off” which can cause discipline problems. This teacher used the school's designated teacher-computer or her smart phone daily. The amount of personal usage time for this teacher using technology shows in her comment that to go without technology, or unplug for a day makes her “antsy” and that technology, for her was a “little bit” addicting. Mary used technology for instruction, and communication with friends, working peers, and parents. The communication tools mentioned in the interview were email, texting, and social media. For her job, she communicated through email and a program purchased
and used by the district. This program was a parental notification system that allows student-specific messages delivered to the student’s home through a phone-calling program.

She used a computer and projector every day to teach math lessons to her students using a laptop, document camera, and projector and to research some current news item videos and stories to share with the students. She was not aware of her prolific use of these tools. She realized her dependency only when the technology did not work, as she was not prepared to work without these tools.

The interview with Yvonne and Mary were similar in that the computer used in the classroom was for teaching purposes. It was used daily for an introduction and lesson starter for the students. They would see a slide projected onto the screen with a prompt for writing or instructions for lesson for the student to complete. Another similarity was that the students did not use the computer with the teacher facilitating. The student’s used the computer with other instructors as she said that they were “pretty savvy at a young age” and that she did not have to instruct them on how to use the computer very often as “they’re so technologically advanced now…they’ve grown up on computers.” “The students are very savvy about, you know, Word…and some of them PowerPoint because they’re taking keyboarding classes and things like that.”

The classroom had two student computers and a laptop cart of small netbooks available for projects. There was no mention of a project with the
netbooks, only that it was available. The small computers were a “little outdated and some of them work and some of them don’t work.” Another difficulty mentioned for using computers with a class of students was with the computer lab. There was only one at the campus and it could be full as there was a computer class in there at times.

Terry had a different scenario for computer use. The students his fifth grade classroom used computers often. There were six in the classroom and they used the computer lab frequently as their campus had two labs. One computer lab scheduled classes during block time during the day and the other was open for signup. Terry was proficient with technology and eager to learn of new technology. He said that the technology department at his district asked him to try out equipment to evaluate the usefulness of the equipment in the classroom. Terry’s did not answer a question directly related to his technical experience directly in the interview, but he does say that someone had to watch the class when help was given to another teacher having difficulty in the lab and also during discussions of technology integration training. Terry also conducted some of the district’s technology integration training. Therefore, others viewed this teacher to have experience and knowledge with using technology integrated lessons with the students.

The innovative school model interviewed was from a one-to-one campus. This campus had available for every child a laptop. The children could bring their own or they could use the ones provided by the school. Part of their motivational
discipline policy allows students to bring other technology if they have earned the trust and respect of the faculty. This was displayed as a trust card worn by the student. With the trust card, the students were available to walk around the building and work where they thought they would be most productive.

The innovative interviews did not mention any specific lessons or activities where technology prominently played a role. The student activities involving technology was mentioned, but technology was a tool to accomplish the learning or for communication and was not the learning itself. Another teacher mentioned that you would “see kids Skyping and you see kids gaming.” There was also “more ease with the video cameras” and “they do a little of some more multimedia.”

What was interesting, when listening to the teacher interviews for the innovative model school, was only to address the teaching strategies used during instructional periods. For example, one teacher spoke of something possibly said by teachers during a workshop or a discussion with students, “if we’re not using laptops for a learning purpose, you’re not messing with them. Screens down.” This was to demonstrate and teach what appropriate technology practices were in the business world and that it would seem rude if not followed.

4.11 Teacher’s Concept of their Role in the Educational Environment

The environment a teacher works within has a profound effect on the teaching practices used by the teacher with the students. The teacher will have to fit the mold given for the environment to have a job next year. This is
determined through teacher evaluations, which, if the teacher scores well, usually lead to contract continuations. The instructional leader at the campus is instrumental in creating the atmosphere on the campus. There are factors affecting the instructional decisions such as budget, equipment, district expectations, school performance ratings from previous years and the training and experience of the staff. All these areas are outside of the role of the teacher but have a monumental impact on the student learning and teacher expectations.

In one traditional model school, the environment produced a heavy influence from the state mandated TAKS test. The campus expectations, and the concern for the students to pass this test, drove her teaching expectations. Each teacher mentioned the TAKS test and one relayed that she was told to only teach strategies for passing the math TAKS.

In the innovative schools the TAKS test was mentioned by four but not as a driving force but one kept in perspective and expected by their students. The one that felt TAKS was influencing the instructional environment in the room was not having this mandated or forced by the instructional leaders at the campus. The students requested focus review for the test a few weeks before the administration of the test by the state.

Another factor influencing teacher practices is the tools and resources available at each campus. The campus using technology with the most success, the innovative model school, has the expectation from administration that the students will be using technology. Technology resources provided to each
student and the teachers training in the instructional model most suited for this resource proved effective. Terry uses the same instructional theory as the innovative school at his traditional model campus. Terry’s campus provides technology tools and with his experience and desire, to give the students some of the tools for future success. Terry modifies the traditional model to continue to fit into the mold while starting to change his teaching strategies.

The two examples where the lack of resources in technology is affecting instruction are the schools where Mary and Yvonne teach. Both of these school environments show very little technological resources for the students, and there are no expectations for the teachers to use the technology for anything other than a teaching resource. These teachers’ resources such as the teacher-computer and projector, but few technology tools seem to be available for the students.

The campus improvement plans at the high school and the middle school of this multi-case study address the expectations of the students and the teachers. The elementary campuses of Mary and Yvonne did not have a copy of their campus improvement plan available on their campus webpage. Each of the plans available addresses the use of 21st century skills, technology and effective strategies to engage all learners. One remarkable difference with the innovative school’s campus improvement plan shows their focused support of the use of project-based learning. Also the teachers are referred to as the facilitators
throughout the campus improvement plan at the high school further emphasizing this school’s embrace of project-based learning as this is a major concept behind this instructional theory. The use of the term facilitator is not evident in any of the other campus improvement plans available.
5.1 Introduction

With the analysis of the data completed, this chapter focuses on thematic findings and their implications for teaching and learning 21st century skills in public education classrooms in North Texas. The questions used in the interviews were influenced by two components: the first influence was the intent of each of the research studies conducted and the second the teachers’ experiences. Through the interviewees’ responses, four themes emerged. The four themes discussed in this chapter affecting 21st century skill adoption in the schools are: the environmental factors at the classroom, school, or district level, the classroom expectations of teachers, the classroom expectations for learning, and the challenges faced in implementation of the skills.

Within this chapter the four themes are discussed as they relate to the literature research in chapter 2 discussing the innovative and traditional instructional models and the findings from chapter four. Additionally, possible future implications pertaining to technology integration challenges and challenges to future preparations for educational leaders are discussed.
5.2 Classroom Environment Factors

As previously stated, environmental factors at the classroom, school, or district affect technology use for educational purposes. The environmental expectations within the school models made an impact on the purposeful use of technology integration within 21st century skills. Some teachers benefitted from technology use while applying 21st century skills while others in the study did not have this opportunity. The teachers benefitting from technology were in a district where ample technology hardware and infrastructure was provided for the classrooms to create an environment conducive to teaching technology enriched 21st century skills.

The NTHS teachers all mentioned that they were “different.” These teachers were referring to using non-traditional teaching methods. They believed this “difference” was possible when the campus instructional leader allowed or expected their teaching strategies to meet expected 21st century skills. This was an arrangement supported by the principal or instructional leader on the campus, and the administration of the district. For district administration to allow this “difference” to occur, it has promoted modified schedules, classrooms full of conversations, student synergy, and classroom spaces to be modified. This attitude awareness was noted during the interviews where implementations of 21st century skills were discussed.

Every campus instructional leader must evaluate teacher performance in the classroom. The evaluator must be willing to look at the results of the teaching
experience and understand the processes used and environmental expectations of that classroom. The classrooms within this multiple case study exhibited non-traditional 21st century technology-enriched learning-opportunities for the students.

The teachers within these classrooms also did not imitate the teaching scenarios demonstrated in the videos provided by TEA. TEA provides these Professional Development Appraisal System (PDAS) videos to demonstrate exemplary teaching. The PDAS appraisal system is used in many public schools throughout Texas since 1997-1998 (Texas Association of School Boards, 2008). PDAS was developed in response to Senate Bill 1 in 1995 under Chapter 150 of the Texas Education Code (Texas Education Agency, 1997) to evaluate all teachers in seven domains, four of which directly addresses students and how they learn (Texas Education Agency, 2005).

All interviewees spoke about the traditional teaching cycle taught in most teacher preparation programs. All five components of the teaching lesson cycle: introduction, instruction, guided practice, independent practice, and assessment, are evident in the scenarios described by each teacher in the interviews. Each described the standards and the expectation that every student should be able to master. One area of difference between those that implemented 21st century skills and those that did not, was the timeline of instruction and the student involvement in the learning. Not all the components of the teaching cycle at New Tech High School (NTHS) are usually evident in the orderly forty-five minute
appraisal session. Since forty-five minutes is the proclaimed time frame usually attributed to a typical evaluation period, this time may not allow for all or most categories demonstrated/evaluated. Paradoxically, PDAS was not designed as a single forty-five minute evaluation, yet this is the main focal component of the appraisal system.

Thomas Toch, co-director of Education Sector (a think tank based in Washington D.C.) diagnoses problems with evaluation procedures used in education. He attributed teacher-evaluation validity issues to systemic “typical drive-by” evaluations (Texas Association of School Boards, 2008). This is when even a sub par teacher is able to create a lesson that enables them to achieve passing marks on an evaluation because of time constraints. Time constraints are a major consideration when an evaluator can only “grade” what is taught within this forty-five minute window. Based on this researcher’s thirty plus years in education as a teacher being evaluated and as an evaluator, this short time frame is crucial for the teacher to demonstrate their skills. Because of this mandatory forty-five minute time frame, teachers create lessons that enable all the evaluation pieces to be observed by the evaluator – that is if they desire a good evaluation. The evaluator may even leave before the teacher finishes the lesson and may not return to evaluate any other teaching. This often causes teachers to use the traditional teaching strategies and to cover the entire lesson cycle within the evaluation time, thereby no in-depth lessons can take an extended period of time to accomplish. In other words, time is short so teachers
are "forced" into traditional teaching styles because creativity takes longer and is therefore, difficult to evaluate within the prescribed time frame.

Evaluations systems are the focus of educational performance, and as such, a strong catalyst for change (Texas Association of School Boards, 2008; Toch, 2008). Texas is one state with an established system of measuring the quality of teachers’ work. All the public school systems throughout the State use a standardized teacher performance evaluation system. Evaluations used in Texas schools can be changed, but any evaluation used is still controlled by the expectations for learning (Texas Association of School Boards, 2008). The district can create one or, use another evaluation system, but it must closely correlate with PDAS standards. Round Rock ISD uses a good example of an independent (not PDAS) appraisal system. They had their system in place before PDAS was adopted. As well, at least ten Texas school districts use an alternative the Teacher Advancement Program system which is operated by the National Institute for Excellence in Teaching (Texas Association of School Boards, 2008).

Another influence affecting evaluations are the training modules used to instruct the evaluators regarding expectations for the classroom. When the instructional leader is evaluated on the performance of the teachers within their campus, this directly effects the classroom environments on the campus. Therefore, in order for the evaluation system to work effectively, the instructional leader must make an effort to establish expectations for learning. These
expectations should include teaching 21st century skills whilst ameliorating teacher’s concerns for PDAS evaluations.

New Tech High School’s district supported the 21st century learning environment thereby, allowing this campus to be different. The district clearly understood that New Tech High School, NTHS was designed to have abundant technology tools and provided an infrastructure to handle the expansive digital load. A small campus was redesigned to allow for 21st century skills of collaboration and communication to precede unimpeded traditional classroom arrangements. The campus design was created support team teaching and student collaboration. The campus opened with classrooms containing glass walls and small collaboration rooms available for the students. Glass walls and collaboration rooms enable learning from one classroom to another and reinforce student realization that learning is the dominant atmosphere at their campus.

The classroom environment where Terry taught was also supportive of 21st century learning. Having computers available is not the only component for 21st century learning but is a necessary tool to prepare students for the 21st century workforce. Terry had eight computers in his classroom and his campus had a second lab reserved that the classroom teachers could use. While the access to technology was not as abundant as Terry’s throughout the district, his campus had the tools and was establishing an environment for 21st century learning success. The district where Terry teaches is building a new campus every year because of the growth within their community. However, Terry’s
classroom is an anomaly. Several factors contribute to whether a campus fully commits to a 21st century learning environment. One possible explanation for this school is possibly the budgetary constraints in changing an established structure while the district is building a new school each year.

The environment for Mary and Yvonne shared common features. Both of their campuses were set up as a traditional model schools with minimal technology available. These teachers followed a prescribed curriculum provided by the district, e.g. traditional. This traditional model of curriculum alignment did not include 21st century skills. The students in their schools did not have many technology tools other than small digital toys available outside of school. Yvonne also commented that the students at her campus did have cell phones but those phones were not allowed in her school. Additionally, her school’s policy required all digital devices be checked in at the door, which included cell phones, laptops, or anything other item that was not considered traditional school supplies. Yvonne’s placement was unique at an alternative educational placement school, the provisions for technology use within the campus environment was minimal. Yvonne did mention the students had two computers for use but implied these were used as an accessory to learning and not an integrated tool within instruction. Mary mentioned her personal computer use in teaching but did not mention classroom computers for the students. Accessibility to computers outside of their classrooms was also limited; there was one computer lab on the campus. The computer class used this lab and therefore it was difficult for
teachers to schedule a block of time. Yvonne’s and Mary’s situations are emblematic of classroom environmental factors affecting the implementation of 21st century skills for learning.

In summary, having the technology available in the classroom, individually, or easily accessible is an important component of 21st century learning. Additionally, environmental factors are often driven by budgetary considerations and constraints of the teacher evaluation processes. Campuses such as New Tech High School have realized and planned for these realities and therefore do not suffer from implementation challenges. NTHS has a similar vision and teaching environment that fosters 21st century learning skills. Terry is an example of a hybrid situation where upon he works in a traditional learning environment but incorporates an enlightened technology infused curriculum that addresses 21st century learning. This seems to suggest that although a campuses culture may be one of a traditional path, the teacher can adjust their classroom environment to accommodate 21st century learning opportunities. Consequently, it may not be entirely the campus/principals influence the drives the choice of the individual teacher’s selection of a particular classroom environment. Place and feasibility, however, may also be a factor. Yvonne works in an alterative education school setting and it is likely her options within her environment restrain her student’s availability to technology regardless of her desire. Although Mary is not constrained by placement, as in the case of Yvonne, she is hampered by feasibility. She has limited access to technology. Because of
this belief, she cannot hope to have the flexibility within her environment to be able to capriciously modify her instruction. Each of these classroom environmental factors may affect the way teachers teach and students learn, thereby influencing education’s ability to manage 21st century challenges.

5.3 Classroom Expectations for Teaching

The expectations of the district and campus instructional leaders should expect classroom instruction to incorporate 21st century strategies. Training should also be provided for all teachers in order to successfully implement the strategies. The campus instructional leader or principal has the authority to change the educational objectives at their school if these objectives are consistent with the district’s goals. State policy gives authority to campus leadership to make these changes based on TEA’s site-based decision making (Texas Education Agency, 2010b). Since this is not only allowable but mandated by TEA, classroom expectations for teaching can be modified at the campus level. The decisions being made at the campus level should include expectations of classroom instruction. This flexibility should encourage instructional leaders to incorporate the principles necessary for 21st century instruction. Though mandated by law to implement site-based decision making. This policy should not impede successful incorporation of 21st century classrooms. This is not implying that the change will be easy. New Tech High School has demonstrated that the change of educational objectives to incorporate 21st century strategies
and expectations is possible and rewarding. This was accomplished through collaboration during the shift in teaching strategies and classroom expectations.

The vision at New Tech establishes a shared vision at their campus evident throughout each interview. Each facilitator interviewed remarked that their role in the classroom was different from other traditional teacher's roles. The vision for classroom expectations seems a part of a shared understanding throughout their campus. Each facilitator used similar vocabulary regarding their vision of classroom expectations. A strong campus instructional leader held this shared vision together. As testament to their district’s support this school is allowed to be different from other schools. Most notable was the principal’s establishing of expectations for 21st century classroom learning on the campus. This autonomy developed a campus spirit of innovation and was proved very successful by TEA. After the first year of implementing 21st century classroom expectations, TEA awarded its highest level of accomplishment – exemplary status.

This recognition is not easily achieved. There were several changes that had to be made. First, the campus held their own staff development sessions at their campus while the rest of the district was required to attend district-wide staff development. The reason from this deviation from normal staff development was so that the instructional leader/principal could establish normative campus behavioral expectations. In other words, the campus instructional leader/principal was responsible to set the classroom expectations for only that campus while the
rest of the district followed the district established classroom expectations. As
part of the classroom expectations, students were allowed outside of the
classroom in collaborative area without the teacher’s direct supervision. The idea
was to create a learning environment intended to promote higher order thinking
skills, collaboration and communication skills. These classroom expectations are
aligned in curriculum throughout the campus to promote 21st century learning.

Staff at the NTHS participated in writing the campus mission each year.
Using this participatory technique in making this type of decision for the campus,
everyone is expected to know and understand the expectations of the teachers
and their role in educating the children attending their school. Using this
democratic, participatory technique for campus policy-making, enabled the staff
to become stakeholders in their campus’ expectations for teachers and their role.
This was apparent as each interviewee explained their role in the classroom. In
fact, their responses were so similar; it was a testament to the instructional
leader’s/principal’s establishment of the classroom expectations. This change in
vision was possible because of the district’s willingness to allow this campus to
design the vision needed for a 21st century school.

The facilitators and the instructional leader/principal worked together in
establishing the mission and goals for the campus. Characteristic of this concept,
the principal is viewed as someone to help the facilitators improve and implement
the campus mission. Only one interviewee from NTHS mentioned the principal’s
role within the evaluation process, one might think the principal was not
aforementioned evaluation schedule. However, this is quite the contrary. The facilitators understanding of the principals classroom expectation of teaching is so normative it was as if they were a colleague in this endeavor rather than a supervisor.

Of course, personnel within a building cannot by themselves enact pervasive changes. Classroom expectations are also enhanced through campus features. One interviewee seemed to reiterate the above collegial atmosphere through examples of familiarity and trans parity. Quite literally, the school has glass walls in their building thereby allowing the principal to become more familiar with the campus. The interviewee seemed to imply, because of the familiarity the principal was seen more often and spoke with students thereby having a better classroom operational knowledge. This it would seem would build more knowledge of the learning environment within the campus in opposition to fore mentioned “drive-by” or limited forty-five minute evaluation.

As mentioned before, Terry’s situation seemed to be a hybrid between innovative environment of NTHS and the traditional learning environment. Although his situation is somewhat different, several of his “different” explanations of his “differences” were actually similar to NTHS’s environment. Although Terry was in a traditional school setting, he had computers in the classroom and children were actively involved in learning. This instructional experience for his students was successful and exciting for the students. Terry’s thirty years of teaching experience was one possible attribute, which led him to
gain the respect of his teaching peers, thereby allowing him to help others (as he mentioned in his interview). The combination of Terry’s experience and willingness to innovate – a necessary ingredient for moving toward a 21st century learning environment – the campus instructional leader encouraged this teaching behavior. In essence, the campus leader was allowing change to begin with Terry by not constricting his “different” approach.

In fact, Terry was tutoring other staff on successful implementation of project-based learning, teaching to use technology for learning, and continuously using one of the campus’s two computer labs. His classroom expectations for himself provided the example for the rest of the campus. Using the above strategies, he was able to promote collaborative learning in ten to twelve year olds. This is not usual at this level or in a traditional classroom setting. This is similar to NTHS and displays the classroom expectations for 21st century learning.

Mary and Yvonne are at the other extreme because they are in a traditional classroom and the principal gives them far different expectations regarding what to teach and how to teach. These teachers did not mention any participatory part in the creation of the school’s classroom expectations. This was possible because their schools mandated strict guidelines and standardized curriculum. Mary focused on teaching the students math while forsaking science until after the state mandated test. Whereas the NTHS teachers and Terry were allowed flexibility and creative license, Mary was forced to incorporate a
prescribed teaching strategy for student learning which was developed by nameless outside company. Her prescribed curriculum involved the teacher introducing the lesson and then teaching the information in small pieces using the seven step stages of the lesson cycle presented by Madeline Hunter, circa 1983 (Burns, 2005). This was evident as Mary mentioned hands-on activities only during the introductory phases of the classroom lessons. However, she would let students work in pairs but only to complete a worksheet, book assignment, or homework review and not as part of a collaborative or communicative strategy of 21st century learning.

As well, Yvonne reiterated Mary’s situation when she was told to use a generic curriculum that was also restrictive and prescribed by the district. Her lesson plans consisted of warm ups, attention getters, direct teaching and indirect teaching and student practice instructions. Yvonne did not mention groups, collaboration, projects, or other traits of 21st century learning. It was obvious the district provided lesson plans supporting 21st century skills. Also, Yvonne did not seem to realize these 21st century learning skills were missing in her classroom. She did think every student should have a digital reader but only in the context of digital readers are lighter than carrying several books in a backpack. There was no indication this slight transition was to engage in a change in classroom expectations for 21st century teaching.
5.4 Classroom Expectations for Learning

As mentioned throughout chapter two, technology tools are needed to prepare the students for their role in their world of the future. There are no reports or news flashes as of March 2012 reporting that technology was going away or that it was not needed for marketable skills necessary for employment now, or in the future. There will always be some jobs without technology components but those manual jobs are becoming more rare.

Farmers, once thought of as manual laborers, now run huge farming equipment with computer chips. They have computer equipment to measure soil nutrients and moisture. They also have programs watching the weather to analyze the premium time to plant, fertilize, and harvest. Even the entry level positions in fast food has technology attached as they watch orders or input orders, track supplies used for stocking orders, and record time for the processing of orders and the workers time sheets.

As early as 1970, the Massachusetts Institute of Technology found repetitive tasks are being computerized and the need for workers who are adept at problem solving and communication tasks were needed. The new workers will be needed to help improve production processes or coordinate and manage the activities of others will be increasing (Texas Education Agency, 2010b). Employers wanting to hire will seek out the students with these skills. The students attending classes incorporating 21st century skills in the classroom will begin their careers better prepared.
Because technology is so pervasive in the workforce, parents should want their children to have the best opportunities afforded them when they graduate from school. This would obviously include any technological advances. Conscientiously, every educator wants to prepare children to be successful in the future. Seemingly, the parent and educators want to prepare children to be successful. This involves allowing children to use technology at every opportunity to enhance their skills in using technology as a tool for learning and not just in gaming techniques. As published in Gerard Butter’s Law of Photonics, the amount of information accessible digitally is doubling every nine months (Tehrani, 2000). The exponential increase of information should demand teachers teach information acquisition and analysis through digital sources rather than information facts memorization. This opportunity for technology skill enhancement is part of the national and state’s mission to prepare students for the future. Schools are purposed to prepare students to work in our economy and therefore the responsibility to teach students to work with technology belongs to the schools (Binder, 2008; Van Duzer, 2006).

Classroom expectations for learning should include activities involving communication, collaboration, and problem solving using in-depth analysis of problems and implementation of creative solutions. Students need to be taught how to find the answers and problems solve using real-world application and scenarios. As the amount of information continues to increase, teaching the
student how to learn and how to find information will be one of the greatest
benefits of 21st century learning.

The teachers should expect students to use these skills just as they
expect them to learn multiplication or how to read. This process will involve
teaching the students how to successfully communicate with their peers while
working in groups. Teachers will need to hold students accountable for the skills
of effective communication, collaboration, and problem solving. Unfortunately,
these classroom expectations for learning are not measured in Texas on
standardized tests given every year (TAKS) and not given the focus necessary
by many teachers.

At New Tech High School, the students are tasked with the responsibility
of learning. The NTHS interviewees spoke about students creating contracts for
their group projects and that the students knew they would have to report their
learning to their facilitator. Most of the facilitators at this high school were not
lecturing every day to the students about what they should learn and how they
should learn it. The classroom expectation is to understand how to learn and
what is necessary for successful completion of the project. The project is given
and students must realize what instructions they need and can either learn it
independently using the resources available, or ask the teacher for assistance.

Based on the interviews, the facilitators expect for the students at NTHS to
develop the 21st century skills necessary for them to be success in college and/or
their future careers. The facilitators accomplish this by letting the students solve
their own collaborative issues as best the students can. These NTHS students must meet with their peers in their collaborative groups for their projects and then discuss the problems. One example given was of a non-participating student who was not contributing to the group. As part of the NTHS classroom expectations for learning the group had to document that the student has not met the expectations outlined in the group’s expectations contract. If the student does not comply and reform their behavior to become a productive member of their group, the group leader can, in effect, “fire” this student from the group. The “fired” student is still expected to complete the assignment independently rather than with the group. This is a typical example of classroom expectations for learning for the 21st century.

The student expectations are created at the campus by the facilitators and students as they develop the campus mission and goals. The curriculum designed to indoctrinate the students into the learning environment was developed for the new freshmen NTHS students. This allows them to learn and hopefully embrace the expectations that will be placed on them as future 21st century workers. As freshmen, the principal and the facilitators orient them to their expectations and responsibilities as students of New Tech High School. The freshmen then have role play or practice sessions in order to practice and reinforce collaboration and communication techniques. This is possible because the district and the campus leader have established this expectation and allowed the mission changes necessary to involve the students.
Terry, the teacher in the traditional setting, is using project-based learning and working toward using 21st century skills in his classroom. The immersion of the students in project-based learning (PBL) and 21st century skills is not to the extent of NTHS, but is what he can accomplish at his campus with fifth grade students. Terry expectations of learning involved students moving around in his classroom, not simply sitting, and listening to him lecture. The fifth grade students move back and forth from their desk to the computer to work on other projects as they finish assignments. Some projects are collaborative and some are independently accomplished.

Terry’s students also begin projects as a class using whole-group instruction in the computer lab. The project is not finished in the lab during that class instructional period but completed later if the students are not finished. This is giving the students the responsibility to manage their learning and the time necessary to complete their task. This is Terry’s idea of student accountability and his classroom expectation for learning. Although this is not New Tech High School standard, this is what is possible in his environment and is what he expects from the students. Again, this illustrates the advantage of classroom expectations for learning and meeting 21st century expectations.

Mary and Yvonne had a different philosophy for class expectations for learning for the students. These teachers provided the students with information and skills one piece at a time. They provided the instruction, the time to practice, and the timeline for completion. These two teachers did have learning
expectations established for their students. This method of learning was to give the students small pieces of information to ingest and recall for a test. The teachers did not mention high order thinking skills, self-paced learning, collaboration, or communication expectations for their students. All of these are skills are necessary in a 21\textsuperscript{st} century learning environment. This was not a normative imperative from their instructional leaders or district. Neither Mary nor Yvonne expressed any expectation presented from the district level of the importance of 21\textsuperscript{st} century learning or the infusion of technology into the learning process.

Both teachers believed technology important and that the students needed to be prepared for their future. The interviewees gave no evidence of how this was occurring for their students or how the teachers could provide this opportunity. There was not an expectation of learning outside of their purview - especially using technology. Based on the interviews, it did not appear the students had resources available outside of the classroom or transportation to another technology laden facility or organization. Mary mentioned that the students had to finish worksheets at home if they did not finished in class and Yvonne did not mention assigning homework or the students completing homework. No work mentioned in the interview incorporated 21\textsuperscript{st} century skills or technology use. The lack of these skills being assigned outside of the classroom also portrays the lack of mission within these environments to include 21\textsuperscript{st}
century learning, which would have impacted their classroom expectations for learning.

5.5 Challenges to 21st Century Learning

Teachers presumably want children to learn. Teachers also presumably want children to be “successful” in the future. The challenges facing teachers in the classrooms are many. Challenges, such as providing a safe and secure environment for learning, and providing the educational opportunities for success are fundamental to a healthy learning environment (Lewallan, 2004).

Teachers should not have to worry about their students passing a test to the extent that all teaching accomplished addresses only measurable standards. A state standardized test should not control the curriculum and control learning environments while denying the use of different strategies. The instructional leaders should be charged with making sure the children are progressing and learning what they need regarding necessary 21st century skill.

State mandated testing make the possibility of measuring communication, collaboration, and problem solving difficult to assess on a mass scale. The assessment of these skills is traditionally accomplished through rubrics. The assessment of 21st century skills on a statewide scale would require a state assessor to view the projects and assess them. This would not seem a possible scenario as each child would need individual assessment. The knowledge and skills, now on standardized tests, should be applied to projects and problems
created by the teacher – not by state bureaucrats. The state test results also should not be perceived as a predictor of student success after graduation. This is because the present individual skills and objectives tested are not inclusive of the skill set for 21st century success.

To prepare the students, the state mandated curriculum should be promoted with the 21st century skills woven throughout. Obviously, the curriculum set by the state is important. It should be used as a base for developing the 21st century skills. It is through the use of the state curriculum objectives that learning scenarios can be created to develop the necessary skills for the student’s future. One way to accomplish preparing the students for working and contributing to our economy is through well-created instruction using project-based learning. The students are given some of the tools for success when they can use technology to learn. These techniques and skills are necessary to investigate and research solutions. Additionally, the students will need an opportunity to work in groups and discuss the processes needed to solve a problem or produce a product. Success in this learning type of environment should be the measure for student’s future success.

The learning that takes place during PBL instruction does not occur when students are sitting in rows and the teacher lecturing from the front of the class. Mary and Yvonne exemplified this type of pedagogy through their pedagogical difficulties. During a typical PBL unit the teacher will not tell the students what they will learn and how they should learn the information. NTHS students
discover this on their own through discussion and planning in groups. Admittedly, this can be an intimidating concept for teachers to accept. In this type of learning environment the students at times noisy and moving around while using 21st century learning skills and technology to find information and/or to create something. To a traditional style teacher, this may be perceived as playing instead of focused learning. Also, if instructional leaders are not informed of this different type of learning environment, they may misperceive the situation. This could negatively impact a creative innovative teacher's evaluation because of the instructional leaders misconception of the purpose of the classroom learning As well, parents need to be educated of the purpose of the classroom interactions and learning atmosphere.

There will also be challenges from the parents as education confronts 21st century learning. Because of parent’s traditional school experiences they might also misjudge the classroom’s learning atmosphere and teacher’s strategies for learning. This, in turn, could lead to parent’s blaming the teacher on their child's lack of success in a non-traditional setting. However, if the parents are educated and understand the teacher’s innovative strategies and classroom environment, they could aid in the students success by supporting their child at home in a similar manner. They will need to promote and educate the parents as to why the changes are necessary and why it is best for their child to learn in this way and with these tools. Parents are part of the work force today and should have experienced the adaptations they have learned in their world of work. Educators
need only to make parents aware of the changes they have made in adapting to 21st century skills and how the changes in the classroom have paralleled their workplace experiences. This may reduce parent’s concern in implementing 21st century skills in the classroom. Changing the teaching techniques and strategies will be one other area in which the teacher, administration, state leaders, and our national leaders will have to focus.

New Tech High School facilitators were asked about the challenges of implementing their innovative school design. The facilitators mentioned parent and student anxiety for student performance using this new strategy for learning. District administration and the campus instructional leader immediately addressed their concerns by holding informational meetings with parents, students, and the community. The principal held multiple meetings to discuss the expectations for students and how this model of learning was beneficial for their students’ future success.

As stated before, NTHS was completing their third year at the time of the interviews but had already recognized twice as a TEA exemplary campus. This atypical rating reflected the students’ superior performance on the State mandated tests for all their students. This should serve as a testament to the procedures of the campus, the teacher’s expectations for the students, and the principal’s interventions to curb campus challenges. As well it should belay any parents’ concerns that this new innovative educational system, though unfamiliar to them, works.
5.6 Technology Integration Challenges

Challenges for technology use for students developing 21st century skills is constrained by what the school district promotes and the budgetary concerns. Most notable were results from the district reports. These results showed the disconcerting realization that the school with the highest percentage of economically disadvantaged students had the least amount of available technology. Also troubling, was that this school happened to use the aforementioned most rigid example of a factory model school. Paradoxically, the students at this campus had the least amount of revenue for the district but spent almost as much per pupil as the wealthiest school district studied. Students should advance through education with their cohorts. If they do not, extra budget is needed in order to reeducate deficit learning. Poor performing students require extra programs, which are expensive, and further exhaust limited budgets (McMahon, 2011). This is not to deny student underperforming students opportunities, but rather to possibly divert discretionary funding to technology rather than operations. NTHS had the foresight that technology investment and innovative teaching strategies would be more cost effective by giving students access to the information needed to succeed before additional fund were diverted for special retention programs.

Children do not want to be left behind. The purpose of No Child Left Behind is to ensure all children are given the opportunities they need to succeed. The example of NTHS was those students that had technology and opportunities,
self learn through exploration of information and incidentally, were from wealthier families. These students started school with an apparent advantage and this continued to increase throughout their school career. Some believe that students given more opportunities for learning and exploration of our world, even if they are not given the 21st century skills had more worldly knowledge and performed better in school. This is due to a broader base of life experiences from which to connect learning to practical experiences (Hall, 2007; Kuh, Kunzie, Buckley, Bridges, & Hayek, 2006).

Whenever families are financially struggling, it is likely they cannot afford the “luxury” of a home computer with Internet connection. Mary explained cursory phenomena between library availability and disadvantaged students. Her explanation was that financially struggling families did not have parents at home to transport students to the library. These families are living predominantly in low-income, low tax base neighborhoods. Because libraries may not be close by, free technology opportunities are inaccessible. This impediment is compounded by the availability of information through (expensive) digital books. Because these families lack the financial resources for personal computers, this is yet another lost opportunity. As technology resources become more prolific, the need to make the trip to the public library to find a book or to look up information is not usually necessary except by those that do not have computers with Internet access at home. This closes another opportunity for the students, which ironically, is in part, because of lack of building use as technology has become
more mobile, the availability of information through the Internet, and digital books. Since school funding comes from tax dollars in the community and other public sources (Texas Education Agency, 2011b), the schools with low income families, noted by the high percentage of economically disadvantaged enrollment, may be disproportionately effected by the lack of technology. The use of these funds for technology seems to be superseded by the funding of extra services provided through the schools for remediation. Practically speaking, the lack of Internet connected technology further divides the rate of student success between those that have the technological resources from those who do not. Alevizou, in his book review for Buckingham’s book, Beyond Technology, he discusses this gap and the influence technology plays in its establishment (Alevizou, 2008).

Through reasonable inference of the widening chasm of student success between the haves and have nots, one can deduce this problem will become worse without equity of technology opportunities. The divide may slowly diminish as the leaders in education begin to make decisions to change education from the model used during the last century. The legislature must be as brave as the innovative educational leaders in order to begin to make changes. This could begin with educating influential stakeholders as to the necessity of the changes with the intent to develop and establish a new, widely accepted learning expectation for the 21st century.
5.7 Future Preparations for Teaching for Our 21st Century

To prepare for 21st century schools, education of current teaching and administration staff needs addressing. Those successfully implementing teaching strategies for 21st century learning, such as NTHS, needs campus support from the district in addition to adoption by the rest of the educational community. To establish this new paradigm, support for pedagogical changes and innovative teaching strategies for 21st century learning need to be implemented. This should necessarily happen before another twenty-five years passes and another generation enters the workforce.

In order to facilitate this thinking, a strong belief in the purpose of 21st century skills should be ingrained within the teacher preparation programs. Teachers graduating now are preparing to embark on their path as an educator and most are from a generation of technology users. Most of these pre-service teachers are digital natives and appear to be very comfortable using technology. These newer teachers would be more likely to embrace these unique new teaching strategies that incorporate technology infused 21st century lessons. These new 21st century teaching strategies should be blended with communication, collaboration, information acquisition, and critical thinking skills. They will only need to change their perception of what teaching should look and sound based upon their previous experiences. Terry is a pioneer forging a new path within a traditional system. His is not allowing the factory model environment to mold his innovative teaching strategies. As exemplified by Terry, future
teachers will also need to be brave enough to not be pushed back or fall into the mold of how they were taught and how some teachers in the field are still teaching.

Technology tool availability, though important for our students, is but one component of the skills necessary for our students to be successful in our digitized global economy. As technology equity is still being established, the skills of communication, collaboration, problem solving, and self-reliant information seeking skills can and should still be addressed. This alone is not was his preventing 21st century skills from being taught in the schools in North Texas.

The paradigm shift needed in the educational institutions must implement new evaluative techniques for the teachers. Also, the educational standards Texas teachers are required to follow must allow the pedagogical techniques necessary to be developed for their students. Teachers should be given back the creative license they are trained to use. The teacher in the classroom knows the learning preferences, the student’s interests and their level of knowledge and should be able to use this information to create the best learning opportunity for the students in their classroom. However, if the instructional leaders on the campus evaluate teachers, the instrument used must reflect what is being written as necessary for our students to be given the opportunities their education should enable them to have. The tools used by the instructional leaders at the campus to evaluate teachers are either designed by the State of Texas Education Department or designed to align with that instrument. This department
also establishes the guidelines for their use. Either the evaluation tool or the guidelines for their use seem to be the foremost component holding up the implementation of 21st century skills in our classrooms in Texas. Technology tool availability, though important for our students, is but one component of the skills necessary for our students to be successful in our digitized global economy. As technology equity is still being established, the skills of communication, collaboration, problem solving, and self-reliant information seeking skills can and should still be addressed.

In summary, the educational system is a huge machine made of many, many, small cogs. These cogs of classroom environments, expectations for teaching and learning combined with technology availability will prepare future teachers transition into 21st century educators. As each cog begins to change, this in turn will enable more students to experience the NTHS, innovative educational model for success. The machine must continue to run and it will take innovation, creative license and bravery to engineer something new to accomplish a successful transition to 21st century education.
APPENDIX

INTERVIEW QUESTION CATEGORIZATIONS
General note for all tables displaying question distributions.

The questions presented in these tables are from all interviews. To addressing the nature of each question, the entire interviewer conversation is included. Bold style of lettering denotes the actual question asked of the teacher.

The questions sorted by school models, and within these groups, three subgroupings for questions. The subgroupings of answers address the environment of the classroom, school, or district. The second table of each group addresses the questions addressing expectations of the students or descriptions of learning opportunities. The third table of each group addresses the experiences of the teachers.
Table A1

Interview Conversations Addressing Environmental Conditions in Traditional School Model

<table>
<thead>
<tr>
<th>Marker</th>
<th>Time</th>
<th>Questions or Comments answered</th>
</tr>
</thead>
<tbody>
<tr>
<td>QS1-37</td>
<td>6:35.5 - 6:37.3</td>
<td>Classroom management?</td>
</tr>
<tr>
<td>QS1-31</td>
<td>3:46.3 - 3:48.8</td>
<td>Absolutely, your curriculum, your methods.</td>
</tr>
<tr>
<td>QS1-39</td>
<td>7:25.2 - 7:27.2</td>
<td>Did you work with a team?</td>
</tr>
<tr>
<td>QS1-66</td>
<td>16:38.9 - 16:39.9</td>
<td>What is Teleparent?</td>
</tr>
<tr>
<td>QS1-68</td>
<td>16:44.3 - 16:45.7</td>
<td>What's it principally used for?</td>
</tr>
<tr>
<td>QS1-72</td>
<td>17:42.0 - 18:22.3</td>
<td>So, this is a weird question, I've not asked anyone else this, but I'm going to ask you. There's this dude called Jürgen Habermas, whose one of my idols. He barely speaks English and most of the stuff he writes is really, really hard to understand. But the one thing that I do understand, that I've adopted as my own theory, is learning and teaching is communicative action. And, he has four different types of communicative action. Basically the first one is strategic action, where you're telling someone to do something. <strong>Could you give me an example of a time that you engaged in strategic communication to teach?</strong> Basically</td>
</tr>
<tr>
<td>QS1-78</td>
<td>19:05.1 - 19:19.4</td>
<td>The next type of communicative action he has is called constative communication and that basically where you can tell someone to do something where you make a claim to</td>
</tr>
</tbody>
</table>
truth is essentially what he says. You’re saying, this is true.

QS1-86 21:09.2  So, they were making claims to truth and someone else was challenging it and they were going back and forth.

QS1-88 21:14.5  Absolutely perfect. The third type is called normative communication. To give you the best example I have from when I was teaching my first year, I had a big piece of white paper with 5 rules on it. And normative communication is about norms and rules.

QS1-90 21:30.5  How do you establish norms and rules in your.... How do you communicate those besides like putting the rules on the board?

QS1-92 21:43.0  Cause they all say something you can negotiate too.

QS1-94 21:58.6  Even just general, um.....

QS1-96 22:03.0  how you treat one another, how you convey this is an underlying rule that you've broken. And

QS1-98 22:13.6  Yea, social norms.

QS1-102 23:05.7  The last type is called, this one is the most difficult one, its called dramaturgical. Its suspsectively self-expression of some form of truth. Whether it may be true of art, it may be true at home or it may be true some other form of communication. Where they're communicating some personal truth. Did they have any opportunities to do anything like that? In your classroom, the other teacher's class?

QS1-104 23:36.6  It can be almost anything. Effectively the documentary that we're doing is the personal expression of truth for both Jonathan and myself in terms of developing this. But, it is something that other people can critique still, even
though it is a personal expression of truth.

QS1-107 23:53.2 So, did they have any opportunities to do anything like that? Like generate a theory or something like that? You talked about them kind of theorizing about the egg. Did they have opportunities to formally construct those theories or anything?

QS1-109 24:37.5 Absolutely, Um Did others have the opportunities to critique their theory effectively? Or was that something you critiqued?

QS1-124 25:30.8 privacy concerns about using technology as a teacher? There have been examples where people have lost jobs or not gotten jobs because they've posted things online that their employers might be looked at, or things like that. Or with students looking up your personal information or something online?

QS1-126 27:03.5 Do you ... Are you concerned that they might bring some of their privacy problems from home or that they've had issues with technology and bring them to school and wind up in conflict?

QS1-144 31:41.4 Um, Now, Can you tell me about how the structure of your school or the structure of school in general. The testing environment, the school building, the structure of the day, how did that discourage or encourage you from using technology? Administrative support, any of those things, training?

QS1-148 32:30.0 How many, were you in block? or was it block or..? (cross talk)

QS2-9 0:47.5 - 0:51.3 Tell me about what and how you taught this week.

QS2-27 6:55.9 - 7:03.9 Tell me about how the structure of your school has helped or hindered your use of technology to teach over the last eight weeks.

QS2-35 9:02.7 - 9:09.5 Tell me about how you feel about your school and district's attitudes toward technology used to support learning?
Do you think feel like your district supports their attitudes with actions? Do you like, do you have a specific example of how they...

Tell me any concerns you have with student security online.

Do you have any concerns with your own, you kxxx, security online or your own privacy online?

I see, and how many kids do you have in a class at a time?

Right, Can you describe uh, your student's demographics in the classroom?

So, in a typical school day, how much time would these kids be getting to use... Like what kind of time do they have 45 minute time period?

So, once a day. 35 minutes. So, when they come back in another day, they could follow up on that activity?

Is it available?

Ok, So, do you create your own lesson plans?

Right, and this may seem like the very uh, ordinary lesson, but do you plan your lessons as a group? Do you have a team which you work with?

OK, how about vertical team building, because that's the second step.

Alright. And, Do you think your district supports your use of technology in the classroom?

That's wonderful to hear. Um, Can you give me a short
example of your typical teaching day? You (cross talk) about the kids. Just real short

Ok, Ok, Um, What kind of policies does your district uh have for encouraging technology use?

Well, you know how each school district has that rule, rules and regulation that they want...like some districts will say a teacher needs to use technology at least three times a week. (umhm) So, do they have any specific guidelines to follow for teachers?

None of them bring their own laptops in? (No, No-interjected by teacher during interviewer asking question)

So, Everything's checked at the door?

And on a similar thread, I'm sorry (spoken by the original interviewer, Interviewer 1) I know you had. (OK, It's OK-interjected by teacher) because it is an alternative school, have you ever had problems with say, CyberBullying? Have you ever seen that (there is a pause as if the sentence would be continued but it is left open ended)?

Can you describe sexting and uh, what went on without going into any, really (there is a pause as if the sentence would be continued but it is left open ended)?
Table A2
Interview Conversations Addressing Student Expectations in the Traditional Model

<table>
<thead>
<tr>
<th>Marker</th>
<th>Time Stamp</th>
<th>Question or Comment from the interviews</th>
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</thead>
<tbody>
<tr>
<td>QS1-35</td>
<td>6:15.4 - 6:20.7</td>
<td>Did you have any major projects where the students used technology?</td>
</tr>
<tr>
<td>QS1-41</td>
<td>8:00.2 - 8:06.0</td>
<td>Do you plan to try to? You said you plan to try do some more, what kind of things would you do?</td>
</tr>
<tr>
<td>QS1-49</td>
<td>10:34.9 - 10:37.7</td>
<td>So, here's a related question. <strong>What is learning?</strong></td>
</tr>
<tr>
<td>QS1-51</td>
<td>10:58.0 - 11:03.8</td>
<td>So, let's go back to the learning question. What do you think, how would you define learning?</td>
</tr>
<tr>
<td>QS1-53</td>
<td>11:20.9 - 12:15.7</td>
<td>Great. That is a great definition. Now, Let's go to the question I that I have here. Which is, several people have defined self-regulated learning. Is. I've given you a little document which has outlined what self-regulated learning skills are we talked about it while we didn't have the recording going for a second. What importance do you place on these skills there? Self-monitoring, self-evaluation, planning, <strong>Do those simply come up as you teach them? Or, as you teach other content? Or that you believe there's something that needs to be taught independently as well?</strong></td>
</tr>
<tr>
<td>QS1-55</td>
<td>13:24.0 - 13:26.8</td>
<td>Do you think these are kind of preskills that learners need to get before they get the content?</td>
</tr>
</tbody>
</table>
| QS1-57 | 13:50.6 - 14:24.2 | Um, Let's go back to technology. You used some technology tools with your kids in the classroom and you yourself, mainly right? Do you, And since you haven't used quite as many, can you project any discipline or management problems that would arise from using technology tools like taking them to the lab and having them do independent work on the computer or bring in laptops or?
What happens when the novelty wears off?

Is it more about the tool or is it more about the lessons in terms of engaging them?

Um, For those students that you do, that do have access to technology, do you have any concerns about their use of technology in things like multitasking and being off task, those kinds of things? Bringing technologies in that are distractions?

Um, in terms of the standardized testing, especially since you are working with Elementary School students and the focus on the test, Do you believe, or how do you believe that the focus on the testing and the focus on acquired knowledge and skills in impacting students and will impact them in the future. Will it change what they think teaching and learning is?

Do you think its going to impact them in college?

Uh, What do you think that's going to mean for them as when they get out into the world of work? Do you think the TAKS skills are preparing them to be 1st century workers?

How do you believe students learn today? Kind of comparing that to how you may have taught them in the past?

Student self-management, such as goal setting or self-consequation (this word was barely audible and the word may be incorrect). (The interviewer recorded too softly after this determine what was said.)

How about the problem solving? Creativity? Critical thinking?

How does that deal with your planning with for the coming unit?

Do you have any issues, or tell me if you've had any issues with um, cyber bullying examples? Generalities. No names
please.

QS2-53 16:28.4 - 16:31.9 Have you had any concerns about it since yours are getting ready to go to Middle School?

QS2-63 20:54.5 - 20:57.6 How do you feel like their attitudes may have changed?

QS3-21 3:03.4 - 3:12.9 OK So, Um, How do you believe the, eh kids learn like? Has that held up to your, the experience that you gained?

QS3-23 3:15.6 - 3:20.6 How do you believe somebody learns? What is your idea of how somebody learns?

QS3-37 6:55.7 - 7:00.9 How, how have your students responded to you using these pieces of technology?

QS3-39 7:15.9 - 7:19.7 Do they have access to these (they do) at home? ok

QS3-41 7:32.9 - 7:33.9 Why?

QS3-73 15:54.8 - 16:15.0 Ok, and going back a little bit you had mentioned that when kids get on the computer you set them up and you kxxx, you have your structure there for them to follow. How do you teach them about security online for the sites that they need to go to?

QS3-79 18:17.5 - 18:32.4 Ok, so you don't even have to go through, like you know how in the beginning of the year you keep aside a couple lesson plans just orientation of how to get on the sight and use it? (no)

QS3-116 29:02.1 - 29:15.4 Yeah, Yeah, Um, now the students have access to the BlackBoard from home or school, anywhere. What about the parents? Do the parents have the ability to get on Blackboard site?

QS3-120 30:01.7 - 30:03.4 Why would you- Why does he hate it?

QS3-140 34:52.5 - 35:22.3 Ok, uh, Ok, One last one. (Speaking to interviewer 1) Did you get the one from the uh, Interviewer 1-Yes, I did. I have 2 of them. Interviewer 2-You have 2 of them, OK, Then, Let
me ask, um, um, Have you ever had any behavior or classroom management paced issues for using technology and if so, how did (the tone dropped off and the question was left open)?

QS3-158 38:14.5 - No sexting offenses?
            38:15.5

QS3-162 38:55.9 - So they were ...(garbled) during the school, in school?
            38:59.0
Table A3
Interview Conversations Addressing Teachers Experiences in the Traditional Model

<table>
<thead>
<tr>
<th>Marker</th>
<th>Time Stamp</th>
<th>Question or Comment from the interviews</th>
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<tbody>
<tr>
<td>QS1-27</td>
<td>2:56.2 - 3:08.0</td>
<td>So, now we’re into the actual questions. So, tell me about what and how you taught over the course of the last semester, or just most recently?</td>
</tr>
<tr>
<td>QS1-33</td>
<td>4:37.7 - 4:41.0</td>
<td>What role did technology play in your teaching?</td>
</tr>
<tr>
<td>QS1-43</td>
<td>8:33.2 - 8:42.1</td>
<td>So, if a dumb researcher came to you with an idea that they’d like to do and it’s some sort of weird science curriculum online. <strong>Would you let them come into your room and just</strong> (over each other)?</td>
</tr>
<tr>
<td>QS1-47</td>
<td>9:03.5 - 9:15.3</td>
<td>We’ll Talk. Um. So, here’s a more broad question. What do you think teaching is?.</td>
</tr>
<tr>
<td>QS1-63</td>
<td>15:53.9 - 16:05.2</td>
<td>UM Can you. You’ve already talked to me about several tools; um can you talk about any software that you have used, for student learning? Even things like grading...</td>
</tr>
<tr>
<td>QS1-130</td>
<td>27:57.7 - 28:05.5</td>
<td>Um, How do you use technology to collaborate with your peers?</td>
</tr>
<tr>
<td>QS1-134</td>
<td>28:57.8 - 29:02.2</td>
<td>Did you use the Internet to kind of help supplement your teaching?</td>
</tr>
<tr>
<td>QS1-140</td>
<td>30:27.1 - 30:36.2</td>
<td>Um, Now thinking back to your time as a student, you used ecollege here?</td>
</tr>
<tr>
<td>QS1-142</td>
<td>30:39.6 - 30:45.6</td>
<td>And, how did, can you tell me about your experience with your eCollege?</td>
</tr>
<tr>
<td>QS1-153</td>
<td>34:03.5 - 34:18.0</td>
<td>Since, you’re in a school with a lot of Hispanic students, did the language issue the past year, ability to teach some of the content, just in terms of their ability to pick it because of the language?</td>
</tr>
</tbody>
</table>
Yes, How much has technology played a part in your personal life since you've only known a world with technology?

What kinds of technology do you use everyday?

You use texting a lot on your cell phone?

Do you ever just unplug to get away from technology?

You ever feel it’s slightly addicting?

Um, Can you talk about any of the trainings you received on technology integration before you went to be a teacher?

Did you learn how to use technology or did you learn how to integrate technology?

Did you learn a lot of it in high school, or on your own?

Can you talk a little about the training you have had related to technology integration as a teacher?

I can recall them though. I'm trying to hear everything and remember all at the same time. Um, thinking back to As a student here at TCU, and now that you've finished your first year of teaching in the classroom, Are there technologies as a student you had available to you here at the university that you don't have at your school or you wish you had as you were, you know, during your first year?

And, the second one I have. Now that you've finished your first year of teaching, Um, Would you take a second to reflect on things you wish you would have done differently or things that you're planning on doing differently next year? Just how are you taking what you learned this past year teaching? You said you were very focused on classroom management and meeting the
deadlines and just, working as a professional the first time.

**QS1-201**  45:30.2 - 45:37.5  Were there any technologies that you were supposed to use with any of your students based on their individualized education plan, or any thing?

**QS1-203**  46:42.2 - 46:46.6  Is that something you feel like you should have more training on before you got out there?

**QS1-205**  47:17.3 - 47:43.1  Do you feel like there was....There was a structure of your university education to prepare to become a teacher. *Were there things you feel like you needed a lot more of whether it be classroom experience (voiced in classroom experience with the interviewer), or anything, or training on ESL, training on special education, things like that, that you feel like are much more important, now that you're there, that should have more emphasis?*

**QS1-208**  48:34.7 - 50:34.2  Just one more. Throw off of from what (loud noise interruption) just said, Now that you have finished your first year, in reflection. *Are there any additional trainings that you wish you could go to either provided to by the district, by TCU as your alma mater, other facilities in the area, yxx kxxx Region XI, UTA, UNT, whatever, that you would like to have more training on? That you think might be beneficial?*

**QS1-210**  49:56.8 - 50:08.7  That's all I have is there anything We just have the last final, final question. Could you just summarize your overall feelings or perceptions about the use of technology to support learning?

**QS2-11**  1:11.9 - 1:17.3  OK, tell me about how you use the technology to support your teaching?

**QS2-13**  1:49.7 - 1:55.5  Can you describe any discipline or other manage or other management concerns that occurred when using the technology to support your learning concerns that occurred when using the technology to support your teaching?
Ok, can you tell me what you think teaching is today?

Can you tell me a time when you had to cover a state mandated standard or content component that you had previously struggled with?

Um Can you tell me about a person or persons that have helped you use technology more effectively?

OK. Now into my next topic. Looking at the training that you've received, you've mentioned some from the district. Do you have any that you've done at school post-secondary which is going to help you use in the course of your week, or do you do on-line, independent online training for your technology use?

How do you feel about the quality of training either at your school, district, college, where ever?

So, probably you don't feel you have any tools you have available that you don't feel comfortable using?

Do you have any concerns about the copyright of your own materials, whether it's technology, or curriculum, or anything?

Um, Tell me about how you feel about teachers who don't use technology in the classroom?

Ok, so, tell me about a time when you had technology completely fail you, how did you deal with it?

Tell me about time when you assisted others with classroom technology or unit development?

Have you seen the attitudes of those teachers who were afraid or scared of technology either in your campus or in the district? Have they changed when you do, use that approach?

Ah, Ok. Ok. so, Tell me something about your experience teaching with ... At-risk? (the interviewer inflection seemed to ask if at-risk was correct before
completing the question) students?

QS3-33  5:36.1 -  OK, Ok, Alright. And um, How do you, Have you used technology for your teaching and learning?

QS3-35  5:44.6 - How do you use that?

QS3-45  8:07.7 - Alright. Can you name the biggest challenge you've had using technology with these kids?

QS3-53  10:12.8 - Ok., Ok And, um, Do you use, like how do you integrate the standards with the technology when you use them? The state standards.

QS3-61  13:25.0 - Now, when you said you, you get training, is that training for curriculum or training with technology use?

QS3-63  13:50.5 - Can you describe a bit how that training was uh offered (mh hmm) to you? What you had to do?

QS3-65  14:47.0 - Does she (both talking at the same time) through the steps of the training? Did you find that relevant to your classroom use?

QS3-67  15:16.9 - Ok, and is there any kind of feedback that you give back to the people giving you training on the technology?

QS3-69  15:37.4 - Right, but other than just giving the form out, do you see that as useful to you?

QS3-71  15:46.3 - The training that they gave you, could they have improved that in a, in a? Given it to you in a different way?

QS3-75  16:50.3 - OK, and how open is your school's system? Like are there certain sites that are blocked? or.

QS3-77  17:19.5 - No, that's pretty (Yea) understandable. Middle (yea-interjected by teacher during question) schoolers (yes-interjected by teacher during question). Ok, And when you teach kids using technology, what kind kind of scaffolding do you have to provide? What kind of
support do, do you as a teacher have to give them?

And as a teacher you never feel threatened that if you give them too much um pow... Like, you kxxx, with a lot of the technology they have to learn very independently and you're not at the head of the class all the time you're kind of more a facilitator? You don't find any problems with that? In dealing with that?

But, you don't um, teach your kids in a certain way where you, you're kxxx, kind of behind a screen and you can look over. Do you have a special seating in your classroom for that?

Ok, I think the middle schoolers, a little bit of guidance is needed (right-interjected by the teacher) they're still not old enough (right-interjected by the teacher) to just let them (no-interjected by the teacher) just come in (no-interjected by the teacher) around them all day (NO!-interjected by the teacher) Right, Right, OK, **Being a first year teacher, have your expectations been met at this school and in this classroom of what you thought teaching would be about?**

Ok. If you have a problem with one of the computers, and this is not a mechanical problem but using the soft, software or the programs, what is the process of going and getting help. What support do you have?

Have you ever had to do that?

Ok, Ok. Um Do you like the grade that you're teaching? 7th and 8th. Or would you rather mind... if you had the choice, If you were given the choice right now, what would be your preferred grade?

Thank you. What kind of training have you personally received for using the technology and even if it's from your personal background?
OK, That's good. That gives you a lot of flexibility to be comfortable. (mhhm-interjected by the teacher) You can do new (Mhhm) things (cross talk), chosen. Ok. (cameraman speaking). Alright, um, you want to ask this or do you want me to ask it? (Go ahead-interjected by the teacher.). More conversation between them and the interviewee chuckles. Alright, uh, some of these might've uh, covered since I was writing them down as uh.... So, just in general, what, what is your overall feeling about using technology in the classroom?

Would you say you should do it more or (at this point they speak at the same time but the interviewer is miked and therefore heard over speaker).

Why Kindles or iPads over typical textbooks?

What about the particular content, where they?

OH, I would agree with you on that one. Alright, so these aren't actually going in any particular order so, (OK-interjected by the teacher), So, you said, you're-you use BlackBoard (Mh hm-interjected by the teacher) Not as much as what you might have want to or don't want to?

Do you think if more parents had access to their student's, uh, current progress in their classrooms that it would affect student performance in the classroom?

What about, you said, a lot of your students, cause they're low socio economic that they don't have, (that must be my phone-camera person's phone began to ring and he answered, I'm just going to ignore her, since we've been here all day, I forgot to turn it off.) Let's go back before the scifi interruption, (I love it-interjected by the teacher), Yes, Agent Mulder is coming for me. (chuckling-interjected by the teacher) You were saying your students are typically low socio economic so, what they have at home varies. What about what you actively see your students using, uh, on a day-in, day-out, from their own personal technology? What do you
see your students... Do you see them with cell phones?, the iPod?.

And they (mh hm-interjected by the teacher) take that (mh hm-interjected by the teacher) home once (mh hm-interjected by the teacher) school is out (mh hm-interjected by the teacher)? Have you ever had a problem with a technology infused lesson?

Hardware, software

integration with the curriculum.

Alright, the next one. Uh, in a similar, from a similar perspective. Have you ever found the TEKS curriculum to be a hindrance in what you want to teach?

Its always been able to go along with, parallel with

So, you don't find it, forced down your throat constantly, Or superimposed over whatever you're doing?

Thinking, now looking back, how is the way use, used, how was the way you used technology towards the end of the year different from when you first started out from the beginning of the year?

And you didn't choose any different ways of using it?

Ok, that's fine. Have you ever had a problem with convincing the parents to allow their child to use technology?

Or had to convince a parent?
I think Leila has one question. I think you'd better ask it.

Interviewer, Leila: I uh. With the interest in technology and students using it and how they use it, have you had any students who wound up at the alternative school related to use of technology? (everyone is chuckling)

Jonathan: That's a good one. Leila: Or technology related offenses?
Table A4
*Interview Conversations Addressing Environmental Conditions in Innovative Models*

<table>
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<tr>
<th>Marker</th>
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<th>Questions or Comments answered</th>
</tr>
</thead>
<tbody>
<tr>
<td>QN1-24</td>
<td>8:47.9 - 8:59.0</td>
<td>Can you tell me what kind of an average day is/looks like for you? The structure and what you do?</td>
</tr>
<tr>
<td>QN1-31</td>
<td>16:30.4 - 16:46.4</td>
<td>That’s really great Thank you. Uh. Just a few more questions. Related to those projects, <strong>how do you vet those projects to the school as a collection?</strong> (mumbling)</td>
</tr>
<tr>
<td>QN1-35</td>
<td>19:41.7 - 20:10.8</td>
<td>You just mentioned the test that you all do And, given that we’re in Texas Say that state testing seems to take a pretty prominent place but there’s a lot of other Texas standardized tests, The SATs and ACTs the Pre-AP the AP test. <strong>What ends up being the role of testing at New Tech?</strong></td>
</tr>
<tr>
<td>QN1-45</td>
<td>39:59.7 - 40:10.9</td>
<td>The last question gets to one of the big words in your high school Technology. <strong>What’s the role of technology in New Tech?</strong></td>
</tr>
<tr>
<td>QN1-47</td>
<td>44:10.0 - 44:16.0</td>
<td>To sum up New Tech, the whole school as one word, what would it be?</td>
</tr>
<tr>
<td>QN2-17</td>
<td>3:49.1 - 3:57.4</td>
<td>Could you just briefly describe what an average day is like for you teaching here?</td>
</tr>
<tr>
<td>QN2-23</td>
<td>7:21.9 - 7:30.5</td>
<td>Now, you use technology in your courses, um, what winds up being the role of technology at um, what winds up being the role of technology at New Tech?</td>
</tr>
<tr>
<td>QN2-33</td>
<td>14:07.4 - 14:15.8</td>
<td>If you had one word to that were going to represent what New Tech is what would that word be?</td>
</tr>
<tr>
<td>QN2-37</td>
<td>14:25.9 - 14:27.6</td>
<td>You can go further, that’s ok. <strong>You can go with a Haiku.</strong></td>
</tr>
</tbody>
</table>
What kinds of benefits, cognitive or social? What kind of benefits do you see from the approach that's taken at New Tech?

Can you see anything getting lost from having smaller environment, verses a uh larger high school environment?

Um, Given that you do math and this is Texas, what role do standardized tests play here at New Tech where you and the kids, You've got TAKS test, you've got AP, PreAP, end of course exams, you've got tests all over the place. How does that work for you?

Um, If you were going to sum up what New Tech is in a word. What word would that be and why?

How is the level of control learned, the level of responsibility as a facilitator verses a learner? What is that like here verses other places that you've been and other new challenges?

Based on your knowledge of educational theory, what's the difference between project-based learning and problem based learning?

That kind of begs the question. What happens if Ms. G's not here?

What kind of support have you had from the district?

How much do you think having a small population adds to the benefits and allows you to do PBL?

Um, Given that technology or tech is one of the, them words in the school name, what's the role of technology here?

Excellent. um, Have you had any conflicts or any sort of challenges that have emerged uh, as a result of the methods that New Tech uses versus what the rest of the state uses versus the rest of the district, versus an, the perspectives of those folks here who think that teaching and learning is supposed to be a particular way and
that's not necessarily the ...............?

QN4b-36 26:22.4 - 26:32.1  Um, vet or how do you ensure the quality of the projects that teachers do at school?

QN4b-38 27:57.0 - 28:13.5  Fantastic, um, If you were going to use a single word to ....part, choose a single word, but a single word that like, is representative of New Tech, what would that word be, and why?

QN4b-4  1:15.6 - 1:41.2  In terms of the rules, the school rules, in terms of when we walk in we see the guidelines that you're supposed to go by but there's an openness here about the way things are, its a very socialized like place. How do you, how do teachers at the school establish rules? How do you establish norms of behavior? What

QN4b-41 28:46.4 - 28:57.1  Standardized testing. That's the last thing we got. What's the role of standardized testing here?

QN4b-45 31:17.7 - 31:35.6  Ok. Just one other thing. I'm sure there will people out there who will watch the documentary that will come out of this and read the research and they'll be concerned that well, Coppell, its (mumbling) top performers. What's the makeup of the school in terms of the students in it?

QN4b-50 37:09.5 - 37:42.5  I don't think kids believe in our views. Almost all of them use the word family and that's very different that than the way that I was taught to teach originally where it was more of a business model. School is where house, you are the foreman and they all sit there and they will pluck chickens or whatever it is they're supposed to be doing. Um, How do you establish this feeling of family versus, I'm the boss and you'll do what I tell you to do?

QN6-23  2:29.8 - 2:33.0  What makes it different?

QN6-25  3:02.1 - 3:11.5  Um, how is that different than some of your other experiences as a teacher and if you were to compare the two? What was the other environment like?
Group work is a big facet of the project-based learning that y'all do here. **How does that work?**

Um, Can you tell me about a project that you've done here that you're just especially proud of that you feel was extremely effective, you were engaged, students were engaged?

This is, provides a community service as well?

Yeah, you go ahead. But if you could, one last question. If you had one word that you were going to use to describe New Tech, what would it be and why?

Why?

That makes sense. Now to take off on that. Do you feel that this different paradigm on schooling that y'all engage in here creates any sort of conflicts between this larger state of Texas paradigm of heavily tested ah very service level knowledge acquisition verses what you were just talking about critical thinking, creative types of process? Does that wind up with any conflicts in the community with any parents, with some of the students or with the larger state as a whole?
Table A5
Interview Conversations Addressing Student Involvement In Innovative Models

<table>
<thead>
<tr>
<th>Marker</th>
<th>Time Stamp</th>
<th>Questions or Comments answered</th>
</tr>
</thead>
<tbody>
<tr>
<td>QN1-18</td>
<td>4:15.8-4:19.1</td>
<td>Now here are some pretty basic questions. What do you think learning is?</td>
</tr>
<tr>
<td>QN1-26</td>
<td>11:01.2-11:08.1</td>
<td>How much self-direction then did the students have in terms of setting those goals what is their roles?</td>
</tr>
<tr>
<td>QN1-28</td>
<td>12:47.9-13:13.5</td>
<td>You mentioned that trench warfare project earlier would you, you have any, would you go like to go into more detail about that one? Or do you have another project you guys have been here that you are especially proud of?</td>
</tr>
<tr>
<td>QN1-41</td>
<td>32:14.7-32:33.3</td>
<td>Oh Yea. Do you have any issues with especially new kids coming in and having trouble understanding the rules as they’re communicated? Because you have some different ways of doing things, the trust card (yea) and its just very different than schools that I’ve been into.</td>
</tr>
<tr>
<td>QN1-43</td>
<td>35:06.3-35:25.4</td>
<td>Two more areas. One is related to that. The norms for group work. In a lot of schools they don’t talk, they sit in rows, they’re not allowed to talk and in this setting, it’s expected that they talk that they work in groups. <strong>How does that work for you?</strong></td>
</tr>
<tr>
<td>QN2-11</td>
<td>0:49.7-0:55.0</td>
<td>Fantastic, just a few quick questions, <strong>what do you think learning is?</strong></td>
</tr>
<tr>
<td>QN2-19</td>
<td>5:08.6-5:23.1</td>
<td>That was really good. To take off on what you just mentioned on collaboration. How does group-work work for you? What are some of those benefits and challenges that come out of the fact that you are required to do group tasks?</td>
</tr>
</tbody>
</table>
| QN2-25 | 8:09.4-8:24.3 | That makes good sense. Could you just talk about one project in particular that you’ve done with your kids that
you're especially proud of?

QN2-27  11:14.8 - 11:23.5 What do you think those type of projects do for their creativity, their critical thinking type skills, those higher order skills?

QN3-13  2:52.7 - 3:03.0 So, here's a question that is probably easy but maybe not. **What do you think learning is?**

QN3-23  6:17.0 - 6:28.4 What role would you say you took of the groups believing groups? What role would you say communication and collaboration play as you teach everything?

QN3-27  7:27.2 - 7:36.0 Have you challenged the kids that don't wanna communicate, don't wanna work in groups, don't wanna um, collaborate? How do you challenge them to do it?

QN3-37  12:47.6 - 12:54.3 Do you see some different??alities that the kids use here because they're-they have more freedom to use what they wanna use?

QN3-39  13:21.4 - 13:24.7 Do you see any distractions from these kinds of technology?

QN3-45  16:08.5 - 16:15.2 So, what did you see their previous instruction being? Where-what was, what was indicated as the kind of instruction they received (too soft to decipher)?

QN4-14  4:03.9 - 4:07.5 What do you think learning is?

QN4-26  9:30.2 - 9:37.1 OK. Um, Can you tell me about a project that you've done with your kids that you're especially proud of?

QN4b-10  8:51.5 - 9:29.3 On one of the students that we talked to the other day, s I asked, how do you use your responsibility for your learning here for you as a student versus they as a facilitator. They said its about 60% the facilitator is responsible for my learning. 40% of it’s me. That's quite unusual in many schools and I can see that that can present some challenges. **Are there any challenges that you have experienced at- kind of students having a lot of more responsibility for their learning than traditional schools?**
Ok. So, what do you see as some of the benefits that you take at New Tech for student learning?

Do you think the kids identify, have a personal have a vested interest in the tech projects that they do?

Do you feel like the students get a sense of identity, a sense of identity, that it becomes their identity with these projects that they do? That this was part of them instead of some school-work that's separate?

Um, given that there's still got to be some sort of criteria for judging the quality of an individual project and things like that, **how, and what process exists for students to critique one another.**

Um, communication and collaboration are some of the big focuses here. How do you prepare students to do that? How do you - There's a big component to that. How do you treat others? How do you organize roles within groups? How do you collaborate effectively? How do you get students to understand that role?

Were there any times when you or the other teachers just have to say, all right, this is the way things are going to be? You can either choose to do it or not choose to do it, but this is the way it is.

Um, I guess the first simplest question that is difficult to answer is, **what do you think learning is?**

Um, it sounds like, from talking to a lot of other folks, that the students have a lot more responsibilities here at new tech. **What's it like to give the students the responsibility for their learning?**

Um, do you have any challenges from doing group work with these kids?

Have you, you have any challenges with distractions or misuse of the technology that the students use?
Table A6
Interview conversations addressing teacher involvement in innovative models

<table>
<thead>
<tr>
<th>Marker</th>
<th>Time</th>
<th>Questions or Comments answered</th>
</tr>
</thead>
<tbody>
<tr>
<td>QN1-16</td>
<td>2:48.7 -</td>
<td>Do, you feel like your university preparation prepared you for what you've been doing at New Tech?</td>
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<td>2:58.9</td>
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<tr>
<td>QN1-20</td>
<td>5:36.9 -</td>
<td>Now, to expand on that, what then is teaching?</td>
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<td>5:41.7</td>
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<tr>
<td>QN1-22</td>
<td>7:03.8 -</td>
<td>What would you say then the role of the teacher is at New Tech verses other schools and all that?</td>
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<td>7:11.5</td>
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<tr>
<td>QN1-33</td>
<td>16:56.5 -</td>
<td>How do you make sure they're of sufficient quality (right) to present to the kids?</td>
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<td>17:00.6</td>
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<tr>
<td>QN1-39</td>
<td>28:10.6 -</td>
<td>That gets to another area you were just mentioning about communication and kind of the role of communication in a</td>
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<td>29:22.1</td>
<td>setting like this. There's a philosopher uh, talks about four types of communicative action. The first step is the</td>
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<td>strategic, which is effectively imperative, you will do this. In the educational setting we tend to see that a lot in</td>
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<td>traditional schools. Do your worksheet and turn it in and basically, you can either choose the do it or not do it. The</td>
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<td>second is what you were just talking about which is constative communication which is this back and forth, the</td>
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<td></td>
<td>dialogue even sometimes even argumentation Um and then there's normative communication in which you establish the</td>
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<td>rules and the goals of the space and then there's the identity based communication-liturgical. Ummm You mentioned a</td>
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<td>lot about this type of constative communication. This back and forth between the students and the instructors uh,</td>
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<td>**In terms of the kind of power relationship with the students, how do you balance that in the terms of how you</td>
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<td>communicate with them in the space like this?</td>
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<tr>
<td>QN2-13</td>
<td>1:49.8</td>
<td>So, what do you think teaching is?</td>
</tr>
</tbody>
</table>
So, with that in mind, what's it like being a teacher at New Tech?

Do you mean challenges working with the other facilitators in terms of getting those projects approved?

Ok, that's great. Um, Do you feel like your training at the university prepared you for New Tech?

So, if that's learning, what's teaching?

Um, What's it like to be a teacher at New Tech?

What was it like the first few weeks you were here?

How do you enforce rule? Or, how do you establish rules in your classroom that...

Um, Given that this is New Tech high school and technology is in the name, what role does technology play for you if it's going to....?

How did for instance the teachers here verses the other school differ?

Um, In terms of the method and what's expected of you as an instructor vs. what the dominant paradigm of what instruction is in the state of Texas tends to be work? Uh, everyone sits in rows and needs to be quiet and take the test. Um, Do you have any challenges in terms of parental perspectives or student perspective, especially when they're starting out? In terms of how New Tech does things vs. the way that everybody else thinks things should be done?

Um, Do you feel like your university prepared you for New Tech?

Then, what's teaching?
Um, What's it like to be a teacher at New Tech?

You mentioned some of that October wall um and you've been out working with the more traditional schools some previous to that. How similar is that October wall to just what people face when they go out and work for the first time?

Do you ever teach the rubrics? How much of a roll do they have in the establishment of the rubrics?

Um, Do you think there can be any tweaks to say, teacher education programs to allow for teachers to be more prepared for this kind of learning?

Do you as a school; use any of the test scores as a diagnostic? Do you try and figure out where kids are having challenges and where to bolster your curriculum in teaching?

Um, something that we've heard from a lot of the other students and facilitators, is that in their time at New Tech, they get to build a rapport with the students. Does that bring in, and I've heard this from other persons (I can't hear myself) I've heard this from other teachers that we've interviewed elsewhere. That sometimes you know school's done but my students still want to be able to get in contact with me. They want to talk to me during the summer. Well, I don't want them to get in contact with me. Where does, how does that affect your level of privacy and maybe ....... security? (OK)

Um, You feel like your University experience prepared you for what you do at New Tech?

So, what's teaching or facilitating? Either one of them.

Um, What's it like to be a teacher at New Tech?
Um, What was it like for you when you started at New Tech coming from a more traditional environment the first few weeks. What was that like?

In terms of the methods, what was it like to shift this very different, social types of instructional methods?

Have you, as you give up control, maintain boundaries: How do you maintain norms, how do you communicate those?

You mentioned a little bit about the technology. For you, as a teacher now, three years in at New Tech, what role that technology play for you as a teacher versus the role that you give the technology with your students?
REFERENCES


