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The purpose of this qualitative study was to focus on the journey of seven high school teacher leaders striving to "sync up" with their students by implementing a one-to-one, mobile computing, teaching and learning, reform initiative. This case study was to give voice to the challenges, successes, and lessons learned during the first year of implementation. The goal was to encapsulate the framework of change as well as their perceptions of how teaching and learning were affected in their classrooms and building in order to better inform practitioners in the field contemplating a digital reform strategy.

The research used structured and unstructured interviews, email correspondence, classroom observations, and document reviews. The interviews were transcribed verbatim and content analysis was used to identify consensus, supported and individual themes, lessons learned, "must knows" and recommendations. Six core components were identified by the teachers as necessary to successfully implement a one-to-one mobile computing initiative: Focused Committed Leadership, Community Involvement, High Quality On-going Professional Development, Curriculum and Instruction, Infrastructure and Software Tools, and Understanding the Change Process.

The study found that broad leadership skills are required to implement such an extensive plan and that collaborative professional development with persistent commitment and vision are needed to overcome the teachers' sense of urgency, yet fear

of failure, when striving to transform instructional methodology. The study concludes with recommendations and a “how to” flowchart for successful implementation.

SYNCING UP WITH THE IKID: PORTRAIT OF SEVEN HIGH SCHOOL TEACHER LEADERS TRANSFORMING THE AMERICAN HIGH SCHOOL THROUGH A DIGITAL CONVERSION OF TEACHING AND LEARNING

by

Annie Wilson Davis

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Approved by

Ulrich C. Reitzug
Committee Chair

I dedicate this dissertation to those in my life who have encouraged me, tolerated me, and given me their support as I pursued this lifelong aspiration. I make this dedication to my husband, Mark A. Davis, to my children, Stephen and Christina, and to my dear friend and colleague, Darla J. Bray.

I dedicate this dissertation and all that I have accomplished in my life to my father and mother, Norman and Julia Wilson, who have given me the strength and courage to achieve my dreams. The high schools in this dissertation were named in your honor.

APPROVAL PAGE

This dissertation has been approved by the following committee of the Faculty of The Graduate School at The University of North Carolina at Greensboro.

Committee Chair _____
Ulrich C. Reitzug

Committee Members _____
Carl Lashley

_____
Charles P. Gause

_____
Craig M. Peck

_____
Date of Acceptance by Committee

_____
Date of Final Oral Examination

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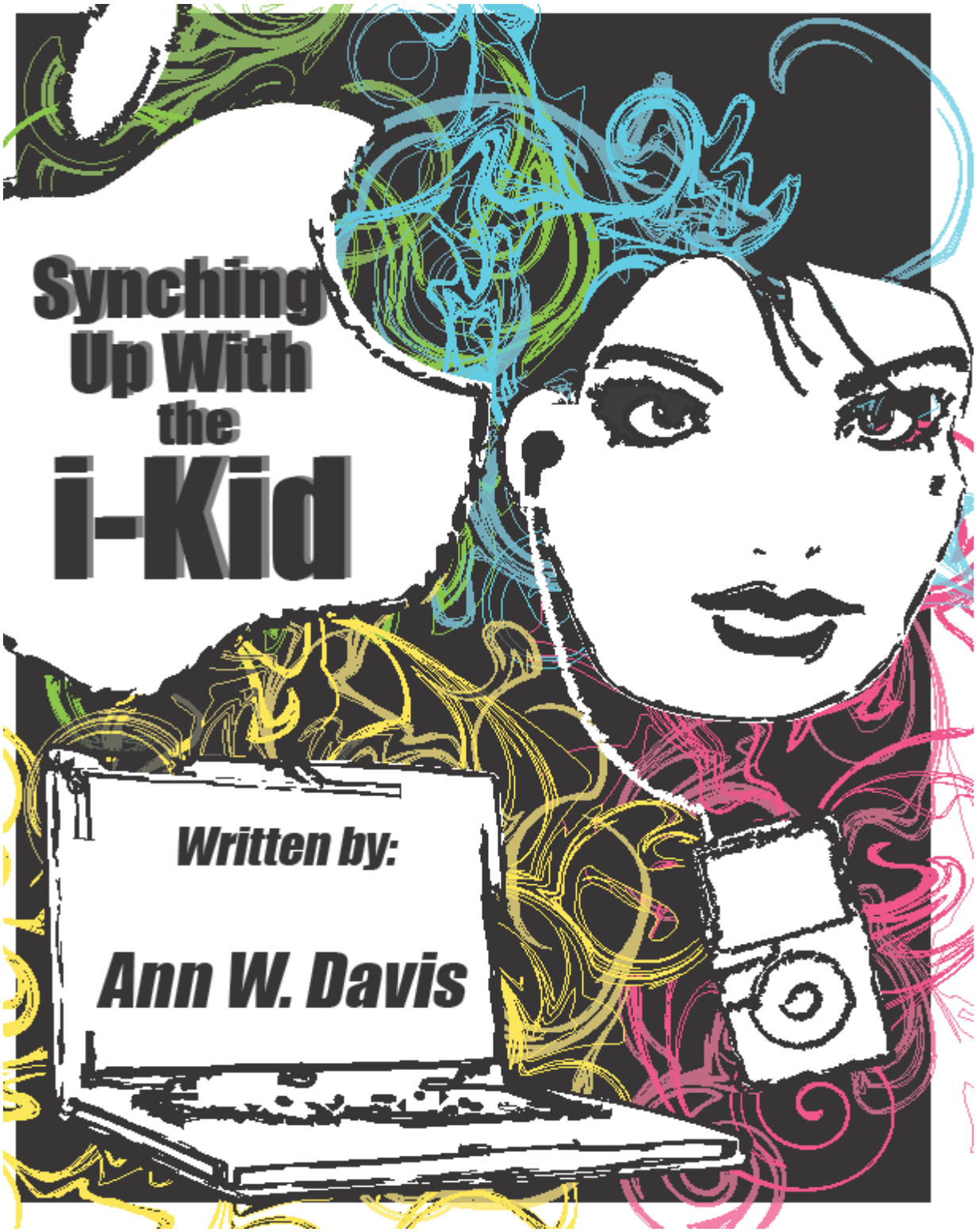

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INTRODUCTION

iText, iSleep, iPod, iFood, iChat, iShop, iLaugh, iRock, iDream, iLove, iFeel, iCry, iLearn, iDare, therefore iLive. This is in the hearts and minds of today's digital generation. The world has changed dramatically from the world that existed just a few years ago. The pace and rate of change in our world is in sync with every forward, rapid movement of technology. A new teaching and learning ecology, grounded in authentic communication, collaboration, and investigations must become evident since these are skills viewed as essential to student achievement in this 21st century world (Johnson & Cooley, 2001). At the heart of most of this change is technology (McCain & Jukes, 2001). How will the world recreate itself in the next ten years with the pace of this change? What will teachers do in response to the change to reach their digital students?

Learning environments need to be created where the curriculum taught and the instructional tools used reflect today's world. Schools must transform to meet society's exigencies in order to prepare students for today's global economy. Teaching methodologies with the use of technological tools that facilitate constructivist learning in every classroom are essential to prepare students for a successful life in the 21st century. These challenges must be met in a standards-based accountability system, which means the paradigm shift cannot be about "either/or but rather both/and" (Ohler, 2001). Changes of this complexity require a comprehensive reorganization of education, both in terms of curriculum and in the development of pedagogies that guarantee every student

obtains skills needed to flourish in this vibrant world (Thornburg, 1998). As Tyack and Cuban suggest, “Change where it counts the most – in the daily interaction of teachers and students – is the hardest to achieve and the most important …” (Tyack & Cuban, 1995, p. 10). Schools can no longer offer the long-established “sit’n git” method of conveying knowledge to students (Barth, 2001). Rather, students of the 21st century must acquire the skills necessary to be resourceful problem-solvers.

Barth (2001) refers to John Goodlad and others who have prudently observed classrooms in American schools. Goodlad states that approximately 85 percent of instructional time in the existing pedagogy follows this format: the teacher talks, the students listen, and then the students demonstrate attainment of knowledge upon demand of the teacher in the form of a written quiz or test. This phenomenon is particularly true in high school classrooms where large group, didactic, lecture-centered instruction prevails. The structure of an average American high school, Coppola (2004) writes, summarizing a range of studies, includes schedules, physical design, space available to teachers, teaching loads and short lived professional development. Generally, school culture breeds "aloneness" rather than interdependence. Teachers are constrained by time and space and "rarely work with other teachers on collaborative endeavors" (p. 40) or learn from each other, and they often compromise their standards for lack of time. One way to combat the lack of time and reform high school environments, Sandholtz (1997) says, is to use “technology as a catalyst for change in classroom processes because it provides a distinct departure, a change in context that suggests alternative ways of operating. It can drive a shift from a traditional instructional approach toward a more

eclectic set of learning activities that include knowledge-building situations for students." (p.47) Pedagogy that promotes engaged learning has students actively involved in meaningful hands-on activities related to real life; authentic 21st century classrooms must reflect this model (Johnson & Cooley, 2001; Means, 2001; Warschauer, 2006). Students need opportunities to respond to complex issues in ever-changing environments that promote essential skills of collaboration, problem-solving, and teamwork.

Educators of today know that they have no choice but to "disrupt" public education as we know it; they must prepare students for their global futures by using digital tools to help achieve key educational goals (Christensen, Horn & Johnson, 2008 and Zucker, 2008). Curricula, teaching methods, and schedules can all be customized to meet the learning styles and life situations of individual students; education can be freed from the geographic constraints of districts and brick-and-mortar buildings; coursework from the most remedial to the most advanced can be made available to everyone; students can have more interaction with teachers and one another; parents can readily be included in the education process; sophisticated data systems can measure and guide performance; and schools can be operated at lower cost with technology substituted for labor (Moe & Chubb, 2009). While Warschauer, Coppola, Means, and Sandholtz presents a body of research about technology integration and implementation as a reform model in the school environment, scant research exists on the collective wisdom of teacher leaders who actually spark a pedagogical revolution away from didacticism and toward constructivism while shaping a comprehensive 1:1 wireless computing reform model. This research seeks to understand the leadership needed for full technology integration,

thus producing a "how-to" manual from the teacher leaders' perspective on transforming teaching and learning from traditional to future ready.

Purpose of Study

The purpose of my study was to conduct an analysis of how five high school teacher leaders and two media specialists at J.E. Dennis High School implemented a full digital conversion. Full digital conversion means shifting from paper/pencil, textbook, teacher driven instruction to wireless computing capabilities with students seeking, creating and analyzing information while the teacher is the facilitator and/or coordinator of student work. Utilizing this strategy dramatically impacts the way business takes place in the high school classroom. This study gives voice to the classroom teachers' experiences, including their challenges, successes, and lessons learned during the first year of actual implementation of the J.E. Dennis High School - 21st Century Digital Conversion Initiative. The accounts of their experiences were sought in an effort to encapsulate the framework of change as well as their perceptions of how teaching and learning were affected in their classrooms and building. Since this reform model is relatively new, the collective voices of teachers who have actually experienced the many layers of implementation give a valuable perspective. The teacher leaders articulate their feelings and opinions reflect on what they would do differently, state what they have learned, and give their views of the broad leadership skills required to implement such an extensive plan (see Appendix A for additional detail on research design and methodology). These seven research participants can provide insight, guidance and advice to other professionals, who no doubt will be faced with similar initiatives as North

Carolina embarks on a *1:1 Statewide Learning Technologies Initiative*. My study, therefore, tells the reform stories of these teachers with hopes that school districts everywhere can use the information learned to help transform their own teaching and learning environments. In order to provide full disclosure, I was the 1:1 Project Manager for this initiative. I was employed in the district for one school year with the main objective to supervise and support the high school through this digital conversion transition. I was previously employed as an assistant principal at the high school from 1997 to 1999.

CHAPTER I

HIGH SCHOOL REFORM

High school reform has emerged as *the* chief education issue in most states. Governors, state legislatures, foundations, businesses, and think tanks are unmistakably driving high school reform (Alliance for Excellent Education 2006). Balfanz and Letgers (2004) have documented that more than one-fourth of high school students do not read proficiently on state or national (NAEP) assessments, perform beneath international counterpoints in science and mathematics, and have soaring drop-out rates. More than a third of all students and more than half of African American and Hispanic students do not graduate from high school (Greene, 2002).

All schools are complicated organizations, but the comprehensive high school embodies the largest and most complex of all schools. "Today there are multiple federal, state, local and philanthropic initiatives that are simultaneously attempting to address the consistent and on-going criticisms of the traditional high school" (Martinez, 2005 p. 1). In the midst of increasing challenges, high stakes, and limited resources, reform efforts must be taken seriously. The business community pressured states to pass accountability standards due to their concern that high school graduates are not prepared to meet job requirements. Additional on-the-job training in basic skills is required for many graduates. Colleges and universities find that freshmen frequently need remedial education because they have not completely mastered subject matter needed for

collegiate academic success. The No Child Left Behind legislation also contributed to high school reform by requiring high schools to raise the achievement levels of all students, especially underperforming groups, and to close the achievement gap that parallels race and class.

The Need to Change

As the Industrial Age faded into the past, the Information Age emerged, with its barrage of information doubling every six months. Also known as the *Digital Age*, this era is one in which a new society of systems and connections exists. Computer chips and imagination created smart offices, smart cars, and smart telephones. Humans are required to use technology or lose access to libraries (card catalogues are gone), phone messages (voice mail), correspondence (electronic mail), gas pumps (automatic credit pay), and banks (automatic cash machines) (James, 1997).

Along with the progress in technological hardware came the Internet, a shared global computing network based on standards including Internet Protocol (IP), Simple Mail Transfer Protocol (SMTP) and the Domain Name System (DNS), which enables global communications between all connected computing devices. It provides the platform for web services and the WorldWide Web; thereby playing a substantial role in change as well. The World Wide Web enabled the spread of information over the Internet through an easy-to-use and flexible format, thus playing an important role in popularizing use of the Internet. Businesses, homes, libraries, and schools are all connected to the Internet and use this medium as a means to communicate worldwide via websites.

The modern workplace has significantly changed with the use of these new electronic tools. Where people work, when they work, and how they work have been forever changed by technology. Currently millions of workers telecommute, with eighty-five percent projected to do so by 2019 (U.S. Bureau of Labor Statistics, 2000). In addition, employees must constantly acquire new skills to survive in jobs that did not even exist a few years ago (McCain & Jukes, 2001).

As chronicled in *Disrupting Class* by Christensen and Horn (2008), mainframes were disrupted by minicomputers which in turn were disrupted by personal computers. Laptops are currently being disrupted by netbooks and mobile smartphones are right behind them. These devices greatly alter the way business is done and therefore should have an impact on how education is delivered. Schools lag behind this private sector innovation; educational leaders need to create smart schools where skills are taught with tools that reflect today's world. Clayton Christensen (2008) actually predicts that within a decade, half of all courses at the high school level will be delivered online and that each student will need a customized learning approach to maximize his or her potential. Christensen is not projecting that 50% of students will be taught outside of schools, but rather that 50% of course-hours will be taken on-line at school. The teacher's role will be to supervise, tutor, assist and mentor the on-line learner. Through socialization and democracy activities will continue to have an important role in schooling, the instructional component will look very different by 2019, with 50% of learners using on-line sources.

With this projected scenario, technology is, and will continue to be, a central part of daily living and working in the 21st century. People can shop, pay bills, get directions, conduct research, check the weather, buy movie tickets, check on airplane arrivals, bid on merchandise, or communicate with friends, all in front of a computer or mobile device. In addition, constant communication can now be achieved through twitter, a free social networking and micro-blogging service that enable the user to send and read messages known as *tweets*. Doctors are beginning to use text messaging and twitter to inform loved ones of the outcome surgical procedures. The health care industry, business community, and worldwide industry reap the innumerable benefits of technology.

Educators must eliminate the disconnect between real world 21st century living and the current assembly-line Industrial Age high school learning environment. My study seeks to find a seamless avenue in an attempt to narrow or close the disconnect that currently exists. What better way to begin this process than to study the impact of a 1:1 technological transformation with a group of teachers who create, develop, implement and assess what it takes to put 21st tools and pedagogy into the hands of our most precious resource, our students. This study has the potential to inform school leaders as they develop new practices, attitudes, and skills to effect change in the ways schools and districts implement curriculum and instruction. This study will provide an opportunity for a group of practitioners to make contributions to the body of knowledge by sharing their expert perspectives of first-year implementation. Having the opportunity to study and learn from teachers, who collectively have gone forth into this new territory of 1:1

computing in teaching and learning, will be a unique contribution to research literature and to the field of education. In the 21st century, the future is now.

Rationale of the Study

An essential research question guided this study: What are seven high school teacher leaders' perspectives concerning their successes, challenges, discoveries, and feelings in implementing a 21st Century Digital Conversion Initiative? The rationale for this narrative comes from several venues. In this trailblazing territory, the background of how and why the school district created this educational vision and how the vision was articulated and shared with all the stakeholders to ensure implementation is important. This study will broaden understanding of similar technology initiatives for school systems across the nations as they begin to understand the need for changes in methodologies to facilitate the way students learn (see Appendix A for additional detail on research design and methodology). School leaders must accept responsibility and find ways to fund hardware, infrastructure, professional development, and digitized content for 21st century classrooms. They know the world has forever been changed, while schools have not. They know once hardware, infrastructure, professional development, and content are all secured, the teachers in the schools are the essential stakeholders who must effectively implement the plan, alter the teaching paradigm, and prepare students with skills that they will need. Limited 1:1 computing high school models exist to study at this time. Because of this scarcity, the J.E. Dennis High School 21st Century Digital Conversion Initiative is productive ground for study.

CHAPTER II

J.E. DENNIS HIGH SCHOOL

J.E. Dennis High School is located in a small town approximately 25 miles from a major metropolitan city. The population estimate, according to the 2007 census, was 21,708. Enormous population growth changed this small town to a suburban "bedroom community" for the metropolitan city workers. The racial makeup of the town in 2007 was 85% White, 10% African American, 0.4% Native American, 1.8% Asian, 2.7% from other races, and 1.1% from two or more races. Hispanic or Latino of any race was 6.9% of the population. The median age was 32.9 years. The median household income in the town was $53,230 and the median income for a family $61,895. Eleven percent lives in poverty. Eighty-seven percent have a high school degree or higher educational attainment. The total school enrollment in the town was 8,900 from 2005-2007. Nursery school and kindergarten enrollment was 1,100, and 5,700 children were in high school or elementary grades. College or graduate school enrollment was 2,100.

J.E. Dennis High School is the only high school in the town. The school has a rich tradition dating back to 1905 with strong community support; to this day, it remains the center of activity for the town. The school district is unique because the school board has taxing authority, which gives the community a sense of ownership. J.E. Dennis High School is a large, traditional comprehensive high school with approximately 1,600

students in grades 9 – 12 with 88 certified staff members. The school schedule consists of four 90-minute classes. N.C. Wilson High School - a satellite campus across town - houses approximately 400 students each period for career and technical education courses. These students are bused roundtrip each period of the day to the satellite campus. Each campus has its own principal and staff. The principal at J.E. Dennis High School began his tenure in November 2007. The superintendent began his tenure with the district in May 2007, coming from out of state. For the purpose of this study, all seven teachers were located on the main campus of J.E. Dennis High School. The student demographics for J.E. Dennis High School are as follows:

Table 1: Demographics

ETHNICITY	2007 - 2008	2008 - 2009
American Indian	0.30%	0.43%
Asian	1.70%	2%
Hispanic	4.30%	3.70%
Black	16.00%	17.25%
White	76.40%	75.19%
Multi-Racial	1.40%	1.40%
Male	52.00%	49.01%
Female	48.00%	50.99%
Free & Reduced Lunch	24.92%	23.40%
Exceptional Children	8.63%	9.60%

The mission of J.E. Dennis High School is *to prepare students to be responsible citizens and lifelong learners through a wide variety of teaching practices and learning environments that embrace technology and assist students to discover their unique gifts and talents*. J. E. Dennis High School holds the following beliefs:

1. Staff members must meet the academic, social, and developmental needs of students by recognizing the individuality of students, understanding their intrinsic worth, and promoting responsibility, self-respect, and good moral character while striving to prepare them for life in a global economy.

2. All students can learn, achieve, and thrive in a school environment that is appropriately challenging and that embraces the use of technology in our society, both of which require teachers to stay abreast of best teaching and learning practices through relevant professional development activities which extends the learning environments beyond the school walls.

3. Student learning, applied in a meaningful context, is the chief priority of the school. Students learn best when they are actively engaged in the learning process and when they accept responsibility for the outcome.

4. Parents must be involved in the decision-making processes of their child's education and that J.E. Dennis High School should provide multiple opportunities for parental and community involvement, which promote positive staff, community, and parental relationships.

5. A strong, positive, and professional rapport among all community members is essential to the foundation of our students' academic and career success.

J.E. Dennis High School also has seven critical expectations of what students should know, understand and be able to do in order to accomplish their school vision: *Students are valued in a nurturing, safe environment where individuality and diversity are respected. Students are challenged to realize their unique potential, personal & community responsibilities and pursue their dreams by being competitive in a global society.*

1. Students must know how to think critically, problem-solve on both global and analytical levels, and be able to formulate, execute, and evaluate plans of action in the classroom, on state assessments, and in real-world applications.

2. Students must understand how they think and learn, which will allow them to become fluent readers who can comprehend a variety of texts, citizens who can write for multiple purposes and audiences, and consumers with proficient technological ability.

3. Students should understand and model respect and citizenship in their daily lives.

4. Students should be confident and self-motivated while seeking opportunities for leadership/ownership.

5. Students should be able to research, analyze, organize, solve, adapt, and apply information while communicating and interacting as part of a team.

6. Students should grow in maturity and be able to make good and wise decisions.

7. Students should demonstrate a high level of performance as measured by state and national standards.

The following are specific goals set for each state required End-of-Course Exam for the 2008 – 2009 school year.

Table 2: NC State End-of-Course Data

SUBJECT	2006-07% PROFICIENT	2007–08 GOAL	2007–08% PROFICIENT	2008-09 GOAL	2008 – 09% PROFICIENT
Algebra 1	63.60%	80%	77.24%	82%	78.80%
Algebra 2	74.80%	83%	76.30%	82%	88.40%
Geometry	63.20%	75%	78.10%	83%	81.40%
Chemistry	--	90%	87.71%	91%	80%
Biology	68%	80%	82.73%	87%	87.40%
Physical Science	--	75%	60.28%	75%	74.80%
Physics	--	99%	91.30%	99%	100%
Civics	70.60%	80%	73.34%	80%	83.30%
US History	68.80%	80%	67.73%	78%	78.10%
English I	79.80%	85%	82.16%	87%	80%
Writing	57.95%	70%	83.29%	87%	79%
Overall	68.70%	---	78%	---	81%

J.E. Dennis High School also tracks attendance, discipline occurrences and graduation rates:

Table 3: Additional Student Information Data

Attendance Rates	2006 - 2007	2007 - 2008	2008 - 2009
	94.38	94.73	96.69
Discipline Occurrences	**2006 - 2007**	**2007 - 2008**	**2008 - 2009**
	4,250	3,358	2,456
Graduation Rate	**2006 - 2007**	**2007 - 2008**	**2008 - 2009**
	76.5	79.9	79.6

J.E. Dennis High School mirrors many large traditional comprehensive high schools across the nation with regards to demographics, course offerings, teacher working conditions and testing information. It has a long history of fluctuating academic and athletic success which makes it an ideal location for this study. Over 55% of the teachers at J.E. Dennis High School have more than 10 years of experience with 33% holding advance degrees and 16 teachers being Nationally Board Certified. Currently there is only one African American certified teacher on campus which does not mirror the student population and a new recruiting strategy is being employed.

J.E. Dennis would like to move from being a "good school to a GREAT school!" The paradigm shift from "sit'n get" teacher focused instruction to 21st century infused student-centered instruction provides an avenue for study that perhaps can be replicated across the state and country as educators strive to "sync up" with the iKid (see Appendix I and J learn more about the Digital Natives language, take the Techno Savvy Test). What better forum to gain this much needed information than that of teachers in the trenches as they strive to connect with 21st century students while using digital tools and resources in an attempt to reshape the public high school into an exciting e-learning

environment? The seven volunteering teacher leaders are eager to share their stories as they embark on a journey with endless possibilities.

Figure 1: Representative Pictures

CHAPTER III

PORTRAIT OF SEVEN TEACHER LEADERS

Two media specialists and five teacher leaders participated in this study. The number seven was selected to give voice to the various departments on a traditional high school campus. A deliberate attempt was made to allow for a diverse representative group of teachers with regards to experience, ethnicity and gender. Their experiences were solicited in an effort to capture the context of change as well as their perceptions of how teaching and learning were affected in their classrooms and building. The teacher leaders articulated their feelings and opinions as well as what they would do differently and what they learned. Most importantly, they expressed their views of the comprehensive strategic approach necessary to implement such an ambitious reform initiative (see Appendix K for detail on their consent to act as a human participant).

In this section, I want to introduce the teacher leaders, describe their teaching background, and share a few personal insights learned throughout this study (see Appendix C for detail on the initial interview questions). My goal is for the reader to have a better understanding of each participant in order to fully appreciate the individual and collective insights in future chapters.

Mrs. Elizabeth Henderson – Social Studies

Mrs. Henderson is a social studies teacher with twenty-six years of teaching experience. Most of her teaching career has been at J.E. Dennis High School. She is a Caucasian, middle age female who currently serves as the chairperson of a fourteen member department. Mrs. Henderson is a very traditional "sit and get" content oriented high school teacher. She prepares elaborate lectures for students and expects them to listen actively while taking notes from her presentation. She teaches mainly Advanced Placement (AP) courses and has strong test scores. Her class size is small (less than 20 students), which makes sitting in a circle for discussion the chosen classroom structure.

Mrs. Henderson is well known in the community and is revered and respected by her colleagues. She considers herself to be an advocate for teenagers. She was openly apprehensive about the digital initiative and whether she could "keep up" with the students and their computer knowledge. Her main concern was being able to "provide ample instruction for the students by combining coverage of vast amounts of information <u>and</u> the use of the computer." From this statement, Mrs. Henderson views the computer as an add-on to what she is already doing in the classroom. She considers herself to be an effective teacher based on her end-of-course and advanced placement results and does not see a need to change her current teaching methodology or pedagogy. Throughout the course of the year, Mrs. Henderson allows students to take notes in class using their laptops, and she assigns computer generated projects. Students are encouraged to look-up discussion topic information on the Internet. Testing continues to follow the paper

and pencil format. Mrs. Henderson attends all the required professional development offerings. She has an open-mind to technology integration for other teachers who are not experiencing success and for student learners who need a different approach to learning.

Mrs. Henderson has a difficult time providing the needed leadership in the social studies department during this cultural shift of teacher to facilitator. She has a strong desire for her department to advance and move forward using the 21st Century tools, and she begins to see a need for new departmental leadership. Many of the social studies teachers thrive under this reform initiative, and one social studies teacher is recognized by Apple Computer with the Distinguished Educator Award for technology integration.

Mrs. Samantha Davis - Biology

Mrs. Davis is a beginning biology teacher currently in her second year of teaching at J.E. Dennis High School. She is a mid-twenty, African American female who is very proud to teach at the high school from which she graduated. Mrs. Davis is a biology major and entered the teaching profession through the lateral entry program. She has a heavy schedule outside the daily classroom environment: JV Cheerleading coach, coursework for licensure purposes, motherhood and recent marriage. Mrs. Davis is very open to new ways of teaching while she is trying to understand the inner workings of the "world of education." Since Mrs. Davis did not go through the university teacher education program, the only instructional methods she has as a source of reference is from her days as a student at this high school. Her biology classes are leveled based on ability – regular, college preparatory and honors. Her average class size is 25 to 30 students. Mrs. Davis' classroom structure has changed

dramatically throughout the course of this digital initiative from straight rows to desks grouped together in four student learning stations.

Mrs. Davis is well-respected and trusted within the African American community and the community at-large. She considers herself to be an advocate for the at-risk student and their families. Mrs. Davis is openly supportive of the digital initiative and is excited about the global possibilities this reform model will bring to students. She candidly expressed fears of some students not being able to afford the fifty dollar laptop insurance fee and attributes this non-issue to the excellent communication and outreach provided to students, their parents and the community.

Throughout the course of the year, Mrs. Davis becomes fully immersed in the delivery of digital content. Students actively research the daily essential question in their learning teams while accessing the digital drop box as needed for assignments. She attends all professional development offerings as time allows while working closely with her ten science department colleagues and chairperson to develop shared lesson plans, pacing guides and formative/summative assessments. The science department provides on-going remediation opportunities for students while striving to achieve the highest science scores in the state. The science department chairperson is ever present in and out of the classroom as a means of support to all members of his department. The expectation of high student achievement and performance is ever present on Mrs. Davis' mind. Samantha believes the infusion of technology has revolutionized teaching and learning and she cannot imagine life in the classroom without it.

Mrs. Jane Honeycutt - English

Mrs. Honeycutt is a Caucasian female English teacher in her second full year of teaching. She was an interim English teacher for one semester at J.E. Dennis High School last year before becoming full-time this year. Mrs. Honeycutt is in her late twenties and also entered the teaching profession through the lateral entry program. She comes to education from the corporate setting on a quest to make a difference. Mrs. Honeycutt greatly enjoys her daily interactions with the students and feels that the three hours of lesson preparation each night is well worth the time investment for her students. Mrs. Honeycutt is committed to learning new things, building trust with her students and exhibiting a sense of humor. Mrs. Honeycutt often over extends herself by accepting additional responsibilities in her quest to make a difference. Mrs. Honeycutt teaches senior English (which includes a senior project component) and volunteered to teach Reader's Apprenticeship (a freshman course for struggling readers) during her planning period. Mrs. Honeycutt teaches honors, college preparatory and regular English classes with an average class size of 22 – 28 students.

Mrs. Honeycutt participated in the mobile cart laptop pilot with the English Department during her first year and is excited about the full scale conversion. She considers herself to be very technology savvy but openly admits that her students teach her new "tricks" daily. Mrs. Honeycutt views this reform effort as a means necessary for students to remain competitive in a global world. She is concerned about her classroom management skills and her ability to keep students on task appropriately given the immediate Internet access to the world and its distractions. Mrs. Honeycutt has a good

understanding of the technical “glitches” from the pilot, and she is apprehensive of what this could mean to the entire school and/or district when the initiative is fully implemented.

Throughout the course of the year, Mrs. Honeycutt fully exposes students to every digital content media and delivery model available. Her classroom environment is fully immersed in technology where her role is that of facilitator. The classroom environment encourages students to teach each other as well as the teacher. Mrs. Honeycutt works closely with the department chairperson and all members of the English Department. The English Department exemplifies a true professional learning community where resources, ideas, successes and challenges are shared. Each member of the English Department has become an “expert” on one technology tool in an effort to assist each other with training, integration and implementation. The English Department pioneered this initiative and is seen as the go-to department on campus for help and assistance. Mrs. Honeycutt has no fear of technology and is willing to research, try and make available any tool that she feels will help engage her students. She attends all professional development training sessions provided, as well as seeking any outside opportunities to meet her individual needs or the needs of her students.

Mr. Tony Clark – Physical Education

Mr. Clark is a physical education teacher with seventeen years of teaching experience, specifically teaching weight training, recreational sports and sports management. Most of his teaching career has been at J.E. Dennis High School, where he also serves as an assistant football coach.

Mr. Clark is a mid-forties Caucasian male who is currently working on a master's degree in school administration (MSA). He has two children in the school district and views this reform initiative as an opportunity to provide all students with a world class education. Mr. Clark is competitive in nature and likes the idea of his school/district becoming a cutting edge technology leader in the state and nation. Due to the content that Mr. Clark teaches, his instructional approach is kinesthetic in nature, and he views that he has limited opportunities for laptop technology integration. I included Mr. Clark in my study in order to get a male perspective and also a coaching perspective. I knew that his instructional content would not necessarily lend itself to utilizing digital resources, but I was hopeful that he would use the technology in his capacity as coach and departmental leadership.

Mr. Clark attended the required planning period professional development opportunities but prefers and enjoys learning and exploring technology on his own. Mr. Clark will recruit assistance from his students and/or colleagues if necessary, but he prefers to figure things out for himself. Mr. Clark is proud of the teachers and their combined efforts to make this transition happen for students. He sees the focus of the school on student achievement as measured by end-of-course assessments and making adequate yearly progress (AYP), neither of which directly affects what he does on a daily basis. Therefore, Mr. Clark does not experience the same sense of urgency or level of expectations as the academic teachers feel.

Throughout the course of the year, Mr. Clark infuses technology where applicable. He is supportive of the health teachers in his six member department and

their attempt to fully utilize the laptops during class. He spends first block each day serving in the role as a "quasi" administrator in order to complete the required internship hours for his MSA degree. The opportunity of completing classroom walkthroughs has given Mr. Clark a school level viewpoint regarding the implementation of this initiative.

Mrs. Dorothy Bray - English

Mrs. Bray is a senior English teacher with twenty-three years of teaching experience mainly at J.E. Dennis High School. She is a Caucasian female, in her late forties, and currently serves as the chairperson of a fourteen member English department. Mrs. Bray is organized, detail-oriented and passionate about teaching and learning. She is well respected by her students, colleagues and the community at-large. Mrs. Bray does not tackle any job/responsibility without zest, determination and purpose. She greatly enjoys the daily interactions with young people and the opportunities to grow and learn with her students. Mrs. Bray believes that teachers should "work collaboratively with kids and try to structure their learning in interesting ways. Teachers should give students multiple venues to express their learning in a way that suits them. Learning is not a factory model but a unique experience for each of us. Teachers must be sensitive and encouraging to struggling students while maintaining high expectations for their work."

The English department at J.E. Dennis High School has the reputation of being a strong cohesive unit with a strong, determined instructional leader. It is no wonder why the new Superintendent and the former principal selected Mrs. Bray and her department to pilot this reform model for the school/district. Mrs. Bray was informed of this decision

late spring of 2007, and initially she was equally excited and terrified. She spent her entire summer reading every book possible regarding infusing technology into the English classroom. She used her research skills to learn of the latest developments regarding teaching and learning in a 1:1 environment. After spending countless hours sifting through numerous documents, books and research studies, Mrs. Bray synthesized and disseminated the "must-knows" to her department.

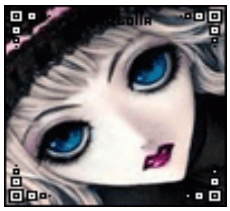
Throughout the pilot process and continuing into this school year, Mrs. Bray has come to love what the laptops have added to her students' motivation, learning and expression. Mrs. Bray says her students "have grown in confidence as independent learners and now see that technology is for more than MySpace, iTunes, and instant messaging (IM)." She believes that educators are doing a disservice to students if they do not adopt a 21st century learning perspective. She asserts that "learning how to access knowledge, understand it, organize it, and apply it are essential skills that our students must know; information is changing and growing too rapidly to teach a body of content and expect students to be prepared for a digital world."

Mrs. Bray knew that the success or failure of this expensive reform initiative rested squarely on the shoulders of her department. She also knew that she had to be the model 21st century teacher with the model 21st century classroom environment. She began by stepping out of her own comfort zone, taking calculated risks and learning the "new tricks" to grow as an educator. Mrs. Bray began the journey with her department, and together they taught and supported the entire faculty.

Media Specialists – Mrs. Wilson & Mrs. Bost

Mrs. Tammy Wilson and Mrs. Christina Erin Bost are the two media specialists at J.E. Dennis High School. Mrs. Tammy Wilson has thirty-six years of experience as a media specialist, twelve years in New York and twenty-four years in North Carolina, most of which has been at J.E. Dennis High School. Mrs. Christina Erin Bost has seven years experience as a media specialist, all at J.E. Dennis High School. Neither has been a classroom teacher, but both has a strong desire to help teachers gain knowledge, secure resources and integrate technology. Mrs. Wilson and Mrs. Bost are the experts on campus for problems, issues and successes regarding technology software and hardware. These well-read media specialists are the technology professional development leaders on campus.

Mrs. Tammy Wilson – Media Specialist



Mrs. Wilson is a Caucasian, over sixty female who does not allow her age to get in the way of learning innovative ways to educate students. She has a strong belief that students must be engaged in their own learning. She believes students need to "learn the skills that will enable them to have successful lives. This certainly includes understanding how 21st century tools can be used and applied effectively." Mrs. Wilson believes that failing to teach students how to use 21st century tools is irresponsible on the part of educators.

During her tenure at J.E. Dennis High School, Mrs. Wilson witnessed a variety of teaching styles and methods utilized by the faculty. She considers the faculty to be very strong academically and instructionally, with the climate shifting under the current

principal to be more "student-oriented," with the focus on "building relationships." She notes that "the teachers who have always done what is asked of them are adapting very well to the laptop as a teaching tool." Mrs. Wilson sees that "numerous veteran teachers have adapted their routines to fully utilize the laptop, noting that the teachers who are resistant to change are very reluctant and unhappy about this change. The younger teachers who have grown up as digital natives are very excited about using the laptops but need to be more concerned with the classroom management aspect."

Mrs. Wilson has great concerns about how students will manage the laptops. As a media specialist she is more concerned with logistics and details than delivery of instruction. "I am concerned that students will not charge their laptops fully before coming to school. I am concerned that they will forget their laptops and be careless with them and damage them. I am concerned about theft and security of the computers. I am concerned about the battery life of these computers. There might be days when a student has done everything correctly and still runs out of battery life because of extensive use of power intensive applications." Mrs. Wilson is forward-thinking and serves as a problem-solver for the administration. She anticipates potential problems in an effort to support the initiative and teacher/student success.

Mrs. Christina Erin Bost – Media Specialist

Mrs. Bost is a Caucasian female in her early thirties who thrives in the 21st century digital environment. She is excited about each student having his or her own laptop, thus eliminating the digital divide. She specifically cites making the card catalog available online as one of their first successes

in an effort to reach out to students and faculty members. This online resource has allowed a larger number of students to search for fiction and non-fiction titles, preview eBooks, and log onto multiple databases throughout the school building or from anywhere that they have Internet access. This capability has also eliminated the need to remain in the media center at all times. Both specialists are now available to spend more time in classrooms providing direct instruction.

Mrs. Bost believes that "now more than ever, she must assist in teaching students how to accurately cite sources in order to avoid plagiarism. Due to the amount of materials (both audio and visual) that students have access to via the Internet, it is vital that they are instructed in the appropriate citation of print and non-print resources." Both she and Mrs. Wilson demonstrated the use of online citation websites to classes as a means to inform students about legal and academic expectations.

Mrs. Bost is also concerned with the logistical aspect of the reform initiative and how her job description will specifically change and grow. As a result of the digital conversion, "one thing that I have been able to do differently this year is work with small groups of students, reading books aloud. This type of activity has been very rewarding to me because it has allowed me to focus more on teen literacy in this digital age." Through an online community group through the school's learning management system, Mrs. Bost started a young adult book club where she communicates regularly with its members. She says that the students at J.E. Dennis High School fall mainly into two categories: "either they treat the laptop as a toy or they have come to consider it a tool." Often, but

not always, the "academic performance of these students corresponds with their respective ways of thinking toward their laptop."

Over the course of the year, the Media Center environment has become that of a "docking station." Individually, students come before school to print assignments, during lunch for a quiet place to study or check email, and after school to complete homework and charge their laptops. Students also continue to visit the Media Center with their classes to conduct research projects, to check out books, and to receive instruction on using the card catalog and online databases. Students no longer find themselves confined in one of the yesteryear computer labs located in the media center since they carry their laptop with them. Both Mrs. Wilson and Mrs. Bost see this initiative as an opportunity to build a larger professional learning community where all faculty, staff and students learn together. They both look forward to leading this part of the initiative while transforming the media center into a 21st century learning environment. Their job description continues to change and expand along with the technology they reinforce. Both are up to the challenge and firmly believe that the "future is now!"

Figure 2: Syncing up with the iKid Artwork

by Haldis Andersen (J.E. Dennis High School Student)
Picture purchased by researcher with full rights.

CHAPTER IV

PLANNING, DEPLOYMENT & IMPLEMENTATION

Introduction

There have been classrooms, whole schools, state designated grade levels and one large school district that have undertaken the mission of transforming teaching and learning from a textbook-driven, straight rows, industrial age environment to a fully integrated digital learning ecology where teaching and learning occur on-line, through digital media and in collaborative seating arrangements. Henrico County, Virginia (grades 4th – 12th) has one of the largest "one-to-one computing" initiatives of any school district in the U.S. According to their website, 97% of mathematics and science teachers reported that the computers have helped students to learn these difficult subjects, and 59% report that the laptops have helped "a lot" or "a great deal." In addition, more than 80% of students reported that it is "helpful" or "very helpful" to have a computer to use for their schoolwork. These reports were validated when state standardized test scores increased and dropout rates decreased.

Many of the one-to-one computing reform efforts where every student is issued a laptop to use 24 hours a day 7 days a week have taken place in Canada: British Columbia, New Brunswick, Australia and Quebec. Only seven states in the US have undertaken this reform strategy in a modified approach – Florida, Indiana, Maine, Massachusetts, Michigan, North Carolina and Virginia. In 1998, Boston Massachusetts was the first

major urban school district to equip each of its school buildings and public libraries with high-speed technology networks. In addition to the school district's network structure, Boston initiated the "Technology Goes Home" project, providing access, professional development, and curriculum through public schools. For less than $15 per month, Boston schools also offered graduates and their family's new computers, printers and Internet access. The collective outcome of these projects was a 15% increase in the number of graduates attending college (65% to 80%). (Boston Public Schools)

The Department of Education in Maine has furnished wireless internet-enabled laptop computers to all the state's 7th and 8th grade students and teachers for the past four years. This initiative has curbed misbehavior in the schools while also boosting student homework completion rates. Moreover, student motivation and class participation has improved with the computers with the improved student interaction with teachers. More than 75% of teachers directly attribute the laptops as the primary tool to meet Maine's statewide learning standards. (Maine Department of Education)

Perhaps most impressive is rural Greene County, a small, tobacco-dependent county in eastern North Carolina. Beginning in November 2003, the Greene County local government, the school system, and social service providers partnered with One Economy to take action on the changing economy by creating a technology-rich, knowledge-based economy. The partnership's mission is to bring ubiquitous broadband computing access, to advance the economic livelihood of residents, to enhance the economic competitiveness, and to advance student academic performance. The school system implemented a digital transformation in grades 6 – 12, encompassing one middle

and one high school. Initiative leaders refined and enhanced the reform model for the past six school years as student engagement reportedly continues to increase. (McNeill, 2009)

J.E. Dennis School District (JEDSD) in North Carolina, my research site where I was employed for one year as the 1:1 Project Manager, is the first district to take the comprehensive approach to implementing a full-scale, system level, mobile, wireless, one-to-one computer program for all students 4th – 12th grade. All K-3 classrooms are equipped with an interactive white board called a Smart Board, a data projector and a laptop. Designed to move classroom instruction to a new teaching and learning ecology, the school district uses the N-line wireless infrastructure (the fastest available broadband network – only one of two in the world at the time, Duke University and J.E. Dennis School District), wireless-network-capable MacBook computers and digital content. This initiative places laptop computers in the hands of all 4th – 12th grade students and teachers twenty-four hours a day, seven days a week, thus bridging the *digital divide* in a growing, diverse school system (see Appendix B for a comprehensive list of definitions).

Planning and Timeline

J.E. Dennis School District (JEDSD) hired a new Superintendent who officially began work May 1, 2007. The new Superintendent decided to implement the digital conversion, with the planning stage beginning in June 2007. Mr. Clark, Mrs. Henderson and Mrs. Bost were all skeptical of the plans of this new person in charge of the district. Would he really be able to pull off this large technology initiative? The Superintendent previously served as the Superintendent of a large school district in another state where

this same initiative, under a different name, experienced significant student success. The Superintendent knew of the time and leadership commitment required to fully engage the school board, business community, teachers, parents and students. He also knew of the political implications that an initiative of this size could summon. He openly anguished over repeating the tireless effort but could not justify to himself preparing students for the 21st century without integrating a mobile 1:1 computing device. A target date of August 2009 was set for full implementation of the digital conversion initiative. Mrs. Davis stated that she was "excited about students getting a laptop…I know firsthand that many of the African American families do not have access to one in the home."

The decision was made to run a pilot to lead the initiative and to work out any problem areas. The English Department was selected for the pilot, due to its strong positive reputation. Mrs. Henderson, Social Studies department chairperson, was relieved that her department was not the one chosen. This selection involved moving the entire English Department from their current location in the school to an area that could be more easily wired.

The English Department chairperson was "excited and terrified" all at the same time. Mrs. Bray stated that she "began reading everything she could get her hands on regarding teaching in a 1:1 environment. She knew that her leadership would be vital if the initiative was to be successful." She further explained that "one English teacher resigned upon hearing that she would have to move classrooms. She was angry over having to move rooms and simply did not think she could handle the laptop/technology demands. She was openly afraid and negative after attending a one day consensus

building meeting with school, community, and county leaders." The journey began in July 2007 with a one-day demonstration for all English teachers, administrators, exceptional children's teachers and media specialists by Apple Inc. professional development staff. Apple personnel presented an overview of MacOS X - navigation and control of the OS, an overview of iLife - defining the applications and features and a group-based project that linked iLife in the classroom. All participating teachers were given a loaner laptop to use during the summer.

The Superintendent had a strong positive relationship with Apple Computers from the previous project, thereby making the decision to use Apple Computers once again a viable solution. In August 2007, right before school started, the entire English Department moved locations and began gearing up for the pilot. A purchase agreement for the laptops was negotiated and professional services were contracted for server installation.

In September 2007, an agreement was reached by the town and the school district to provide wireless access to the entire high school campus at an estimated cost of $185,000. The digital conversion initiative was beginning to take shape: site survey was completed, drop installation was decided, Cisco Hardware was installed, testing began, outdoor antennae for amphitheatre and additional testing was completed, and finally the English Classrooms had a projection date of early October to be 100% ready. In addition, several personnel changes occurred: the high school principal resigned, as did the Director of Secondary Education and Career Technical Education (CTE). This situation was further complicated with a newly hired Personnel/Communications Director

and a soon to retire Finance Officer, but these changes certainly did not stop the Superintendent's drive to move the plan forward. Mrs. Henderson, Mrs. Davis, Mr. Clark, Mrs. Wilson, Mrs. Bray and Mrs. Honeycutt all admit to experiencing some anxiety during this time period. So many new things were happening in the district, yet so many familiar faces were leaving. The last two Superintendents were "home grown" and spent most of their careers in the district. Their longevity and quiet leadership style was quite different from the new Superintendent who, after all, was an outsider; could he be trusted?

A new Executive Director of Secondary Education/CTE and 1:1 Project Manager was employed by the end of the month, along with a new High School Principal selected and set to begin at the end of November. (In order to provide full disclosure, I was the newly selected Executive Director and 1:1 Project Manager. I previously worked as an Assistant Principal at the high school ten years earlier and still had many teacher allegiances present. I was employed in the district for one school year with the main objective to supervise and support the high school through this digital conversion transition.) This certainly was a stressful month for the entire school district and especially for the teachers at the high school level who were involved in this pilot.

In October 2007, two days of professional development was provided for the English Department and Media Specialists. This instruction reinforced the many articles they were actively reading, which were supplied by the English Department Chairperson. The hardware began arriving for the English Department deployment, which is set for October 1 – 4, 2007 but delayed until November 5. The unpacking, scanning of serial

numbers, tagging, populating carts and imagining began. On October 5th the carts were assembled and moved to the media center. The decision was made to begin with computers on wheels (COWS) in each English classroom and not allow students to take them home during the pilot period. All shipments of laptops, servers and X-Raids were complete on October 11, 2007. The shipment of laptops was manageable at the warehouse dock, given the limited computers delivered at this time. A note was made to explore other shipment drop-points when the delivery of 3,000 computers was scheduled to arrive in early summer. Apple Engineers arrived on October 15, 2007 to assist with student laptop imaging, setup of servers, RAIDs, Home Directory Sync and Active Directory Authentication.

Figure 3: Pictures of laptops arriving and assembled

In November 2007, the new principal began and the mobile carts were delivered to the high school English teachers. Mrs. Bray and Mrs. Honeycutt both note that "this most definitely is an exciting time that is underlined with anxiety. Having a new principal with new expectations, standards, procedures and a new leadership style is daunting enough for any staff, yet add to that a new teaching ecology and the

performance pressure is surely elevated." After all, the teachers were still getting accustomed to a new Superintendent and Executive Director (Assistant Superintendent).

Small mini-sessions were held during the month of November with JEDSD School Board Members in order to gain full support and a better understanding of the initiative. The school board members were kept abreast of the initiative by the Superintendent throughout the entire planning stages. The Superintendent was hired to bring JEDSD back to its previous grandeur status of fifteen years prior when nationally recognized for year-round schooling. The theme used during these mini-sessions was "educating with excellence by extending learning environments beyond the school walls." An official vote to proceed with the full scale 1:1 digital implementation was to be held during the December School Board meeting.

21st Century teaching and learning was fully explained, as well as, the rationale behind 1:1 computing. The presentation began with the North Carolina's Educational Pipeline information as documented by achieve.org:

Figure 4: North Carolina's Educational Pipeline data

In North Carolina, for every 100 9th grade students…

…64 students graduate four years later.

…41 students enter college.

…28 students are still enrolled in their second year.

…19 students graduate with either an Associate's degree within three years or a Bachelor's degree within six years.

A discussion was held regarding the Mission of the North Carolina State Board of Education – Future Ready Students for the 21st Century: *Every public school student will graduate from high school, globally competitive for work and post-secondary education and prepared for life in the 21st Century.*

Table 4: A comparison of traditional and 21st Century learning environments

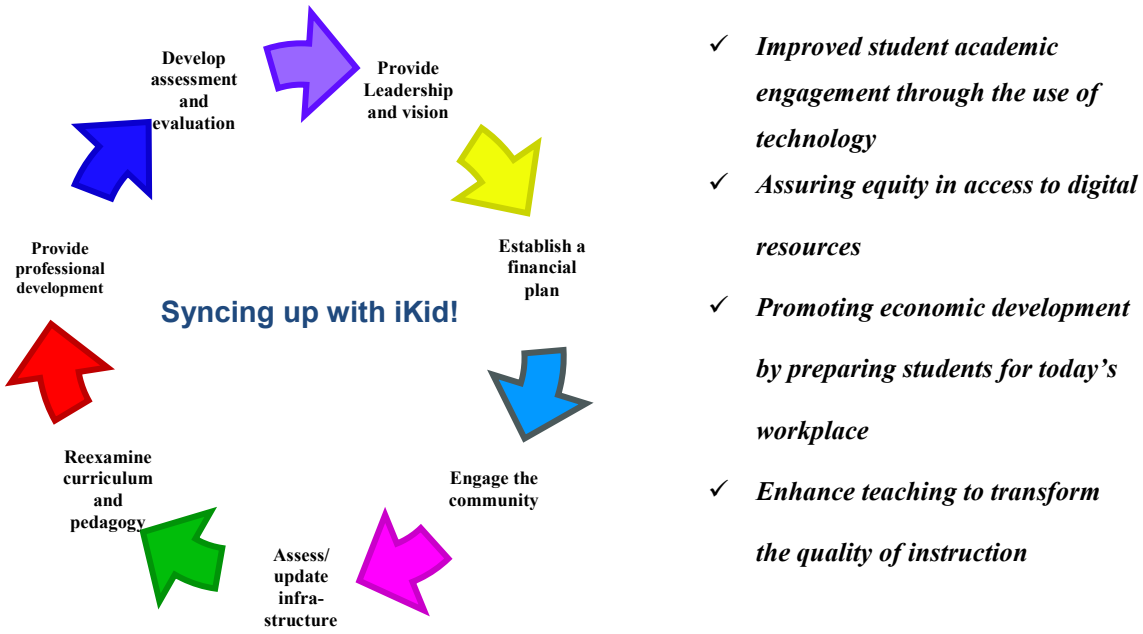
Traditional Learning Environments	21st Century Learning Environments
Teacher-centered instruction	Student-centered learning
Single-sense stimulation	Multi-sensory stimulation
Single-path progression	Multi-path progression
Single media	Multimedia
Isolated work	Collaborative work
Information delivery	Information exchange
Passive learning	Active/exploratory/inquiry-based learning
Factual, knowledge-based	Critical thinking & informed decision-making
Reactive response	Proactive/planned action
Isolated, artificial context	Authentic, real world context

Source: International Society for Technology in Education (ISTE) NETS Project, National Educational Technology Standards for Students, June 1998, pg. 2.

School Board members wanted one-to-one mobile computing clearly defined. Answer: collaborative teaching and learning anytime and anywhere. The administration explained that today's learners have grown up in a digital world with cell phones,

computers, video entertainment, iPod technology, and the Internet. Students are hyper-communicators, goal planners, multi-taskers, expert technologists, and active learners. Yet, students experienced a huge disconnect every day when they walked into a classroom where pencil, paper, lecture, textbook, review, and test were still the norm. Engaging these students and making education relevant once again was critical. We explained the components of success as a never-ending continuum with our planned results:

Figure 5: Continuum of Success



Budgeting for the massive project was the largest component of these mini-sessions. (Note: the entire budgeting process occurred prior to the deep recession for which the world is about to enter.) Through creative five-year leasing of the wireless

infrastructure and computer hardware, the total cost of machine was little more than a bottle of water per student each day. Infrastructure cost estimates were:

Total cost for 7 sites was $1,055,033.06 with a monthly payment of $20,042.76.

Table 5: Computer Hardware cost estimate

Total Laptops	5% Loaners	Total	Cost per Unit	Total
4734	**237**	**4970.28**	**$1,210.33**	**$5,410,513.99**

It became obvious during this meeting that funds would need to be redirected, reallocated, purposeful and focused. All monies – local (including school tax and fund balance), state and federal would need to be directed toward this one goal that will supersede all others. Conscience decisions of where money savings existed were explored and explained. The goal of the system leadership was to develop and implement a realistic and sustainable plan. Mrs. Henderson and Mr. Clark openly shared many of the rumors surfacing within the community and school district regarding where all the money was coming from for this initiative. It was clear that we had much work to do in communicating a transparent budget plan.

Budgeting and "Abandon" List

Once every student had a computer in their home, many more ideas of cost saving measures would continue to be explored as listed below.

List of traditional funding components to possibly abandon:

- Text books
- Traditional desks
- Transportation costs once students are taking more on-line classes.
- Computer labs-equipment, support and building space

- Legacy desktops-support, software
- Energy savings of mobile device
- Library reductions
- Media center reductions (Reference library and materials)
- Overhead projectors
- Classroom tools such as dictionary, thesaurus, calculator, globes, maps
- Classroom curricular materials
- Printers and ink cartridges
- Paper
- Mailing and postage
- Report cards
- Travel expenses due to distance learning/training
- Substitutes for time away training
- Online versus printed materials—handbooks, calendars, newsletters, guides
- Virtual schools—regular and summer school
- Schools will look different—less seat time, fewer classrooms, less brick and mortar
- Career and Technical Education (CTE) funding for computer labs
- Student Registration process can be done on-line saving money on staff
- EC read alouds done by the computer saving staff time and money
- Field Trips done virtually saving both time and money.
- Expensive consumable resources for science labs (chemicals, dissection, etc.) Labs done virtually.
- Expensive consumable resources for CTE courses (Health science labs, food labs, construction trade, etc.) Labs done virtually.
- Skeletons used in biology classes, CTE Health Science classes & PE classes.
- Art supplies and materials cost reduced. Computer graphics can be used.
- Music can be written and published making the school needed money.
- Single band equipment needs can be reduced using computer synthesizer thus reducing cost of expensive instruments.
- Security monitoring devices reduces cost of parking lot attendants' personnel.
- Remediation money Title 1/69 monies can be redirected from personnel to on demand software tutorials.

Fundraising efforts with the local business community and grant applications/receipts would also need to be ramped up in order to fully meet the current timeline. The School Board was invigorated by the potential effect on students and understandably weary at the same time of the cost of this massive trailblazing project. I will never forget the Chairwoman of the Board looking directly into the eyes of each

member of the system leadership team and asking, "Do you believe this is the right direction for our students, and are you fully dedicated to support this initiative?" We all looked her squarely in the eyes and committed our belief in, support of and dedication to this project – the Future is Now!

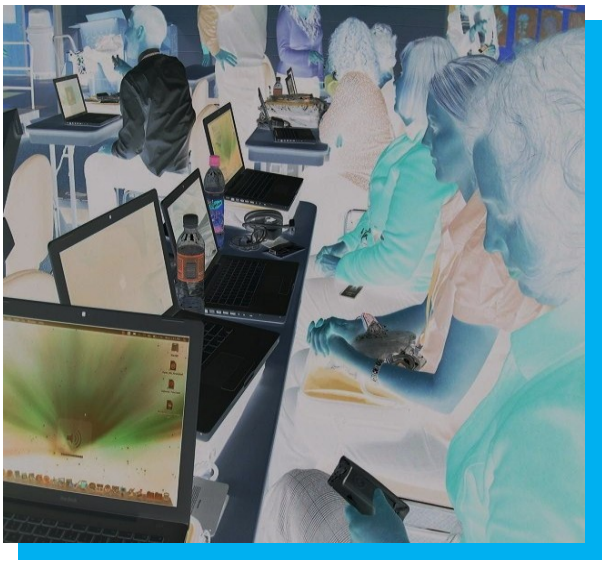
On-going Professional Development

While all this was going on behind the scenes, two additional days of professional development was provided for the English teachers and media specialists. All the professional development to this point had been geared toward using the programs installed on the MacBook and its basic use --troubleshooting, printing, saving, backing up, internet and Mac software applications & curriculum of care - ethics, rules, security, care and AUP (acceptable use policy). J.E. Dennis High School traditionally used PC computers with Microsoft applications and the change to using the Apple Computer platform with new software programs was a daunting learning experience. More time was spent learning the applications than anticipated.

Mrs. Dorothy Bray refers to this time as "overwhelming, exciting and adventurous." She further explained, "After very limited training, the nervous English department members began gingerly introducing laptop use. Teachers stuck mostly to Pages and Keynote (a word processor, page layout application and presentation software application developed as a part of the iWork productivity suite by Apple Inc.) during the first semester as they were struggling to learn the programs with the students. By January, we felt proficient in these programs and were also delighted to find that our students could teach us as much as we could teach them about the laptops. Collaboration

between students and between teachers and students flowed naturally as we learned together. For once, we were laptop novices in our classrooms with our students, rather than the content expert!"

November also brought many technical issues. Because student's computers were synching to backups on a server, the laptops were slow to synch, documents disappeared, and the Internet was spotty. Much experimentation went on to work out the kinks, which usually caused new kinks as the old ones were solved. The English teachers were frustrated many days, but all held true to their commitment to make this work for students. They were determined to "sync up" with the iKid, according to Mrs. Honeycutt.



The English teachers and media specialists continued their differentiated training through a one day professional development session during December 2007 (Appendix E), but the excitement exploded for many (though some were still skeptical) as the School Board and System Leadership Team began playing Santa Claus a little early. All J.E. Dennis High School teachers and N.C. Wilson High School teachers (the satellite campus with whom J.E. Dennis shares students) received a laptop to use 24/7. Teachers were told to take the

computers home and play with them during the holiday break. Training sessions were planned for second semester beginning in January 2008 during their planning periods (P.P.A.T – Planning period action teams – 45 minutes of 90 minute planning each Wednesday), led by the English teachers, Technology Division and Media Specialists. The plan was to use a professional learning community environment with a peer-to-peer network.

The dissemination of laptops continued during the month of January to all middle and elementary school teachers, and new 21st century furniture replaced the traditional desks in some English classrooms at the high school. The excitement was growing throughout the district, yet P.P.A.T at the high school was met with varying levels of interest, according to Mrs. Bray. "Many teachers were eager to learn, while others feared to touch them. A few teachers were openly hostile to the training and loss of planning period time. Some teachers worked on other work; some did not complete projects assigned to show use of the program. Most cooperated and tried to produce products that were useful in the classroom or personally."

Implementation Team

By this time a system-level implementation team was needed to provide the much needed leadership and oversight for the district. A new Finance Director was hired and began work in January, thus slowing the progress somewhat while time was needed for this person to become acquainted with the J.E. Dennis School System budget. For our mission to be successful and meet the necessary timeline, quick, deliberate attention to detail was essential. The Technology Director and I attended an Apple Leadership

Institute in Florida to help set the course for a master plan yet to be developed. We had less than eight months until the high school's deployment of laptops to all students, and we were beginning to get inwardly anxious. Fortunately, we returned with a game plan, and a system level implementation team was formed with the following members: Superintendent; 1:1 Project Manager; Communication & Human Resources; Financial Plan & Grant writer; Infrastructure, Curriculum and Pedagogy; Exceptional Children; Visitation; Professional Development; Deployment; AUP/Discipline Policies and Procedures; Assessment, Research and Reporting; Apple Representatives; Cisco Representative; JEDHS Principal; NCWHS Principal and the Intermediate School Principal (The intermediate school was set to deploy at the same time as the high school).

This fifteen member team (some performing dual roles) made up of the Superintendent, Executive Directors (Assistant Superintendent level position in this district), Directors, Principals and technology support personnel began meeting weekly. The weekly meetings included a planned agenda and lasted between two to three hours in duration. Our first task was to answer the many questions from school personnel, which surfaced in a recent survey. We decided that "one voice" must be heard throughout the district in order to squelch false information and rumors. Mrs. Henderson solidifies our need for "one voice" when explaining "that with all the rumors and new personnel it is hard for teachers to know who to trust." She says that "my leadership calmed many fears due to my previous connection at the school." The original question/answer document produced by the team addresses over 120 questions and was disseminated to principals and media specialists to relay information at individual schools.

February 2008 quickly approached, and our implementation team was floundering. The vision, goals and expectations were set and communicated (Appendix F), yet our master plan was lacking coherence and direction. With so many newly hired personnel and a recently formed system level leadership team, specific job expectations were lacking, which caused an endless spiraling revolution. At this point, an outside coach was needed and solicited to formally launch our initiative. Our coach was one of the master minds behind the Henrico, Virginia 1:1 deployment. After she set clear job duties, assignments, roles and responsibilities and we viewed hardcopies of a master plan, we finally had specifics needed to forge ahead with direction and purpose. Our coach was instrumental in providing us direction on this day and on many days to come as she was always available by phone and email, with site visits provided as needed.

Master Plan

Our Master Plan (see Appendix G for a sample master plan template) was electronically created in Excel using the following 12 categories: Documents List, Deployment, Infrastructure, AUP-Discipline, Professional Development (Students, Teachers & Parents), Communication, Human Resources, Financial Plan & Grant Writer, Curriculum & Pedagogy, Assessment & Research, Sponsors, and Miscellaneous. The master plan was placed in a shared folder, and each member of the team now understood their roles, responsibilities and tasks to be accomplished. At last, we were functioning like a team and accomplishing goals and tasks. Research certainly is correct in telling us that trusting relationships is the key to any organization moving forward positively as a team.

The principals were charged with replicating the launch meeting at their respective schools by the end of the March. The high school principal hand selected his implementation team utilizing individual teacher strengths. Momentum was starting to build. Meanwhile, professional development continued for all technology contacts at all schools while laptop synching of information was discontinued on the high school pilot. This move seemed to solve most of the technology issues that the teachers were experiencing. The technology staff learned from Apple that no one had tried this synching back-up system before, and our initiative was being used as a learning experience for their engineers! This revelation explained the recurring technology glitches that occurred since the inception of the laptop pilot.

Community and System-wide Outreach Symposium

On the evening of February 25, 2008 the J.E. Dennis School District sponsored its first ever Technology Symposium with a reception preceding the event. A private event occurred directly after school for all system-level employees with a focus on the classroom teacher. This event intended to raise public awareness, build excitement and involve the community and local businesses while hopefully building financial partnerships. Guest speakers included: Susan Patrick -- President and CEO of North American Council for Online Learning and former Director of the Office of Educational Technology at the U.S. Department of Education; David Warlick – 21st Century Futurist, Consultant, National Speaker,CEO of *The Landmark Project* and author of three books on instructional technology and 21st century literacy; and Randy Wilhelm – netTrekker CEO from Thinkronize, Inc., a company he co-founded in 1999 to enhance

the education of youth through innovative technology. Lowe's Charitable Educational Foundation was also in attendance and presented JEDSD with a check for $250,000. According to Mrs. Honeycutt and Mrs. Davis, "It was during this event that the excitement began to roar and doubters faded away, and most every person present began to believe that this dream could come true for students." Energy, drive and determination became the force during this event and remained constant until deployment day in August 2008.

Partnerships formed during the month of March to provide Internet connectivity in the homes for all students at a modest cost of $10.00 - $12.00 a month for impoverished students, furthering narrowing the *digital divide*. Mrs. Davis was so excited about this partnership. Her dream of bridging the gap between the "haves and have not's" was coming true.

March also brought more formalized professional development once a teacher technology profile survey was administered. This survey allowed for differentiated professional development to be developed while actively training the technology contact personnel on basic use -- troubleshooting, printing, saving, backing up, internet and Mac software applications & curriculum of care, ethics, rules, security , care and AUP (acceptable use policy). The high school implementation team was building momentum while digital curricular resources and learning management software were actively being explored by the system level implementation team. With less than five months until deployment, countdown dates were set to keep all members of both teams on target. Mrs.

Henderson clearly felt that "the weight of expectations, responsibilities and the growing "to do" list that the countdown dates brought."

Countdown Dates

• Storage and Staging	April 3
• Learning Management System	Early April
• Image Set	April 17
• School Deployment Launch Meeting	April 3
• School Master Plan	April 24
• Determine # of Additional People to get laptops	April 24
• System Professional Development Plan	April 17
• Learning Management System selected	April
• Calendar revision – Early release	May 13
• Discipline Code of Conduct Completed	June - July
• AUP Completed	June - July
• Strategic Plan	June
• Technology Plan	June
• Technology & Other Positions Posted	April 11
• All Positions Hired	June 13
• Positions Start Date	July 1
• Help Desk Notebook Printed	June 13
• Training of Help Desk Personnel	Month of July
• Deployment to Schools	August 17 – 23
• Parent Meeting	May
• Digital curricular resources chosen	May
• Shipping of Computers to JEDHS	June 16

April and May was spent securing digital curricular resources in an effort to phase out the use of textbooks (see list below), selecting a learning management system (a web-based program that parents and students could access to view grades, assignments and exchange information with teachers), investigating on-line professional development resources, setting policy and guidelines for deployment, continuing teacher professional development, building community support through outreach, adhering to budget constraints, hosting parent and student meetings, hiring and training new staff positions to

support implementation, assembling a help desk, and attending to the technical requirements for a smooth deployment. Both Mrs. Wilson and Mrs. Bost were excited to be part an integral part of this process. Their role shifted from solely media specialists into an unchartered territory. They plug along assisting throughout the year while wondering what their new role would become on campus.

Curricular Resources

The following resources were secured with teacher input to ensure teachers and students had access to state-of-the- art curricular resources (see Appendix D for their comprehensive curriculum resource guide) and professional development, including *Apex Learning* - Digital curriculum for differentiated instruction**;** *Atomic Learning* - Web-based on-line training and video training on +110 software applications which supplemented the curriculum**;** *Renzulli Learning* - Enrichment and differentiated activities for the gifted and talented student; *ThinkFinity* - Content and professional development which included 55,000 standards-based lesson plans, interactive tools and reference materials; *Explore Learning* - Math & Science Gizmos and supplemental modular instructive simulations in math and science that supported state and national standards; *Intel®Education Initiative* - Online tools and resources for teachers; *SAS in School* - Standards-based online exercises, quizzes; *Angel Learning* – (Learning Management System) Portal offering variety of online services, including professional development, online classes and assessments, and a parent portal for tracking grades, homework, etc.; *StudyWiz* – Portal offering assessments, classroom management, grades and homework access; *Dynamic LearnSpace for K-12 education* - Enhanced mobile

learning through iPhone, iPod and iPod touch customization; *NC WiseOwl* - On-line databases of information for students, parents and teachers with web links and online professional development; *NetTrekke*r - Customized Search engine for educational resources; and *Discovery Education* - On-line video streaming and other resources that were searchable by state objective.

June 2008 brought two personnel changes with the hiring of a new Executive Director of Secondary Education and CTE and a new Director of Human Resources and Public Information. The high school prepared for the 1:1 setting by having all PC desktop computers removed from classrooms, the library and labs. These computers were redistributed to other schools in the district with some sold as surplus. The design and setup of Angel Learning Management System began, and the entire district converted to Follett Destiny in support of the initiative. Follett Destiny is a web-based, district-wide library browser inventory system to be utilized for inventory of the laptops. Mrs. Wilson and Mrs. Bost had hoped for this web-based program for many years; both shared the excitement of their vision becoming a reality.

Student Help Desk

During the month of July 2008, teachers experienced in-depth pedagogy instruction and curriculum integration during a four-day summer institute. Mrs. Honeycutt recounts, "the summer institute had mixed reviews…the teachers who strive to learn and grow were satisfied with the professional development received, while the naysayers took the wait and see approach."

Over 115 teacher's system-wide participated in this training. In addition, five professional development early release days were approved and added to the school calendar to afford prescriptive training for teachers during the 2008 – 09 school year. The laptops began to arrive and were stored for security while a new Director of Technology and Media was hired. Imaging later began with the help of future help desk students. A help desk was to be located in the media center for students and teachers to utilize for technical issues. The help desk employs one full-time teacher who oversees student apprentices and interns servicing the computers and offering assistance each period of the day. Mrs. Wilson and Mrs. Bost feel that "the help desk quickly became the "hub" for any and all technical problems on campus and that the initiative could not have moved forward without it."

Deployment – D-Day(s)

Parents' two-hour training sessions were held August 19, 20, 21 & 26, 2008. This training was a required pre-requisite before students could be issued their laptop. Parents were required to sign the Acceptable Use Policy (AUP – see Appendix H), participate in the training and pay a non-refundable $50.00 insurance fee for usage of the computer for one school year. Payment plans were available as well as a special benevolent fund for students and/or parents who could not afford the insurance fee (see Appendix M for additional detail on the student insurance agreement). No student was to be turned away due to lack of funding. Roughly 75 students (out of 1,600) did not have a parent to attend one of the sessions. These students and parents received personal phone calls and/or

visits to seek understanding for non-attendance/commitment. Of these students many did not attend for financial reasons. They were unaware of the special funding offers. After learning more about the initiative and their responsibilities, every student on campus was issued their own laptop by the end of September.

The week of August 25 – 29, 2008 will forever be etched in the minds of all who participated in this initiative. Mrs. Tammy Wilson, senior media specialists attributes the success of this week to the principal, high school implementation team, Assistant Principal in charge of deployment and the Instructional Technology Facilitator who masterminded a detailed plan to train 1,600 students on basic use, AUP, care, use, and safety information and then issued a laptop through homeroom. The deployment began with the senior class and continued throughout the week until the freshmen received their laptops on Friday. Mrs. Bray noted that "there were no stumbles or falls; the plan was specific and detailed, and every person on staff knew his or her role and executed it effectively." Students at J.E. Dennis High School now had the privilege of taking the laptops home to complete assignments, homework, projects, or research. The laptop provided them access to the most current information available through the internet as well as multimedia tools, which could supplement materials presented in textbooks and by teachers.

The planning road was long and the journey not without bumps, but with successful deployment, the voyage continued toward full implementation of teaching and learning…hopefully shaping a new educational ecology!

Implementation

The month of September 2008 was the first month of implementation. As with any new technology initiative, kinks presented themselves that needed immediate solutions and or fixes. The J.E. Dennis Help Desk was now fully operational and able to remedy many of the student issues. Initially there were problems with the computers working correctly. Lots of computer got hung up for no particular reason. Some students nicknamed the little circling ball that indicates a hang-up "the beach ball of death" or the "disc of death." According to Mrs. Wilson, printing was a huge issue on campus. From this comment, teachers clearly had not fully evolved into the paperless world. In the beginning, individual visits were made to the classroom to log-on as administrator and add the printers. Then the technology department created an update that allowed most of the students to add printers. Now most teachers and students can go up to any network printer, look at the IP address, and add the printer themselves.

According to Mrs. Bray and Mrs. Wilson, many teachers complained excessively about not having printers easily available. The technology department brought seven network printers and placed them in different areas around the school, and the English Department purchased five extra network printers. In addition, ten printers that were on the English Department (C.O.W.S) carts originally were brought back to the high school. As of June 2009, lack of printers on campus and continuing issues with Apple computers working with HP printers was the single most concern amongst teachers on campus. It is without a doubt that this will be resolved or teachers will find other creative avenues to fully utilize technology and abandon the need for printers. This thought process proved

to be true when teachers quickly learned to back-up grades when the learning management system – Angel - collapsed on September 18, 2008. The teachers used this as a learning experience and quickly rebounded to ensure this mistake would not inhibit them again.

During the months of September and October, weekly technology updates from the Assistant Principal (Mrs. Wilson calls him the detailed deployment mastermind) were broadcast via email to teachers and to students through Angel (the learning management system). Following this paragraph is a small snippet of the types of issues/kinks that occurred during the first months of implementation. Effective, efficient and timely information is crucial in all aspects of life, but in this situation to avoid collapse of a new initiative, communication was critical. These updates continued throughout the course of the school year with less regularity and purpose.

The initial bumps in the road were smoothed, and now the focus began on teaching and learning in the classroom through a different pedagogical approach. Student monitoring was done remotely from the administrator's desk, which allowed more time to focus on instruction.

Figure 6: Pictures of students in new classroom environment.

Figure 7: Technology Update Newsletter

Technology Update:
1. Laptops are to be SHUT while carrying them in the hallways.
2. The laptops are NOT allowed out at all during lunch (this does include the amphitheater).
3. There are numerous printers in classrooms throughout the building. PLEASE be courteous to those teachers who have network printers and only retrieve printed materials the LAST 10 minutes of the block.
4. Back up as often as possible.
5. Many teachers have emailed me sites to "unblock" and we have taken care of it...please continue to do so!

NOTE 1: The Acceptable Use Policy states in part: "Information obtained via the internet and other sources using JEDSD technologies is not guaranteed as to its accuracy or quality. I understand that should I fail to honor all the terms of this Policy, future Internet and other electronic media accessibility may be denied. Furthermore, I may be subject to disciplinary action outlined in the JEDSD Student Code of Conduct and, if applicable, my Laptop computer may be recalled." JEDSD does filter web content and makes every effort to filter for inappropriate material, but nothing is as comprehensive as supervision. Reports of violations of this matter are mostly discipline issues and will be dealt with accordingly.

NOTE 2: In order for student machines to get the latest updates, patches, and fixes, students should, at least once a week, - AT SCHOOL - power down their MacBook, restart, and login to the MGSD network.

ISSUE: Student Laptops do not have the ability to install printers
Students may not have the ability to install printers (i.e. at home or elsewhere) because they cannot install the printer drivers etc.
SOLUTION: A solution has been found and an update is being pushed to student laptops. Students will need to completely shut down their machines, reboot, and login - while at school for these changes to take effect. (See Note 2)

ISSUE: Student Laptops do not have Adobe Acrobat Reader
Most all PDF documents can be viewed with "Preview" (Apple's version of Adobe Acrobat Reader) however; some textbook applications require Acrobat Reader.
SOLUTION: An update needs to be performed on each laptop for this ability. (Note 2)

ISSUE: Student Laptops seems to hang and do not shut down
All issues so far have been related to multiple applications (5 or more) being open.
SOLUTION(S): Make sure each application has "quit" and not just closed. Clicking the red dot on the window does NOT quit the application, it just closes that window.

November 2008 through January 2009 was pretty uneventful once the iChat feature on the student MacBook was disabled. A continuing struggle existed with the students wanting to iChat during classroom discussions. According to Mrs. Jane Honeycutt, "students were using this feature to be off task, cheat on assignments and tests and harass other students." Since the chatting feature was available from within the Angel Learning Management System, there was no need to provide full access to this extra feature. Teachers could use the feature when instructionally warranted.

Continuing Professional Development

The month of February 2009 ramped up more professional development for teachers both formally and informally (see Appendix E for an outline of the types of professional development offered). Changing a teacher culture of instructional practices takes lots of on-going high quality professional development. During this month's early release day, the focus was on integrating technology and curriculum. This required professional development afternoon used the essential question: How can technology and software be used to get students engaged and to demonstrate a deep understanding of course content? Teachers were to create a lesson with their assigned peers with the hopes of posting them later in the online library hosted in Angel, "Lessons that Work." The long term goal was to have a digital repository of best practices in rich, technology-infused lessons.

Since these early release sessions were limited by time to the afternoons, Mrs. Tammy Wilson and Mrs. Christina Erin Bost, Media Specialists, offered mini training sessions as a follow-up to the entire staff on a voluntary basis. The sessions were offered

before and after school three days a week and also during planning periods. The topics ranged from iMovie, Keynote, Angel, and Discovery Ed. Mrs. Wilson reported that usually no more than two teachers attended each session (see Appendix B for definitions to words). The principal said, “The mini sessions were offered as optional in order to build a culture of constant learning.” He further explained that during some presentations on an early release day, teachers would say that is awesome, "How do I do that?" He would then reply, “Look at the calendar and attend some training during your planning and you can get the basics on how to do it.” Forty-seven teachers were trained voluntarily during the month of February alone,

February was also used as the halfway point of the school year to conduct a student laptop check. Teachers checked laptops during an extended homeroom for any and all possible damages and to ensure students had the specific laptop and laptop bag issued. The technology department removed some inappropriate games from the hard drives while increasing the security to limit students’ ability to access proxy servers. The laptop check went smoothly, according to Mrs. Wilson and Mrs. Bray, with little disruption to the instructional day.

March 2009 brought another early release day and more quality professional development. The peer to peer networking was working, and most teachers were excited about this month’s focus: Integrating Educational Websites into the Curriculum. Excitement was welcome after the anxiety produced when all teacher laptops had their hard drives replaced after repeated crashes. This upgrade was done at Apple’s expense

and brought disruption to teachers over the loss of some data, despite multiple back-ups, as accounted by Mrs. Bray.

Nonetheless, for many the afternoon of professional development was a much anticipated afternoon of learning and spending time with colleagues. On this day teachers were grouped with peers who teach the same course content. They were instructed to work together integrating a website (selected websites were given to the participants) to create a lesson using the "Lessons that Work" template. The lesson was to be directly related to the course listed in the newly revised curriculum guide, using one of the essential questions and submitted to the Instructional Technology Facilitator by the end of the day. A clearly defined rubric was given to teachers to ensure success while using Discovery Learning, Curriculum Pathways or Brain Pop:

Figure 8: Rubric for Lessons that Work

- Initiation (Opening) Activity: How are you going to generate student interest in the lesson?
- Presentation of New Material
- Performance Assessment: Activity that gives students the opportunity to demonstrate understanding
- Closing/Wrap Up
- Rubric

Teachers were to leave with a lesson plan in hand to take immediately back to their classrooms while also having built a better working/sharing relationship with their peers. The principal felt that the momentum was continuing to build.

J.E. Dennis School District hosted an April conference on the How-To's for a Digital Conversion. Many school districts across the state had heard of their success and

were interested in how they too could go about changing teaching and learning for their 21st century students. The Golden Leaf Foundation of North Carolina, an organization whose mission is to promote the social welfare of North Carolina's citizens and to receive and distribute funds for economic impact assistance to economically affected or tobacco-dependent regions of North Carolina, recently extended grants to fourteen additional school districts in the state, and many wanted to see first-hand what all was involved in the planning, deploying and implementation of a project of this magnitude. The day was successful for all participants, according to the principal and several Superintendents with whom I personally chatted over the next couple of months. This event provided the school district with a chance to publicize their success, while invoking much reflection through the planning. Hosting this event was certainly a win-win situation for all.

Laptop Checkup and Collection

May 2009 brought another student laptop checkup to assess damages and losses. Teachers were trained in P.P.A.T. on how to collect laptops from students for summer service and imaging. The collection day for all 1,600 laptops was June 1, 2009. The planning, deployment and implementation had now gone full circle as teachers collected laptops and students reluctantly parted with their new found instructional tool, global partner and social connector. Excitement was in the air as summer and graduation quickly approached. The purpose of employing technology in a way that would improve teaching and learning through increased student engagement was accomplished by most for this school year with a new year quickly approaching. The laptop computers significantly enhanced the level of student interest, motivation, and engagement to learn for most

students and teachers. Technology, according to the principal, was not the silver bullet but rather a means to bring teachers together to concentrate on the real pedagogical focus, "how we engage our students instructionally to get results and add value to their performance."

CHAPTER V

THE TEACHERS' STORY

Introduction

Technology can affect how a classroom is organized and managed, what curriculum is taught and how the curriculum is taught, all while reshaping the roles and expectations of both teachers and students. That is, a technology-enhanced classroom may have both different goals and a somewhat different culture from a traditional classroom. The literature reflects a shift in the teacher role when technology is used as an instructional tool in the classroom. The more teacher-directed approach transforms to one of being a guide, facilitator and co-learner. Means and Olsen (1999) believe that because students learn to use technology at a faster rate than teachers, teachers are more inclined to take on a deeper coaching/advisory role. Sandholtz (1997) believes that functioning as a facilitator with regard to technology can also lead to teacher willingness to assume a facilitative role with regard to content (p. 43). As teachers and students share the teaching and learning process they quickly begin to work together to form a strong community of learners.

Knapp and Glenn (1996) believe that using technology effectively can help teachers restructure their classrooms and move from a teacher-centered, lecture approach to a more learner-centered inquiry approach (p.218). As teachers see collaborative

student interaction on the computers, they become more inclined to try other project-based learning activities with their students. Teachers are then more willing to add new and different instructional approaches that lead to building a community of learners when they see first-hand the direct benefit to their students.

Jonassen and Wilson (1999) summarize the importance of the shifting role of the teacher. They believe that students should construct their own meaning of the world rather than to understand the world as the teacher does. They also believe that in order to empower students to become more responsible for their own learning, teachers must relinquish at least some of their authority (p.219). The teacher is not the sole authority of knowledge but rather is a coach who helps students to engage in a larger community of scholars (Jonassen & Wilson, 1999, p.220). Jonassen (2000) states the "role as the teacher must change from purveyor of knowledge to instigator, promoter, coach, helper, model, and guide of knowledge construction" (p.276). He also observed that teachers who readily adopted the use of technology in their classrooms possessed a constructivist philosophy and did not require any major classroom philosophical changes.

As the classroom environment changes and teacher and student roles begin to shift, students reap many benefits. The literature makes clear that technology alone does not produce learning but is only a tool that can be used in many ways. Means and Olsen (1997) affirm that when students are using technology, they are in an active role rather than passive role. Students engage in making choices about how to acquire and process information. They work together to explore, discuss, investigate, analyze and problem

solve. Providing real world experiences through the use of technology makes students' learning relevant, interesting and motivating, which appears to be beneficial to all.

Based on survey data taken during the spring of 2008 by Apple Computer Professional Development staff members, J.E. Dennis High School teachers were motivated to put technology to work on behalf of their students. The survey administered was created following an in-depth study of the Apple Classroom of Tomorrow (ACOT) project where teachers were followed for numerous years as they learned to use technology in their classrooms. A close analysis of the responses provided in the survey showed consistency throughout the different sections being analyzed. The majority of educators were assessed at the Adoption stage (Stage 2 of 5) of the Evolution of Thought & Practice in all seven areas being evaluated: About Technology, In the Curriculum, In My Teaching, For Communication, With Media, For Productivity and For Research.

Table 6: Stages of Development

Stages of Development	Evolution of Thought & Practice
1. Entry Stage	Teachers experience both trepidation and excitement as they learn to master the new tools themselves and begin to plan how to use them in their classrooms. They are often concerned about the time and efforts required and wonder whether computers will ever be effective learning tools in their classrooms.
2. Adoption Stage	Teachers begin to blend technology into their classroom practices, without making any significant changes to those practices. They may, for example, have students use drill-and-practice programs or word processors—tools that may fit easily into the current curriculum.
3. Adaptation Stage	The new technology becomes thoroughly integrated into traditional classroom practices. Word processors, databases, graphic programs, presentation tools, and content-specific software are used frequently. At this stage, teachers typically

	begin to see some real benefits, finding that students learn more, produce better work, and are more engaged in learning.
4. Appropriation Stage	The teachers understand technology and use it effortlessly in their own work and in the classroom. By now the teachers have difficulty imagining how they would function without computers.
5. Invention Stage	Teachers are ready to experiment with new instructional patterns and ways of relating to students and to other teachers. Interdisciplinary project-based instruction, team teaching, and individually paced instruction become common.

Source: Kleiman, G. M. (2000). Myths and realities about technology in K-12 schools. In the Harvard Education Letter report, *The digital classroom: How technology is changing the way we teach and learn*. Retrieved February 8, 2009 from http://www.edtechleaders.org/documents/myths.pdf

The survey clearly showed a need for continued professional development for teachers at J.E. Dennis High School. Teachers needed to achieve digital literacy to create an evolving foundation for their journey into classrooms that fosters a 21st century learning environment. They also needed help to find positive ways to empower students to channel creative digital interests and increase productivity in the classroom, including an introduction to digital media, communication, and online research and publishing tools. Teachers also needed to learn how to incorporate online research into the curriculum and take advantage of multimedia tools to develop a dynamic, novel curriculum that promotes student achievement. Teachers also required the opportunity to collaborate with colleagues to design content that encouraged the creation of media rich projects, while integrating technology throughout the curriculum. Teachers also had to learn about productivity applications that can feasibly provide engaging and motivating learning opportunities for their students.

The five classroom teacher research participants involved in this study span the entire continuum of development with both media specialists striving daily to meet the

entire high school staff's professional development needs (see Appendix L for detail on the protocol used for my classroom observations). Mrs. Elizabeth Henderson, the experienced traditional Social Studies teacher, began the initiative in the entry stage of development and moved toward the adoption stage during the school year. Mrs. Henderson continued to be concerned about time restraints and the ability to cover large amounts of content. The laptops in her classroom were used primarily as a note-taking device, but as the year progressed they were used by students for research and presentation purposes. She felt that her teaching style met the needs of her advanced placement students, thereby needing little change from the lecture, round table-style discussion.

Mr. Tony Clark, the mid-career physical education teacher and coach, began in the adoption stage of development and remained there for the duration of this study. Mr. Clark did not make any significant changes in his classroom practices or coaching strategies. He remained encouraging to the teachers around him but did not make any significant changes to the traditional role of teaching physical education and coaching. He had difficulty transferring the computer design capabilities into his curricular content.

Mrs. Samantha Davis, the second year biology teacher, began in the adoption stage and moved toward the adaptation stage as the year progressed. Mrs. Davis thoroughly integrated multiple digital resources into the traditional classroom setting. The structure of her room design changed towards a more collaborative design. Virtual labs and content-specific software were used frequently. Students in her class became more engaged in learning and Mrs. Davis reported better student work.

Mrs. Jane Honeycutt, second year English teacher and Mrs. Dorothy Bray, late career English teacher and department chairperson, both began at the adaptation stage. This advancement could be due to their constructivist teaching style, the fact that Mrs. Bray was Mrs. Honeycutt's mentor, or the fact that they were both involved in the pilot. Mrs. Honeycutt moved to the appropriation stage while Mrs. Bray teetered on the innovation stage boundaries. Both teachers understood technology's role in the classroom, and they integrated it effortlessly in their own work and the work with students. The laptops were an integral part of the collaborative classroom learning environment, and both teachers could not imagine teaching again without computers. Mrs. Bray began to innovate when experimenting with project-based instruction and individually paced instruction while expanding her use of the Angel Learning Management System.

All five teachers altered or modified their teaching practice to some degree, while others worked more diligently to transform the classroom learning environment. The following sections and succeeding chapter will share individual teacher leaders' voices and the principal's voice as they reveal their individual and collective beliefs, experiences, reflections and lessons learned while attempting to transform their American high school through a 1:1 digital conversion of teaching and learning. The accounts included in this section and that of the principal in the following chapter were constructed over the course of a year through one-to-one face-to face interviews, small group participate discussions, email correspondence and classroom observations (see Appendix A for additional detail on research design and methodology). All interviews were audio

recorded and transcribed verbatim for accuracy. All classroom observations used the observation protocol form located in Appendix L. On-going themes and areas of emphasis as documented in the classroom observations and as reported in actual words by each participant was "lifted" from the transcription and written into a narrative story. Each excerpt containing exact accounts, paraphrased at times was sent electronically to each participant for editing purposes to ensure accuracy of their individual year-long journeys. In June 2009, each participant was asked to reflect over the course of the year and to add any personal lessons learned, what worked or did not work during the year, "aha" moments, things left to learn while planning for the upcoming year, things to do if a "do over" was possible, advice, and recommendations to future schools and teachers beginning the 1:1 reform process to the excerpt. Final edits were completed and resent to each participant for final approval before being included in this paper. The passages, written by the researcher, are in first person to give the reader a direct sense of the participants' actual voice.

Teacher Leader Voices

Mrs. Elizabeth Henderson – Social Studies Teacher & Department Chairperson

I enjoy seeing students learn about history. I like to see their eyes light up and hear them say, "O' really I wondered what that was about." I take pleasure in former students dropping by after they have attended college for a while to "say thank you for teaching me history, but also for teaching me how to study." I believe that the most beneficial philosophy in teaching

and learning is to be an advocate for teenagers. I believe that if you encourage young people to study history, they will realize that our nation's history is relevant to their lives.

I was somewhat apprehensive about the digital conversion initiative. I was one of the naysayers on campus and really did not like the idea of changing my teaching methods at this time in my career, especially since they were working for me and my students were experiencing success on the end-of-course state exam and on the advanced placement test. I did not begin to feel better and less anxious about the conversion until I attended numerous workshops and meetings. My students demonstrated a remarkable ability to complete projects and visual assignments, which inspired me to become more involved. My main concern in the beginning and still present at the end of this first year is providing ample instruction for the students by combining coverage of vast amounts of information and the use of the computer. I know that I need to adapt to the 21st century, but this initiative has been too much too quick. There have been too many changes in this district at one time. I wish we could have taken the digital conversion a little slower. The immediacy of action made me and those I teach with frantic at times. I hoped that I would be able to "keep up" with the students and their previous knowledge of computers. I was from a paper pencil era, the advanced placement tests were paper pencil, and now I was to teach with a computer. The task was daunting at first but was somewhat eased with the summer training by content and the regular, much-needed training throughout the year. We were fortunate to have five early release days built into the calendar for staff development as well as drop-in training by the media specialists.

As far as my motivation regarding teaching, I would say that it has not changed very much from all my previous years. I am here for the students and not for the technology. I am still cruising along the way I've been doing things for years. Students do presentations, and I do Keynotes and things like that, but for the most part students only use it to take notes. Students can type much faster than they can write, and this seems to assist them when we have our talks. I like to talk and share history through stories. My students enjoy our round table discussions. If you were to come in and take all the computers from my classroom, I would not be motivated any less, and I would not miss a beat with instruction. I did try to use Keynotes on several chapters, and after I finished, my students said that they did not want me to do that anymore. They emphatically told me that they would rather hear me talk and be with them in the circle, talking directly one-on-one with them and answering their questions. So, I decided to continue with my traditional practices. If that is what makes them learn history, do well on the end-of-course test (which they normally do well), and pass the advanced placement exam, then that is my mission.

Am I syncing up with the iKid? I would say that I am sort of in the middle. I really like technology, and I enjoyed using it this year, but I think I'm really too old for the iPod generation. I like to sit and read a book or do something to get away from all the world's craziness. I don't feel like I have to be in communication with people all the time, which the computer offers 24/7. It might just be a personal thing, but I don't feel like I have to be talking to people all the time. I would just like to go get my book or do something else and tune it all out. I do have a Facebook, but since I am not active on it, I

don't have that many friends. It has been nice to reconnect with some past friends and colleagues that I would not have heard from otherwise. I did this to find out what kids are doing these days and what they are experiencing. I do want to stay in touch with this generation. I do think that we are really missing the ability to just sit and enjoy one thing and finish just one task. Everyone, especially the students of today, are so busy multi-tasking that I feel we as a society don't even know how to sit and relax anymore. I also think we are more isolated. We don't even communicate and talk to each other the way we use to…face-to-face. I used to walk downstairs if I needed something from one of the media specialists; now I email her. The entire way we communicate has changed. I am concerned about my students' interpersonal relationship skills. I have to repeatedly tell them to look me in the face. They are so busy doing multiple things that they are missing out on seeing facial expressions, smiles, the gleam in one's eyes, etc. We are much more connected yet more isolated at the same time. To answer the original question, I guess I would say that I enjoy the technology; I like it, and I'm excited that our students have it. It is a good shot in the arm, but sometimes I wonder about where we are headed as a society. I don't mind asking students to help me. They are glad to do so, and I have learned from them exactly what I needed to know at the time. I always appreciate their willingness to teach me, and I like to learn from my students. If I were to do this initiative over again, I would try to be more receptive to using the computers in the classroom from the beginning.

I quickly learned that students know a lot more about computers than I do! However, all my students were more than willing to help me when I was "lost." With

their help, I was able to do better presentations and make things more meaningful to them. My students did NOT like taking tests on their computers. I tried Angel testing, and they really disliked it. Students could not eliminate incorrect answers like they could on paper. I tend to agree since both the AP exams and the EOCs are given on paper. During the course of this year I became much more efficient using computers. I really liked placing grades on Angel for both students and parents to access. The only drawback was students wanting instant information. If I "promised" to add a ½ to a test, the students would e-mail me to remind me to do it. I guess my biggest surprise was that I really came to depend on the computer to do most things - I never thought I would be so "hooked."

Mr. Tony Clark – Physical Education Teacher and Assistant Football Coach

I believe that as a teacher I have the opportunity to help shape the lives of students and help them become productive members of our society. I must be equipped with the knowledge of my subject and be willing to continually work to improve my understanding of the subject. I believe teachers must incorporate learning styles into their teaching. The social cognitive theory of learning is important in the Physical Education class. I believe using technology is the future of education. The digital conversion could give our students a competitive edge over other students from different school systems within the United States and globally. Students in schools now have grown up using technology such as computers, video games and cell phones/smart phones. Education

must be willing to shift to using technology in new and creative ways to engage student learning. It will be great for J.E. Dennis School District to lead the way into the future.

I believe that in order for this to be a successful competitive strategy, the teachers must become excited about using the computers as a learning tool. If the teachers will learn to use the computers appropriately in the classroom, the students will feel more confident doing their work on the computer. I do not believe all teachers will buy into the digitized shift due to the time commitment it will take for them to feel competent using the computers as a teaching tool. However, once teachers get a few ideas about how to incorporate the computers into their lesson plans, the possibilities for our students will be unlimited. One of the challenges that we face as educators is to teach students how to use the computer as a learning tool and not just a toy. Parents need to have an in-depth understanding of the educational value of the computer. In the beginning my biggest concerns were with logistical things – deployment and maintenance of the computers. These concerns, with detailed planning, turned out to be non-existent. I credit our administration's attention to details and empowering each department chairperson for the overall success – strong leadership is essential in an endeavor of this magnitude.

There are many benefits to students all having their own computer on a high school campus. I'm going to be honest with you; it is a good babysitter and keeps students occupied during non-instructional times. Before school starts in the recreation room, students were bouncing all over the place, yelling and acting fools. Since we deployed laptops this craziness has all but vanished. Now, three-fourths of the students

have their computers open and are busy on the internet or playing games. Some are also doing last minute homework or checking their grades. The students who do not have their computers out are sitting quietly. It is an amazing transformation that you have to see to believe. The hallways are so quiet in the morning and are much easier to supervise.

As far as my motivation regarding teaching due to the computers, I would say that I am somewhere in the middle of the road. I love teaching students. I love being physically active with my students. I do not need a computer to deliver high quality instruction to my students. Computers have been readily available in the media center should I have had a need to use them with my students. I am not a gadget person or a tech geek. I do have an iPod, and I listen to it when I run. I am proficient on the computer, but after fifteen or twenty minutes, I put it down. I don't enjoy sitting and playing with a computer for an extended period of time. I like to be active. I also have tunnel vision. I like to do one thing at a time, unless it is watching football on television – I can watch three games at once. My brain is just not equipped like today's youth. They enjoy sitting at a computer all day. They enjoy iChatting, iPodding, talking on a cell phone, and surfing the Internet all at the same time. I have tried to sync up with them this year for this initiative. I have done a few projects like, heart rate monitoring where I involved full usage of the computer, and I have used the grading on-line for parent and student access, but if you were to come and take them all away, I would not be upset for my classroom environment. The subject that I teach really does not lean toward regular use of the computer anyway. I would be upset for our students. I think they are greatly

needed in the core academic classes. Computers are the way of the future. I am attempting to better navigate the computer when I am at home. It is a slow process. I am attempting. I know that I am not there yet, but I am moving in the right direction. I am on my way. If I were to do this initiative over again, I would work harder to keep down all the rumors of the naysayers. I would support the efforts of the administration more. I would work within my department to create more effective lesson plans.

Through this initiative I learned that a digital conversion does not happen overnight. I also do not believe that a digital conversion has to be with laptops. I think the next approach may be with cell phones or handheld devices, since most students enter the school doors with them in hand and/or pocket. I do know that change takes time and will not occur without proper training, practice, bumps, and bruises. Getting teachers out of their comfort zone of lecturing to students on a traditional high school campus is going to take time and strong leadership. The best strategy we used was beginning the process with a test pilot. I applaud the English Department and their strong leadership. If I was to advise another school thinking about doing a similar initiative, I would encourage them to have a pilot utilizing members from all departments on campus in order to build leadership across the entire school. This was not possible for us to do given the limited wireless capabilities in our school. However, I think this would build teacher leadership capacity thus affecting school-wide change at a faster pace.

Mrs. Samantha Davis – Biology Teacher

Teaching and learning has dramatically changed in my classroom this year. Before the laptop initiative, my kids sat in five long straight rows. PowerPoint was my technology tool, and students took notes with pencil and paper. During one ninety minute class period, I covered approximately one half of a unit or chapter. With 1:1 computers, my kids are in learning pods helping each other understand the content objective for the day. I have "certified" at least one student per learning pod to be the technical assistant. This enables the learning team to continue with an assignment even when technology issues arise. My students work together as a team on almost all assignments. Notes are taken on the computer now in whatever format meets the individual learning style of the student. Today's student can type much faster than they can write. I am now able to expose students to more curriculum content in half the amount of time. This extra time enables me to have more enrichment and remediation activities than in the previous year.

I feel like the kids are more engaged and wanting to learn now during direct instruction time. Sometimes they take notes using PowerPoint or Keynote; sometimes they take notes as a document in Pages. A few students even take notes using the sticky note feature. Their ability to choose the tool seems to keep them more engaged and responsible for their own learning. My class certainly is much more student-friendly now with the laptops. Don't get me wrong, there have been days when I would have liked to take my laptop and throw it out the door due to technical issues. The kids have also experienced the same frustrations on and off during the year when the Internet would

decide not to work on a certain side of the room for no apparent reason. My students and I quickly realized that a plan B is always necessary.

I love teaching with technology. I would be lost instructionally without it. I hope we never have to go back. I think I would be bored, and I know that my students would be bored. There are so many instructional games we play and virtual labs that we can do with the technology. I do all of my pop quizzes on the computers through *Angel,* and this tool has saved me valuable time. The on-line learning management system instantly grades the quizzes, gives the students their individual scores, and posts them in my grade book. The technology will generate formative data for me to use in my lesson for that day. Pretty cool! I have had my computer crash twice which makes me somewhat leery of having the students take their unit tests on the computer. Hopefully over time all the technical problems will be remedied, but for now I am staying with the paper and pencil version for major tests only. I also have to find a way to outsmart my students with technology. Since we take all our notes on the computer and the lessons are just a click away in *Angel*, I have to be wise to students trying to cheat when taking on-line tests. They are smart and fast and can click between multiple sources at a flash. It is important that I discern what they truly know and not what information they copied and pasted from another source.

Changing from being a bookwork teacher where I was assured of the resource working and being available when needed has had its ups and downs over the course of the year. I have spent many hours finding great websites and/or labs that I wanted to infuse in our topic discussions only to find the web link no longer in existence or blocked

by the school filter. This is a good learning lesson for teachers and/or districts looking to infuse technology into the classroom. Teachers need to check the website right before planning to use it. Just because it was there and available last month does not mean it will still be available this month. The teachers at J.E. Dennis High School are very fortunate to have many software program subscriptions purchased through our school system. These resources provide teachers with content on demand and help eliminate the downtime from using Google searched websites. Our department chairperson has been instrumental in helping us secure instructional resources to support the science curriculum, while setting high expectations for our delivery of instruction. Our department has really pulled together this year to create a cohesive professional learning community. We share resources regularly, and each member has his or her own strengths and weaknesses that are brought to the group. This initiative has caused us to depend more on each other and to spend less time isolated in our classroom. We have needed each other, and this interdependence has helped us all grow professionally while making a better learning environment for the students.

All the fears I had last year about students not bringing their laptops to school or not charging their batteries at home have all turned out to be a non-issue. For the most part, students come to class prepared and ready. They even read their text on-line. They love the highlighting feature and ability to look up the meaning of words all at the click of a button. I have learned not to underestimate them. Students will rise to all challenges put in front of them. We as educators need to expect more from our students. It is only

through high expectations that students will excel and surpass our wildest dreams for them.

Mrs. Jane Honeycutt – English Teacher

The best part about teaching is being with the students. Don't get me wrong. I love my content and discussing writing and reading novels, but I really love working with the kids because each and every day is a new adventure. I believe that in order to teach my students, I must first gain their trust. If my students trust me, then they may be more inclined to believe what I have to say. Trust should be mutual in the classroom in order for students to learn from me, from each other, as well as me to learn from them. I want my students to know that I am committed to learning new things, that I do not know everything, and that I will sometimes look to them for assistance. I think it is okay for a teacher to mess up. Teachers need to remember to laugh it off and not take themselves so seriously.

The digital conversion initiative has caused a renewed sense of excitement in learning on campus. Giving each student a laptop has enabled us (the classroom teachers) the capacity to speak the language of our students. They have demonstrated a willingness to enter the student's world and leave yesteryear pedagogy behind. Laptops also forced teachers to lessen control on content and instruction. Students can now access information right in the classroom. The ability to access this information at such a rapid pace has greatly empowered students and has forced teachers to allow students to assist them in the integration of the technology. Students are much more tech savvy than

teachers, and this knowledge has led to their assisting the classroom teacher on a daily basis. The classroom environment, for all who are willing, has become a collaborative environment where the teacher functions more like a facilitator than the dispenser of knowledge. It has also become a fun place to teach and learn. I am proud and thankful to be at a school with a 21st century focus and vision where their money is put directly in the hands of students. I think technology in the hands of all students is critical for them to be competitive globally.

I strongly believe that teachers play the largest role in facilitating the change needed for today's student. Teachers must be open to change and willing to take risks for their students. Perhaps this is easier for me to say since I have only been teaching two years. Teaching in a 1:1 environment is pretty much all I know. I have had a great mentor in Mrs. Bray, and I have been able to take her pre-technology paper/pencil lesson plans and transfer them to technology-infused lesson plans. The payoff has been invaluable to me as a beginning teacher, and the students have been very receptive and motivated with this new approach. I feel comfortable with all the computer programs, and I am at ease with designing a technology infused lesson. Perhaps it is because I am only twenty-eight years old and that I grew up with computers. The computers do not intimidate me, and neither does designing a lesson. What I need help with at times is managing twenty-five to thirty self-directed students all at the same time. I struggled more this year since the students could take the computers home. During our pilot process students turned the computers in at the end of the class period. They were also locked up in a cart when not needed for instructional purposes. This year has been much

more difficult with them having access to them at all times. Students have their own music loaded on the computers, along with their pictures and personal customization settings. Keeping students on task has been a daunting challenge at times this year. Students find things to keep them off task like gaming or iChatting. I would also be less than honest if I did not admit to my many meltdowns when I had planned a "great" lesson only to be diverted with an off- task student misbehavior or a technology issue such as the Internet being slow or down. It was on those days that I had to remind myself that it was not the technology causing the problem. These classroom management issues have existed for generations of teachers – students off task with a magazine, note passing and doodling, bulbs blowing on the overhead projector, students using cheat notes or writing on their hand. This is just part of teaching teenagers, a part of the excitement mentioned previously. Teaching is a collaborative process, and with the help of my mentor and colleagues, with whom I became very dependent throughout this learning process, I found my resilience.

If I was told tomorrow that the computers were being taken away, I would lock my classroom door and not them enter. I simply cannot imagine teaching without computers. I would be bored without the ability to use a laptop as a teaching tool. I cannot imagine standing alone in front of my students. Teaching and learning would be less exciting for both me and my students. I would still be able to teach, but my motivation would diminish. I am kind of like the kids. I am an iKid of sorts. I have to power down when I come to school. I have an iPod, I text, I get e-mails on my cell phone, I have a Facebook, I use a digital camera, and I share my pictures electronically. I

am on and off the computer all day and night. I even read the paper and watch missed TV shows all via the Internet. My students' lives really are very similar to mine.

Through this initiative, I learned that as a young beginning teacher, I could be a valuable asset in collaborative learning environment. I learned that the computer knowledge that I had as a young iKid myself could help older, more experienced teachers. I learned that by my willingness to help them with technology that they in turn helped me with classroom management strategies and techniques. I also learned that when you take a good tried and true paper/pencil lesson plan and infuse it with technology that you move from "Good to Great." I still believe trust and success breeds more trust and success. I attribute my success to the trust I have built with my mentor, administration, fellow colleagues, and students. Trust must include sharing success stories, failures, frustrations, technology woes, and humor.

Mrs. Dorothy Bray – English Teacher and Department Chairperson

I was born to be a teacher. I taught my stuffed animals lessons! I enjoy sharing my love of literature and writing with students, they keep me young. I love the daily interaction that I have with young people and the opportunities to grow and learn with my students. I believe teachers should work collaboratively with students and try to structure their learning in interesting ways. They should give students multiple venues to express their learning in ways that suit them. I believe that all students can learn and grow as thinkers, readers and writers but at different rates and in different ways. Learning is not a factory model but a unique experience for each of us. Teachers must be sensitive and encouraging to

struggling learners while maintaining high expectations for their work. Initially, I was equally excited about and terrified of the digital conversion. I have come to love what the laptops have added to my students' motivation, learning and expression. My students have grown in confidence as independent learners and now see that technology is for more than MySpace, iTunes, and IM. We are doing a disservice to our students if we do not switch to a 21st century learning perspective. Learning how to access knowledge, understand it, organize it, and apply it are essential skills that our students must know. Information is changing and growing too rapidly. Educators must step out of their comfort zones and embrace the new digital world. I am an old dog who has struggled with learning some of these new tricks, but I am a better educator and my students are better prepared for the workplace because I have been willing to take risks, though my stomach often flip-flopped with fear on some days!

My main concern has never been with the laptops or the kids but with the infrastructure. Will the servers be large enough and fast enough? What about back-up and storage of files? Drop boxes and shared folders? Will there be quick turnaround of broken laptops, and how will a system breakdown be corrected immediately? Will there be slow log-in issues? I was concerned that problems in those areas would dull both teacher and student willingness to integrate technology into their teaching and learning. We have to be able to depend on the infrastructure to work smoothly. The English department had some VERY frustrating days when lessons fell apart during the pilot period because of these types of issues. During the early days, I think there were some teachers who totally resisted using the computers and rarely pulled them out because of the technical glitches,

and then there were those teachers who used them every single day. We had the entire spectrum with most teachers probably in the middle. We started the pilot in October, but it was February or March before we really felt like we sort of knew what we were doing. It also took this long before we had most of the technical problems worked out. The first semester was learning the programs and working through technical glitches and surviving. It was not until late February or early March when I started really thinking -- Okay, I feel more confident about the programs, I'm starting to see how I can use this, and then consciously worked the integration into my units. By May I began to feel pretty good. Think about it – it took from October to May before I finally got to that point, and I had studied all summer, which the other teachers had not done. This new paradigm takes time. It will not happen overnight, no matter how hard a teacher works.

After the pilot was over and most kinks were worked out, I spent the summer reworking my lessons to integrate the technology. Lessons that have been tried and true do not need to be thrown out; they just need to be tweaked, updated, and revived to reach our digital natives. I am finally pretty comfortable teaching in this new environment. I know there's still more stuff I could learn; I know I'm not there completely yet, but I am more than half way, and for that I have accomplished much. Learning all new programs on a Mac vs. a PC was tough. It probably slowed down my progress, yet I am so thankful for the educational focus of the programs on my MacBook. I do think that my testing students on-line phobia is a big thing that I need to work through. I have to figure out a way to do testing on-line where students can't cheat. That will be my goal for next year.

As far as my motivation, I think that this initiative has reinvigorated me as a teacher. I found myself saying, "This will be a really cool way to teach this." For example, *Beowulf* is always one of those pieces of literature that as a teacher you just try to get through. This year I set up a *Beowulf* wiki collaborative learning project, and my students greatly enjoyed reading it, building their own wikis and then critiquing each other's information while putting together the complete literary picture. Their engagement exceeded any of my previous years' lessons just using a study guide while lecturing. When teaching the *The Canterbury Tales* this year, I had each student select a character to create a personality profile and then present it to the class. The students then taught the Prologue through their personality profiles, and I later showed short animated versions of two tales that we also read. I allowed students to take notes using their computers in any format they desired. I rewarded their attentiveness by allowing them to use their notes on the test.

I have never seen students this engaged or excited about literature before. This certainly makes all the frustration, the huge learning curve with the programs, and all the behind the scenes work well worth it when you see the payoff for the kids. If you were to come into my classroom now and try to take away our computers, I would be very upset. Actually I would want to beat you with a hammer! This reminds me of when the technology division came around to take our mobile carts up during the pilot project. They waited until exam time so that we would not be using them as heavily. We were very upset, and we had only had the computers for a couple of months. We were scared to death when we were to asked to pilot them, and now we did not want to teach ten days

without them. What an enormous paradigm shift in such a relatively short period of time! I do believe this shift has changed the relationship I have now with my students. My classroom has become a more collaborative environment. We truly are a learning community teaching each other. The class atmosphere is so much more relaxed since I have given up control. I have never been technophobic, and I like learning from my students. I function more as a facilitator now, which builds student morale and engagement. I love the Angel learning management system. I can post lessons on Angel when I'm out for conferences or sick. I can also communicate with students outside of class easily. I can also grade paperlessly and send individual student grades directly to the electronic grade book. I would never have thought I could become addicted to using technology as a teaching tool. The wikis, blogs, electronic bulletin boards, iMovies, Comic Life, and Pages tools have worked as both learning and instructional methods, as well as student assessment and monitoring tools. I would never want to go back to teaching without technology. The journey has been long yet rewarding. I have learned so much, yet still have much to learn, explore and do. Next year, I plan to develop more activities in each unit utilizing technology to learn or to demonstrate learning. I also want to better utilize blogs for journaling and use wikis as reading comment areas for reading assignments at night. I may even try a cross class collaborative project through the Angel community between two of my classes or with another teacher's class. The possibilities are limitless!

If I were to give advice to another school or system beginning a 1:1 computing initiative, I would tell them to make sure to have the appropriate technology

infrastructure in place; technology slowness and glitches waste class time and frustrate all, causing teachers to abandon the technology. I would definitely encourage them to have a pilot group to work out technical kinks and to TRAIN the pilot group thoroughly AND give them TIME to learn programs and to develop some lessons and ideas before rolling out laptops. Careful planning and detailed organization will ensure a smooth deployment and retrieval of laptops. I would tell them to believe in their student's maturity. Most students will take special care of their laptops and will use them for instructional purposes. I would emphasize the importance of developing a core group of teachers with expertise and experience to introduce others to using technology in the classroom. I would also recommend the school or system to make available a learning management system (like Angel or similar product) to make the technology more useful, lesson planning easier, and the communication between students and teachers better. I would encourage the school or system to explore a way to monitor student usage during instructional time; off-task behavior on the laptops is a constant battle that we have still not conquered. Finally, I would insist that FUNCTIONAL printing stations are essential; everything cannot be paperless!

Through this trailblazing year at our high school, I learned to let go of the "expert" mindset and be more open to experiment and risk NOT knowing everything. I learned that getting started with this kind of teaching, revamping the way I planned lessons and infusing technology into my teaching, is a TREMENDOUS amount of work, but the benefits to students far outweighs the effort. I learned that my students can present their learning in amazing ways that show a multiplicity of talents and abilities of

which I would have been completely unaware without the technological tools. I learned that internet games and proxies are EVIL and DISTRACTING! I learned that students can discover the course content using technological tools and teacher prompts/essential questions, and I learned that making mistakes and having occasional disasters as we experiment with technology is okay.

If I could do this entire initiative over again, I would INSIST that the pilot group go visit schools that had laptop initiatives and sit in classrooms for EXTENDED periods of time watching instructional presentations and even working along with student groups, NOT quick walk through visits. I would beg for time to talk to expert practitioners and with their students so that I would be better prepared for my kids!

I would schedule common planning periods of teachers with same classes in order to give teachers time to develop lessons and ideas and to learn computer programs together. In addition to training the faculty, I would REQUIRE that inexperienced teachers make several extended visits to the classrooms of the pilot group teachers to see the technology in action. This observation would reduce fear and resistance to change once they saw the motivation and success that the students experience. They can also learn first-hand different classroom set-ups, organization and monitoring techniques, and program uses that could translate to their content areas. I would seek help with monitoring classroom management issues. I know that PCs have programs that allow a teacher to see all desktops on his/her computer. This capability would be great - I could move from group to group with my laptop but still be aware of the other groups'/individuals' usage after I walk away! I would recommend one-on-one training

and coaching from on-board content area colleagues. Those resisting might need to be prodded to pair with a technology savvy partner to create lessons, observe each other, and share ideas and successes. (Perhaps only 40% to 50% of the teachers are 100% on board. All are trying, but many are still uncomfortable with Mac programs and/or are frustrated with off-task use. This is especially true in lower grade and lower ability classes where the maturity level is lacking.) Lastly, I would not stress and worry so much. I was so focused on what could go wrong that I failed to see all that could and would go well in instruction and learning.

Mrs. Christina Erin Bost - Media Specialist

The change process has been vast for me as a media specialist since the inception of the digital conversion. I would consider myself to be somewhat of a digital native. I have grown up with computers, and I love the efficiency they add to my daily life. I am addicted to my iPod and multi-media gadgets, and I could not imagine life today without the connectedness, accessibility and creativity that they provide. I am not fearful of using

technology or experimenting with the latest techno device introduced on the market. I was not, however, prepared for the drastic change this initiative would bring to my job description and the role of the media center. The 1:1 student computing world changed almost every aspect of my role as media specialist and what once was the hub of the high school – the library/media center. I suddenly found myself in a position and a physical space that needed to be redefined and repurposed. This year turned out to be a mission-finding adventure for both myself and Mrs. Wilson.

Besides adapting to a brand new operating (Mac vs. PC) system, Mrs. Wilson and I have had to learn how to adjust to a media center (library) that ironically became both computer-less and wireless at the same time. In previous years, in order for a student to work on or access a computer, he or she would have to come to the Media Center, as each classroom contained only one machine for the teacher. The Media Center was the central hub for the school, the place where all computers and vast amounts of information was stored. However, since every student has had the good fortune of being issued a laptop this year, the media center no longer houses computer labs and students can access information, including our on-line reference materials, from their own computer without ever stepping into the media center.

Each day I grow more accustomed to this digital environment, whether it be participating in a wiki or blog with my peers or assisting a student with an oddball printing problem. For the last seven years, the Media Center has had a strong web presence, but with the addition of the laptops, we were finally able to make our card catalog available online and link it to our website. Therefore, a larger number of students are now able to search for fiction and non-fiction titles, preview eBooks as well as log onto multiple databases throughout the school building or from anywhere that they have Internet access. What this means for me is that I am no longer bound to stay in the Media Center when I want or need to teach a lesson; I simply venture to the various classrooms.

Now more than ever, it has been increasingly important for students to know how to accurately cite sources so as to avoid plagiarism when creating Pages documents, Keynote presentations, iMovies, and other digital projects. Due to the amount of

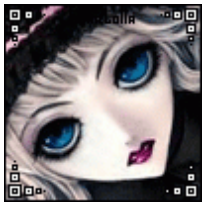
materials (both audio and visual) that students have access to via the Internet, it is vital that we instruct them in the appropriate citation of print and non-print resources. Consequently, Mrs. Wilson and I have demonstrated the use of online citation makers to classes and have offered further training to all staff members about Copyright and Fair Use Guidelines. As a direct result of the digital conversion, I now have time to work with small groups of students, reading books aloud. This type of activity has been very rewarding to me personally because it has allowed me to focus more on teen literacy in this digital age. I have also started a young adult book club through our Learning Management System and I communicate regularly with the members via Angel's email program, especially since many are not able to attend our meetings.

My feeling is that our high school students mainly fall into two categories: either they treat the laptop as a toy or they have come to consider it a tool. Often, but not always, the academic performance of these students corresponds with their respective ways of thinking toward their laptop. Perhaps after the first year, all students will come to understand the computer as a strong curricular resource tool. The best way to describe the current environment of the Media Center is that of a docking station. Individually, students come before school to print assignments and to visit the Help Desk for technical issues, during lunch for a quiet place to study or to check email, and after school to complete homework and to charge their laptops. Students also continue to visit the Media Center with their classes for research projects, to check out books, and to receive instruction on using the card catalog and online databases, but they carry their laptops with them. Even though we are not seeing the same amount of students on a daily basis

as we did last year, our online schedule reflects a high level of usage, and our book circulation has increased. Mrs. Wilson and I are still perfecting our individual roles and the use of the media center. Our library's mission now is "ensuring that students and staff are effective users of information and ideas." We have attended several conferences this year in an attempt to seek ideas as we strive to transform our mission and the mission of the media center. This is an on-going venture as we too embark on changing the learning paradigm to meet the needs of the 21st student. I am more motivated than ever to make this shift a success for all. Perhaps my new role will be more as an instructional-technology facilitator/professional media integration development resource coach. I will be serving in the facilitator role this fall for our UNCG iSchool program. The possibilities are as endless as the need for learning. The journey will be as exciting as the fruit we bear!

Mrs. Tammy Wilson - Media Specialist

When I was first told about the digital conversion initiative, I was overwhelmed and somewhat skeptical. I have been in the high school business for many years, and, like many teachers in our school, I had seen many new things started and stopped. It was not that I was not a fan of technology, which I was, or that I was afraid of it, which I definitely was not. I guess I could not wrap my arms around how we were going to go to a completely digital format in such a short period of time. Was this another phase? I wondered whether we would have enough money and resources to make it happen successfully and then to sustain it. I assisted the faculty over the years when problems



arose with their PC and to learn different programs, yet many were still reluctant to integrate them into the curriculum. Most teachers used the current computers for checking email, recording grades and typing. How could we possibly change platforms, learn new programs, and transform teaching and learning in the classroom all in such a short period of time?

The media center had been the hub for technology in previous years, so logically Mrs. Bost and I would help spearhead this new initiative. The first feat to tackle was the learning of all new programs on the MAC computer. This was not a difficult task but took additional time and training. Our role was to return from training and then train the rest of the staff during planning periods. We had one semester to accomplish this mammoth task with outside help, resources and strong administrative support. I cannot believe all that we accomplished together, looking back now after a full year into the initiative. The staff pulled together, sink or swim, as we learned together. There were many disbelieving bumps along the road with many more left to be conquered, but together we made a giant step forward into the 21st century.

Teachers posted assignments and quizzes online though Angel (our learning management program) so that students could communicate within the school environment, certainly an experience they will need in the workforce. Students were able to make multi-media presentations using multiple programs/devices to teach curriculum to their peers and to make visual presentations of lessons learned. In one class, students researched World War I through student inquiry. Each member of the class was responsible for compiling fifteen questions they had about the war. These questions

formed the basis of the students' research. Students worked in groups, shared resources with other groups and other classes, and produced a multi-media presentation to be placed on a website. The teacher involved in this project felt that the students learned much more than if she had taught about WWI in a traditional way. This teacher most certainly has become one of our new found "star" teachers with the technology. Prior to this initiative she sat in the background and was not a leader among her peers. This initiative has enabled her to be creative and allow her students to create. She is now teaching her peers and has risen to be a well-respected member of the faculty.

Full seamless computer integration takes time, and our school is moving in the right direction but not as quickly as I had envisioned. Most teachers support students working together to produce projects and/or reports of some type, which generates engaged learning. In some ways our students overall are more engaged in learning, but many times it is hard to keep them fully on-task. If not closely supervised, students explore Internet sites not at all related to their work. Many students want to plug in earphones and listen to their music when needing to collaborate with a partner or group. A teacher needs to be a good classroom manager to make sure that students stay on-task and that optimal learning takes place. Teachers need to have clear concise rules and high expectations when it comes to using laptops. The teachers that utilize this framework are doing well with the laptops and students are on-task. Ninety percent of our teachers use the computers for some learning activities, while about fifty percent fully integrate them into their daily curriculum. The math department experienced the most difficulty finding uses for the computer on a daily basis. Geometry sketchpad was incorporated as much as

possible, as well as some websites used occasionally. No software programs or websites have been found to fully meet their needs. *Plato* comes closest to helping with the mathematical drill needed yet does not break away from the traditional boring rote work of yesteryear. Perhaps this is a content area where Mrs. Bost and I can assist in exploring resources for the upcoming year.

With the digital conversion many new and exciting opportunities were afforded in the classroom. Mrs. Bost and I quickly realized that our role of being the school's information hub was forever changed. We had to change the way we did business. We needed to develop a new mission and reinvent ourselves professionally (We are still working on this). We were no longer strapped to the physical location of the media center, supervising computer labs and assisting classroom visitations. We needed to be in the classrooms, assisting with multi-media projects, collaborative projects, online research sources, and teaching programs. We needed to work with teachers during their planning periods, supporting them with media rich resources for technology-infused curriculum integration. We began our classroom crusade by going to every English class where we taught students to use the online media center catalog. We demonstrated the NC Wise Owl database as a rich information source in lieu of random web searches. We established a Book Club, still in the infancy stages, due to the outside time demands on students. We started several blogs and wikis for direct student participation to share personal thoughts and feelings in writing. Next year, I hope to get more involved with promoting literacy on campus. I believe the single largest factor affecting our graduation rate is literacy. I want to promote reading comprehension and enjoyable leisure reading,

while helping students and teachers alike learn to read digital text. Our job may be shifting from print materials to digital resources, but this change opens the door for creative innovative teaching and learning!

Lessons Learned – "10 Must Knows"

During a focus group meeting held in late May of 2009, all seven teacher leaders gathered to reflect upon the previous school year and the digital conversion initiative. A broad set of questions had been sent to the participants prior to the meeting. One question asked participants to reflect over the course of the year and to identify whether the reform model had impacted their practice and whether 1:1 mobile computing was needed in order to prepare students for the future. All seven unanimously agreed that 1:1 mobile technology is needed in our 21st century high schools. After all, we are almost a decade into the twenty-first century and yet politicians and educators alike are still looking to make a change – the future is now and a change is needed now. The teacher leaders all agreed that with this change came many challenges and growth opportunities. They were all glad to be at a 21st century cutting edge school, and they each feel that this experience has given the students and teachers a more global perspective of the skills needed for the 21st century workplace. Another question I asked was for teachers to identify essential components necessary for a successful 1:1 digital conversion. Teachers were to bullet the responses they would give to a Superintendent beginning the reform process. During our May meeting, each participant shared their individual thoughts while I facilitated the conversation with additional questions based on my data collection. Many components were discussed, then ordered, reordered and edited until the following ten

lessons were collectively agreed upon as a "must knows" for future districts seeking to transform the educational experience through the infusion of 1:1 mobile technology. The lessons are written in priority order and also included in Chapter 5 as a flowchart to help districts see the "big picture" process at a glance.

1. **Ensure strong focused leadership at the school building level.**

   Strong focused leadership is essential when executing a reform strategy of this magnitude. The superintendent and Central Office leadership team is crucial to the success of implementing a 1:1, but the principal's leadership is the most central, crucial and critical aspect between success and failure for the teachers. The principal does not need to be a technology expert but should be a person who communicates well, outwardly shows enthusiasm, is detailed-oriented (or has a strong detail oriented Assistant Principal), and serves as a morale and confidence builder, which allows teachers to be risk-takers. An effective principal leader models technology integration, sets high expectations, acts as a problem solver, and is politically savvy, student-focused, data driven, and goal oriented. The principal is flexible yet firm in expectations, celebrates successes, and always knows how hard to push staff members out of their comfort zones in an effort to move the school toward its ultimate overarching goal of student achievement. The principal must empower the department chairpersons while holding them accountable and responsible for their individual department's professional success and/or failure. The principal must be someone who can "build a plane despite the fact that it is flying" while remaining cool, calm and confident.

Strong principal leadership was an underlying theme throughout each individual interview and focus group. The word underlying is used because specific principal leadership factors were mentioned continually without a direct correlation by the participants to their principal. After reviewing the data from the interviews and discussing the essential elements with the participants, an "aha" moment occurred amongst the teachers. Since their principal was perceived to be a strong leader, no consideration was given to his leadership as being essential. It was accepted merely as fact. After delving into the data collected, the participants firmly agreed that strong principal leadership was the most important factor for reform in any school.

2. **Involve the Community.**

Inform the community, community leaders and parents of the benefits to a student's future success in college and/or the workplace through technology integration. Communicate a clear concise vision for future education in the district while developing a strategic plan for sustainability. Detail a clear deliberate aligned plan for implementation. Market the vision and plan by letting the community and parents know exactly what to expect from the integration and how they can best support its goals. Be sure to let the community know that students should be using the laptops on a regular basis at school and home and what expectations of care and AUP have been set and will be enforced. Help the parents understand the learning curve being undertaken by many teachers, therefore causing a gradual home usage requirement for homework, presentations, etc., during the first year. Fully inform the community and parents of the on-line grading resource and assignment repository

portal as a means to keep information about student's progress flowing in both directions.

During the May 2009 discussion, each teacher felt that community support and buy-in were essential factors. They defended this requirement by referring to the Symposium, newsletters, parent information nights, required parent training for student usage, required signed AUP, and parent modules to access student grades and assignments. Each participant felt that the initiative was successful due to strong parent knowledge thus leading to strong parent support – "knowledge is power." Without strong parent and community support the jobs of teachers become increasingly difficult. For this reason, the participants ranked community support as the second essential component of school reform.

3. **Present High Quality On-going Professional Development.**

Teacher professional development must be of the highest quality with complete integration into the individual content areas while modeling new effective pedagogy strategies for the 21st century learner. Teacher professional development should be plentiful and in a variety of formats utilizing face-to-face, online, just-in-time training and support, train the trainer, peer-to-peer networking with school-based and classroom-based professional learning communities. Chapter 1 outlines the series of professional development offerings that each teacher leader participated in throughout this implementation year.

The professional development offerings should be differentiated in delivery based on technical ability gathered through survey data and offered during various times of

the day, week, month and summer. All professional development should be focused toward the vision of technology integration with all other projects folded into this one overarching school and/or district goal. If another strategy, project or professional development offering does not clearly align with the 1:1 vision, do not waste the faculty's time and/or attention on it. Keeping the extraneous elements of schooling away from the teacher level will enhance teacher performance toward the one overarching goal of student engaged 1:1 mobile teaching and learning.

Early student release days for faculty professional development and showcasing lessons and student work are essential for building professional learning communities. Professional development must be required during the planning stage and strongly recommended after deployment. One year of professional development prior to student deployment of computers is optimal. Less than six months of professional development yields heightened apprehension from faculty. This recommendation is based on their yearlong experience as detailed in Chapter 1.

It is essential that teachers be trained on how to use the computer programs. As teacher leaders, we recommend schools and/or districts stay with their current computer platform when beginning an initiative of this magnitude. Chapter 1 specifically addresses the additional challenges J.E. Dennis High School incurred by switching from a PC platform to Apple Computers in Chapter 1. All computers operating systems have their pluses and minuses. To change platforms while also changing pedagogy is almost too much change for the average high school teacher to handle at once. Students will adjust quickly to either platform having grown up in the

digital world, while teachers find it much more difficult and this difficulty hinders the teaching learning process. If you want to speed up the change process and avoid acute resistance remain with whatever platform is currently in use.

Classroom walk-through observations completed by the administration and departmental chairpersons should be done after deployment of student devices to guide future professional development offerings while also targeting specific teachers requiring the need for certain offerings. The science department chairperson was highlighted often for exceptional leadership in this area as described by Samantha Davis – Biology teacher in Chapter 1. Parents and students must also receive professional development on an on-going basis in order to ensure the proper ethics of care and full usage as an instructional tool.

Each teacher participant agreed that without the professional development provided by the school district, the learning community within the school, and the self-motivation of on-line learning, their classroom instruction would not have advanced to a new level on the stages of development (see Chapter I - Planning, Deployment and Implementation for comprehensive data of all professional development). It should be noted that each teacher leader felt that professional development was and is the key to sustainable reform. The participants struggled placing professional development as number three on the continuum of "must knows," but agreed that without strong leadership and community support professional development would not and could not reform public education. Therefore, a strong recommendation is to consider the first three recommendations –

Leadership, Community Support and Professional Development as THE major component of successful school reform.

4. **Operate a Pilot.**

Having a micro-version pilot to test the computers and the infrastructure pays huge dividends prior to a large full scale deployment. The teachers involved in the pilot have an opportunity to work through all the bumps and technical issues. This small group also becomes the peer trainers for the rest of the faculty. J.E. Dennis High School had the English Department run the pilot for their school (see Chapter 1 for detail.) This strategy was very effective for this high school given that only one wing could be wireless during the early stages.

During the May 2009 focus meeting all participants sited the assistance of the pilot teachers as key to their buy-in. Knowing that other teachers in their building had worked through most of the glitches and kinks helped calm the teachers. Also, knowing that someone who had overcome an obstacle was within "shouting" distance for help was unmistakably reassuring. The participants also felt that by selecting two or more teachers from each core subject area to run a pilot would be another means that may pay large dividends when training additional staff members from varying departments. This strategy may also help keep a large comprehensive staff better informed of the day-to-day happenings of the reform initiative. Communication must flow up and down and side-to-side to all constituents in order to experience success.

5. **Provide an adequate and appropriate infrastructure to support on-line curricular resources.**

Providing an adequate and appropriate infrastructure is just as important as securing a laptop for each student. The peripherals (printers, data projectors, video recorders, digital cameras, flip cameras, etc.) are important, but a teacher can proceed without them in the beginning. However, if the infrastructure will not support the number of students accessing the Internet all at the same time, then both teachers and students will get frustrated and stop using the computers. Speed and access are critical and essential when implementing a 1:1 computing environment. The server and wireless speed must be able to handle the number of students needing wireless access efficiently and dependably (see Chapter 1 for issues that arose throughout the year regarding meltdown, slow servers and computer crashes). Teachers must also be provided software and on-line digital resources to support their individual content areas. These resources, coupled with curriculum mapping, balanced literacy, differentiated instruction and best practices, provides for student-centered learning and academic achievement. Throughout the course of this year, many new resources, as evident in the data, were given to the teachers for utilization in the classroom with students. The new resources were many and overwhelming at times, as documented in Chapter 1. In reflection, these resources were guiding lights to change teaching and learning. All seven research participants highlighted the many resources throughout the journey and then decided together in May 2009 that this needed to be a "must know and must do" for anyone beginning this reform strategy.

6. **Secure adequate technical and instructional support staff.**

Having adequate technical support is essential to the successful integration of technology. The technical support staff should be easily accessible and willing to listen to problems and concerns from the classroom teacher and student. The support staff should be highly skilled in handling technical glitches while working professionally with both students and teachers. The technical staff must also be able to "think outside the box" when trying to problem solve issues related to content delivery and the Internet.

High quality instructional support is also essential for teachers to feel secure in exploring different uses for technology within their content. The instructional support personnel team (Instructional Technology Facilitator, Curriculum Facilitator and Media Specialists) should be easily accessible modeling good instruction while also assisting in the classroom on a regular basis.

Throughout the course of the year, as documented in the data, technical issues will arise that are unforeseen and prove to be problematic. The technical staff at J.E. Dennis High School held this initiative together by anticipating potential problems and quickly addressing problems once they arouse. Each participant has multiple stories of the technical assistance (some of which are documented in Chapter 1) that they received that kept their confidence and motivation high in what could have been an overwhelming sea of trepidation. Without technical support, the initiative would not and could not be successful.

7. **Kids will be kids…but never underestimate them.**

Kids will be kids, so be prepared to police them! Establish and communicate an ethics of care acceptable use policy and build the culture of the school around it. Most students use computers for personal play, email or social networking. Students do not fully understand at first that the computers are issued as an academic learning tool. They quickly find ways to be off task with various computer programs and/or develop alternative methods to access off limits/ blocked information sites. Therefore, excellent, on-going detailed communication about instructional use is essential for the students and then reinforced through the parent and community base (see #2). Students' being off task has been around for decades -- sneaking to read an inappropriate magazine or comic book during class or cheating on a test by writing the answers on their forearm. However, the laptop provides a mechanism for the student to easily hide behind…so teachers must be proactive and have strong procedures for appropriate classroom use. Cheating is only a few clicks away and must be monitored more closely (see Chapter 1 for data documenting many of these events.)

Students in lower ability classes seem to have the most difficulty understanding that the laptop is an academic learning tool. Many of the students in these classes come from lower socio-economic households with no computer in the home. This circumstance leads some students to view the laptop as their own personal household computer. They have difficulty limiting play time for academic time in class and at home. However, overall student engagement increased for all ability levels. Students

love to create and are very adept at making powerful displays of academic materials to demonstrate understanding never before seen in a traditional high school setting.

Never underestimate that students will adhere to a well thought-out plan that is in their best interests. Non-believers said that students would not return the computers in working order. Many naysayers said that the computers would be sold, lost or stolen. The $50.00 non-refundable insurance fee for accidental damage, requiring parents to attend training, and the signing of the enforced AUP helped students and parents accept responsibility for the laptop. Out of 1,600 laptops deployed in August 2008, one was lost, nine were reported as stolen, two were not returned, and ten were damaged beyond repair (water damage). The total of twenty-two computers out of 1,600 or 1.375% was remarkable for one full school year. This number is considerably less than the text books which are currently issued. Who said teenagers could not be responsible? Believing is achieving!

8. **Supply a backup system for teachers while encouraging it for students.**

Computers crash and information gets lost! During this school year almost every teacher experienced at least one hardware crash (see Chapter 1 for data documentation). Several teachers experienced multiple crashes. Recreating documents, lesson plans and grades is time-consuming, tedious work that should be protected on a backup system. No external hard drives or backup systems were provided this year at J.E. Dennis High School. The approximate cost of $100.00 is an unfair amount for teachers to have to spend out of pocket. The participants unanimously agreed that school districts need to provide external backup systems for

each teacher while students need to be encouraged to purchase a flash drive for any information that has not been saved on the learning management system.

9. **Furnish a Learning Management System**.

In order for both teachers and students to truly experience 21st century teaching and learning, a learning management system must be provided by the district. This system must allow two way web-based communications. Chapter 1 provides data documentation of J.E. Dennis High School's Learning Management System and how the teachers used it. This section includes the features that the seven participants believe to be crucial for future school districts' deployment.

Students and parents should be able to communicate easily with teachers, access grades, and obtain assignments. Students should have a drop box of student work for each course enrolled. The drop box enables teachers and students to continue "academic talk" outside the classroom environment. Students can submit work 24/7, have it graded by the teacher, and later reclaim the assignment for feedback. This system has become an effective means of communication when a student is absent from class. Tests and quizzes may also be given through the management system. The system will grade the assignment if multiple choice, notify the student of the grade and record the grade in the teachers on-line grade book. This feature saves precious time for the teacher and allows immediate feedback for the student. The email feature allows the teachers to communicate with an entire class or subject area at once. The administration also uses this feature to send emails out to the entire student body. *.Angel,* J.E. Dennis High School's learning management system, has

many special features but is not without limitations. Currently the system will not allow a test to be printed out, which is frustrating at times. The program will also not allow tests to be exported out for backup. This concerns many teachers who fear that if or when a new management system is chosen, all their tests, quizzes and hard work will be forfeited. Needless to say, this limitation has discouraged some teachers from using the testing feature to full capacity. Otherwise the learning management system has been a technological time-saving communication device.

10. **Change does not happen overnight and good teaching is not 100% laptop driven.**

The seven research participants had good insight into how the change process takes time. This was evident to them from their combined perceptions of the percentage of teachers who fully bought into the initiative. The data also showed through the observation walk-through that many teachers would talk-the-talk but were not fully utilizing the computers in the classroom. All seven participants agreed that change is slow, even with a consistent convincing push. Principals should expect every teacher to grow from current level of development during the course of a year. After one year the comfort level has developed, and most teachers have conquered the different programs. The participants anticipate that year two will be spent exploring creative innovative pedagogical approaches, with some teachers soaring and other teachers taking small classroom risks. Getting classroom management under control will continue to be a source of contention for many novice teachers. They also believe that it will take approximately five years before most teachers will have their "keys fully in the ignition."

After looking at the observation walk-through data, the participants made the point that good teaching and pedagogical practices involve using a variety of resources and tools other than the laptop. Therefore it is not realistic to expect to see laptops fully utilized every moment of every period. Nothing can or ever will take the place of good discussion and quality conversations thus building trusting relationships while demanding critical thinking.

CHAPTER VI

THE PRINCIPAL'S STORY

As the seven teacher leaders reflected on the first year of the Initiative, they spoke passionately about learning together and sharing what they had learned. Students were teaching students, students were teaching teachers, teachers were teaching administrators, administrators were teaching parents, and the entire learning community was learning from each other.

The transformation was beginning to take shape as teachers began to welcome the learning from their students. By having a full-time instructional technology curriculum specialist and two full-time media specialists, professional development was on-going throughout the school year. Teachers and staff members were constantly engaged in after school and planning period training. Administrators, teachers, department chairpersons, and students all experienced pressure to learn. The organizational expectation to learn how to use the computer to enhance teaching and learning became the norm.

The principal reported that this kind of intense learning proved to be a powerful experience in which teachers collaborated and worked together for a common purpose. He also describes a new attitude of solidarity within the school faculty. Having to "build an entire airplane while flying it" allowed the entire school community to bond through their constant learning, sharing, and problem-solving together.

Lewin and Regine (2000) remark in their book The Soul at Work, "Genuine relationships are based on authenticity and care" (p. 29). When individual soul is linked to the organization, people become committed to something profound – "the desires to contribute to a larger purpose, to feel that they are part of a great whole, a web connection" (p. 27). The principal reported that it was a colossal year of learning for everyone involved in the Initiative, and this learning strengthened relationships as well as everyone's commitment to a cohesive belief in student achievement.

The following section will share the principal's reflection and lessons learned after leading the first year of the comprehensive digital initiative at J.E. Dennis High School. The excerpt contains his exact account summarized for the purposes of this paper. The principal reviewed the summary in an effort to provide his most accurate voice after the year-long journey.

The Principal's Reflection

Wow, what an extremely busy year! Amazing is the first word that comes to my mind as I reflect on all that was accomplished this school year. The summer had been spent in professional development by many of the teachers, yet when they all walked back on campus in August to begin another school year there was one consistent feeling of being a "first year" teacher. Many of the teachers knew how to use technology every now and then for instructional purposes. The English Department had piloted the use of the computers during classroom instruction (not to be taken home by students) during the spring semester, but to unleash laptops to an entire student body at one time was a totally different "first" experience. Teachers would now be facing approximately twenty-seven

students at one time who would come in, sit down and open up a laptop to use instructionally. The yesteryear classroom would be forever altered with this new 21st century tool. The learning environment would never be the same.

In a year and a half the faculty and staff have gone through intense professional development on how to use and infuse technology. The professional development took place during planning periods, in the summer, after school, you name it. Training and more training was the name of the game! We brought in technology gurus and content specialists while also fully utilizing our in-house experts. Together we worked on learning the programs, applying best teaching practices, and infusing technology into the curriculum. Enormous strides were made in the area of professional growth with on-going continuous professional development continuing this summer (2009) and next school year (2009 – 2010).

In the middle of all of this, teachers wrote curriculum, created pacing guides and began the process of writing our own formative assessments. Much of the staff was introduced to the disaggregation of data as well as the use of EVAAS data. Included in all of this, the staff also went through Capturing Kids Hearts training (summer 2008 & continuing), a training that I believe has helped turn our school from teacher-centered to student-centered. A year and a half of hard work has paid off as we were able to raise our overall composite score on state end-of-course testing nearly fourteen percentage points. Astounding work by this staff!!!

To nail down precisely what worked well and what did not work well during the year is difficult due to plotting a course in uncharted territories for most of the year. We

were building an airplane while flying it! Deployment of 1,600 laptops went incredibly smoothly. Discipline turned out to be less of a problem than we anticipated with the technology. Looking back, the staff could have used more specific detailed training on Angel (our learning management system) last summer. When the school year began, I pushed hard to get student grades posted on-line and Angel up and running. Some teachers were ready but many teachers, including our sharpest tech savvy teachers, were still trying to figure out the program. We waded through these bumps while working together to learn the program, and everything turned out well in the end. In retrospect, more training should have been offered, thus eliminating the early frustrations.

I have learned some really valuable personal lessons. When a major initiative like this is taking place in a school, it is all about principal leadership. I do not say that in a boastful or prideful way. To really change the face of instruction there has to be a very clear vision, non-negotiable expectations, and accountability. I even stopped using the word expectation and started using the word requirement much more. Our Superintendent calls it sustained gentle pressure. I spent much of the first semester being patient and accommodating to teachers. I still think this decision was the right leadership skill needed in the beginning in order to ensure steadfast, persistently optimistic attitudes. In January, I consistently enforced expectations and rebuked whining which produced a higher level of student performance on all our end-of-course state exams second semester.

Strong departmental chairpersons are essential leadership components on any traditional comprehensive high school campus striving to transform into a future learning

environment. I knew last summer which department chairs were not well suited to lead this initiative; my mistake was giving them the benefit of the doubt and keeping them in their current position. When they performed as I had anticipated, I had to make mid-stream changes. A tough decision and tough conversation, but in an initiative of this magnitude the department chairs have to be strong instructional leaders, data leaders, technology leaders, trainers, listeners, and a "modelers" of the right way to do things. Department chairs have to be willing to call people out and have tough conversations with those not meeting expectations.

Being hired mid-year of the 2007- 2008 school year allowed me time to assess the school environment, gain trust with the faculty, and coax them through the preparation for this initiative prior to deployment. The number of teachers who tried to resist this initiative and found it to be a "distraction" surprised me. I still cannot begin to wrap my mind around why faculty members would choose to remain mired in mediocrity and not use a tool that can transform teaching, learning, and the level of engagement for students in the classroom. I know that what was being asked of teachers was extremely hard, very hard in fact! But I believe it was the right thing to do for students. There were faculty members who gave up very early, some who needed extra encouragement and were finally able to gain momentum, many who set course and never looked back, and others who still have a long way to go and need more coaxing. Out of eighty-five certified teachers, we are down to five who have not bought in to our reform effort. I do not have any statistics to compare this to, but that seems pretty good at this point. Fortunately, all

five of my strong naysayers signed up voluntarily for our summer institute, which I am taking as a positive sign in the right direction.

We are developing a new classroom observation walk-through instrument that will be given to teachers at the beginning of the upcoming school year. This instrument will outline the expectations of what we as administrators and department chairpersons will expect to see when visiting in the classroom. We will be looking for student engagement, questioning level and activities as they relate to Bloom's Revised Taxonomy, and technology integration. Our goal is to achieve over 90% proficiency overall on state end-of-course tests. To be honest, I was not sure if this was an achievable goal (even though I never communicated this outwardly), but when our Algebra 2, Geometry, and Biology all went over 90% second semester, I quickly became a believer.

A priority in addition to technology integration for next year will be on literacy. Through the disaggregated data analysis and daily interactions with students, we have learned that the lack of literacy is at the root of our student achievement issues. We have developed a detailed plan on how to equip our entire staff with professional development and needed information/resources to teach reading and writing strategies across all curricular areas. We are working with our English department chairperson on training, developing a "school-wide" read, and creating a rubric for writing assessment specific to each content area. All technology training will also have a focus on literacy.

The next step for us as a professional learning community with regards to the digital conversion is to expand the use of our learning management system (Angel), to

explore more on-line resources and assessments, and to further promote and utilize our Challenge Based Learning initiative. I truly believe that together we can accomplish these many tasks. It may be two more years down the road, but I do believe we can get to 90%.

I honestly do not know what I would do differently if given the chance to start again on the digital conversion initiative. Last spring I was often frustrated by the endless meetings and time out of the building. Looking back, I am thankful that we spent that time because there was no real way to streamline all that had to be done any better. I cannot imagine our training, deployment, and collection going more smoothly. More upfront training on classroom management and room arrangement would have been beneficial. This training will be essential this year given the current budget crisis and reduction of force. Our class size will be increasing to thirty-five students.

My assistant principal over this initiative this year did an absolute amazing job handling the distribution and collection of laptops, discipline, damages, and so much more. I would advise any principal who is about to embark on an initiative of this magnitude to select an assistant principal to oversee the day-to- day operation. This person must be thorough, detail-oriented, and hard-line on rules. Having this person in place allowed me to be the "big idea" person and to focus more on managing personalities, facilitating collaboration, and encouraging others through the initiative.

Finally, I think anyone leading this type of initiative has to have performance first and foremost in mind. I pushed the use of technology, got people out of their comfort zone, and held them accountable. When I spoke with my staff, my attention was always

on improving performance, not using technology. There were times I even made concessions with the technology to keep teachers focused on individual student performance. I realized in November that this was year one of a long initiative and that I had to be careful to avoid pushing too hard. Our high school could not be transformed overnight. You see, I am competitive like most principals, and I wanted us to be the best high school, the one to do it all immediately, and to be ultra successful with technology integration. After watching my students and staff work so hard together, I came to realize that my expectations and competitiveness was not realistic. I knew that the change process took a minimum of five years and that to focus solely on technology was missing the boat. I redirected my attention and energy to being a School of Distinction, improving the work place climate, and retaining our staff. I believe we balanced all three of these areas well through much hard work, persistence, and dedication. After multiple visits from other school districts to see what we were doing, I began to see how well we were doing, how far we had to go, and that was okay. I am proud of the staff at J.E. Dennis High School. I am proud of all that they have accomplished, and I am especially proud to be called their principal.

CHAPTER VII

CONCLUSIONS

The implementation of any reform strategy is a process, not an event. Implementation will not happen all at once or advance effortlessly. Thoughtful and effective implementation strategies at numerous levels within an organization are crucial to the success of any systematic endeavor. The National Implementation Network at the University of North Carolina Chapel Hill defines implementation as a "specified set of activities designed to put into practice an activity or program. That is, implementation is synonymous with coordinated change at system, organization, program, and practice levels." Ineffective programs can be implemented well (Elliott, 1997; Ennett, Tobler, Ringwalt, & Flewelling, 1994). Effective programs can be implemented poorly (Fixsen & Blase, 1993; Fixsen, Blase, Timbers, & Wolf, 2001). Neither one is desirable. Desirable outcomes are achieved only when effective programs are implemented well (Fixsen et al., 2001; Leschied & Cunningham, 2002; Washington State Institute for Public Policy, 2002). A review of the literature shows implementation of an activity or program to be most successful when:

- carefully selected practitioners receive coordinated training, coaching, and frequent performance assessments;

- organizations provide the infrastructure necessary for timely training, skillful supervision and coaching, and regular process and outcome evaluations;
- communities and consumers are fully involved in the selection and evaluation of programs and practices; and
- State and federal funding avenues, policies, and regulations create a hospitable environment for implementation and program operations.

The review also revealed six stages of the implementation process (e.g., Blase & Fixsen, 2003; Cheung & Cheng, 1997; Faggin, 1985; Feldman, Baler, & Penner, 1997; Fox & Gershman, 2000; Rogers, 2002; Williams, 1975; Zins & Illback, 1995).

Table 7: Stages of Implementation

Stages of Implementation
1. Exploration and Adoption: This is the process by which an individual, organization, or community (a) comes to understand a need; identifies a program; determines what is needed to implement that program; and examines the resources available in the community; and (b) makes a decision to adopt (or not adopt) the practice or program.
2. Program Installation: This stage includes the tasks that need to be accomplished before the new program can actually begin to function. These topics include putting new policies into place, obtaining necessary resources, hiring or training staff, and so on.
3. Initial Implementation: Implementation has begun, but is not yet fully in place. It is during this stage when many implementation attempts end, as they become overwhelmed by inertia and/or other problems.
4. Full Implementation: At this point, the implemented program becomes fully operational with full staffing complements, full client loads, and all of the realities of "doing business."
5. Innovation: This is the stage at which staff members have enough experience with the program to refine and expand the program to respond to the unique challenges and circumstances of the community in which it is implemented. Desirable changes that expand program effectiveness are "innovations" and should become part of the standard practice of the program. However, some changes represent "program drift" and are a threat to fidelity. Research seems to indicate "adaptations made after a model had been implemented with fidelity were more successful than modifications made before full implementation."

6. Sustainability: "The goal during this stage is the long-term survival and continued effectiveness of the implementation site in the context of a changing world."

Implementation Research: A Synthesis of the Literature, by Dean Fixsen, Sandra Naoom, Karen Blase, Robert Friedman, and Frances Wallace was published in 2005 by the National Implementation Research Network at the Louis de la Parte Florida Mental Health Institute, University of South Florida and produced with support from the William T. Grant Foundation.

These stages and the key factors outlined above from the existing literature on program implementation parallel with the implementation strategies used for the Digital Conversion at J.E. Dennis High School. The research participants at J.E. Dennis High School began the 2008 school year with a sense of hope and purpose to transform teaching and learning for students in order to meet the demands of a new age - Exploration and Adoption. They also had a fear of the urgency coupled with a fear of failure –Program Installation and Initial Implementation. As the participants began full operation mode of the implementation process and were rounding the corner toward innovation with sustainability still in the distance, six articulated findings and one validating theme emerged from the data.

Major Findings and Themes

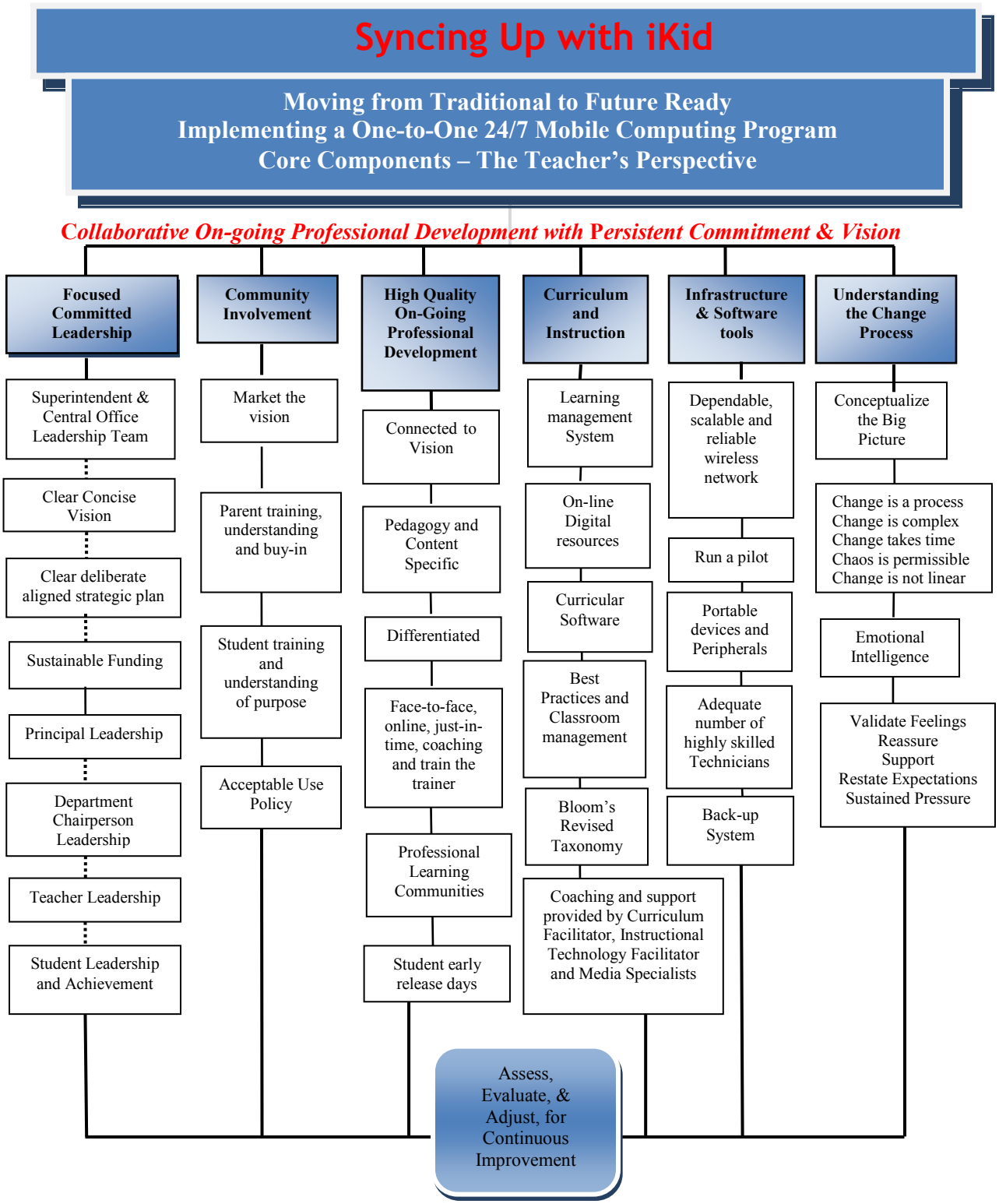
The six articulated findings represent the teachers' perspective on core components necessary to successfully implement a 1:1 mobile computing initiative: Focused Committed Leadership, Community Involvement, High Quality On-going Professional Development, Curriculum and Instruction, Infrastructure and Software Tools, and Understanding the Change Process with the ten "must knows" and lessons learned from Chapter 4 embedded into the flowchart. Each finding has a strand of crucial essentials that the teacher participants feel must be in place for the core

components to function effectively. Core components refer to the most essential and indispensable components of an intervention practice or program or the most essential and indispensable components of an implementation practice or program. (Bauman, Stein, & Ireys, 1991; Dale, Baker, & Racine, 2002; Winter & Szulanski, 2001).

The major findings reinforced the constantly reoccurring theme of *collaborative professional development with persistent commitment and vision* on the part of all stakeholders while assessing, evaluating and adjusting the implementation plan for continuous improvement. It is only through collaborative professional development with persistent commitment and vision, as described by the seven teacher leaders that ensures the implementation of an initiative that calls for a transformation in instructional methodology – Syncing up with the iKid. The data validated the existing research on program implementation and the technology integration implementation research of Means, Warschauer, Coppola, and Sandholtz, yet the core components described by these teacher leaders represent a precise framework. Regardless of the teacher leader's age, sex, race, socio-economic status, education, or experience, each reported the same types of experiences, feelings, challenges, and successes. The framework flowchart (Figure 1) details each of the core components with essential elements needed in order to move from traditional to future ready teaching and learning. The flowchart was designed for use as a reference point for "how to" implement a one-to-one 24/7 mobile computing program – Leadership for Technology. The data obtained from the yearlong journey of seven teacher leaders indicates success and transformation can come if this process is followed with fidelity.

The speed and effectiveness of implementation may depend upon knowing exactly what has to be in place to achieve the desired results for stakeholders; not knowing the core components leads to time and resources wasted in attempting to execute an assortment of (if only we knew) nonfunctional elements (Arthur & Blitz, 2000; Fixsen & Blase,1993; Winter & Szulanski, 2001). Knowing the core components as learned from this study and outlined in Figure 1 should allow for more efficient and cost effective implementation plans by school districts beginning the digital conversion process, thus leading to more confident decisions by Superintendents, Principals and Teachers.

Figure 9: "How-to" Flowchart – Moving from Traditional to Future Ready



Implications

The major findings and emerging theme of this study have implications for superintendents, central office personnel, practicing principals, teachers, and schools of education as well as state level representatives who are interested in implementing a one-to-one mobile computing program in their school, school system or state. This document is meant to serve as a how-to manual. Undertaking an initiative of transforming teaching and learning through the use of technology is a mammoth task that must be well thought out, planned and communicated effectively with all stakeholders. The teachers' stories provide a detailed framework for practitioners in the field to consider as they tackle this task. Our hope is that through this documented approach, practitioners will be able see the "big picture," understand teachers' fear of the urgency coupled with the fear of failure, and provide collaborative on-going professional development with persistent commitment. Through the utilization of this study, others can avoid known pitfalls.

Higher education could also use the results of this study to expand their current programs of study for both administrators and teachers. Today's practitioners need to be able to read, interpret, share and apply research in order to transform America's schools to meet the needs of the future. Perhaps more emphasis could be placed on understanding and articulating vision, understanding the change process, using emotional intelligence, modeling, communicating, building leadership capacity in others, managing, infusing technology into the curriculum and pedagogy, learning together, sharing knowledge and building relationships – all 21st century skills. Aspiring principals and teachers could then practice using theory and knowledge learned by actually having

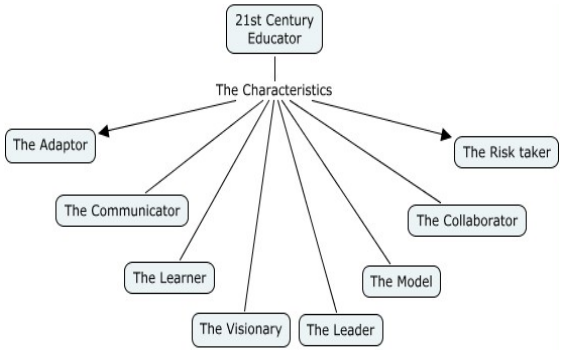
practical experiences in a 1:1 learning environment through a practicum, internship, shadowing, and/or student teaching experience.

Finally, if education is about transforming our schools to meet the demands of a new age, then sustainable reform and transformation is needed. To achieve sustainable reform and transformation, leadership commitment at the state level is needed. State level visioning, support, and financial appropriations will be essential to transform yesteryear schools into future-ready new age 21st century schools. Both teacher and administrator standards must be aligned with new age standards of learning and assessment. Leadership, coaching, and professional development must be of high quality and available for all areas of the state. Bandwidth and connectivity must also be available to every household. Strong school systems lead to strong economic development and a more globally competitive market.

Recommendations

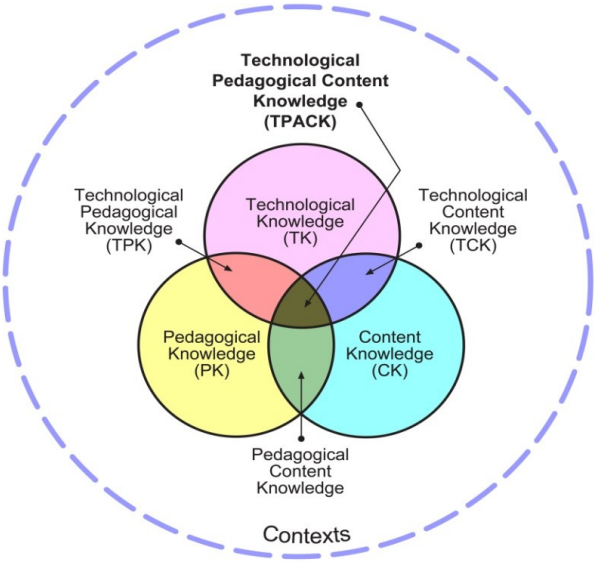
Students are advancing in their use of technology, and they are discovering unlimited opportunities to explore and create on-line. Are we making sure that we teach students how to do this wisely? Are we building on these instinctive interests and abilities? Are we harnessing the power of technology to optimize their educational experience? As educators we MUST be able to use the technology.

Figure 10: The 21st Century Educator



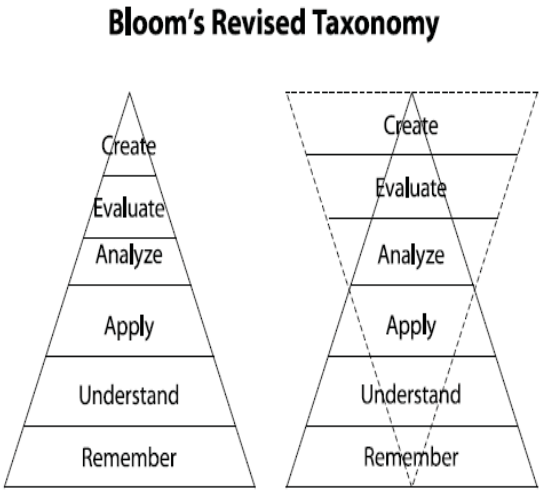
The 21st Century Educator (Figure 2: 21st Century Educator Churches A, 2007, Edorigami, blooms taxonomy and digital approaches http://edorigami.wikispaces.com) must be an adaptor, communicator, learner, visionary, leader, model, collaborator and a risk-taker. It is not enough anymore to be a teacher of content alone in isolation. We must synch up with the iKid and combine content knowledge with pedagogical knowledge with technical knowledge (Figure3: Technological Pedagogical Content Knowledge TPACK from Koehler and Mishra 2008).

Figure 11: Technological Pedagogical Content Knowledge



Today's teachers should also utilize Bloom's Revised Taxonomy by Anderson and Krathwohl to further expand learning opportunities as technology advances and becomes more ubiquitous. Bloom's Revised Taxonomy (Figure 11) is an excellent resource to expand existing traditional instructional practices, but it does not specifically account for the new pedagogies needed in a 1:1 mobile 24/7 computing environment.

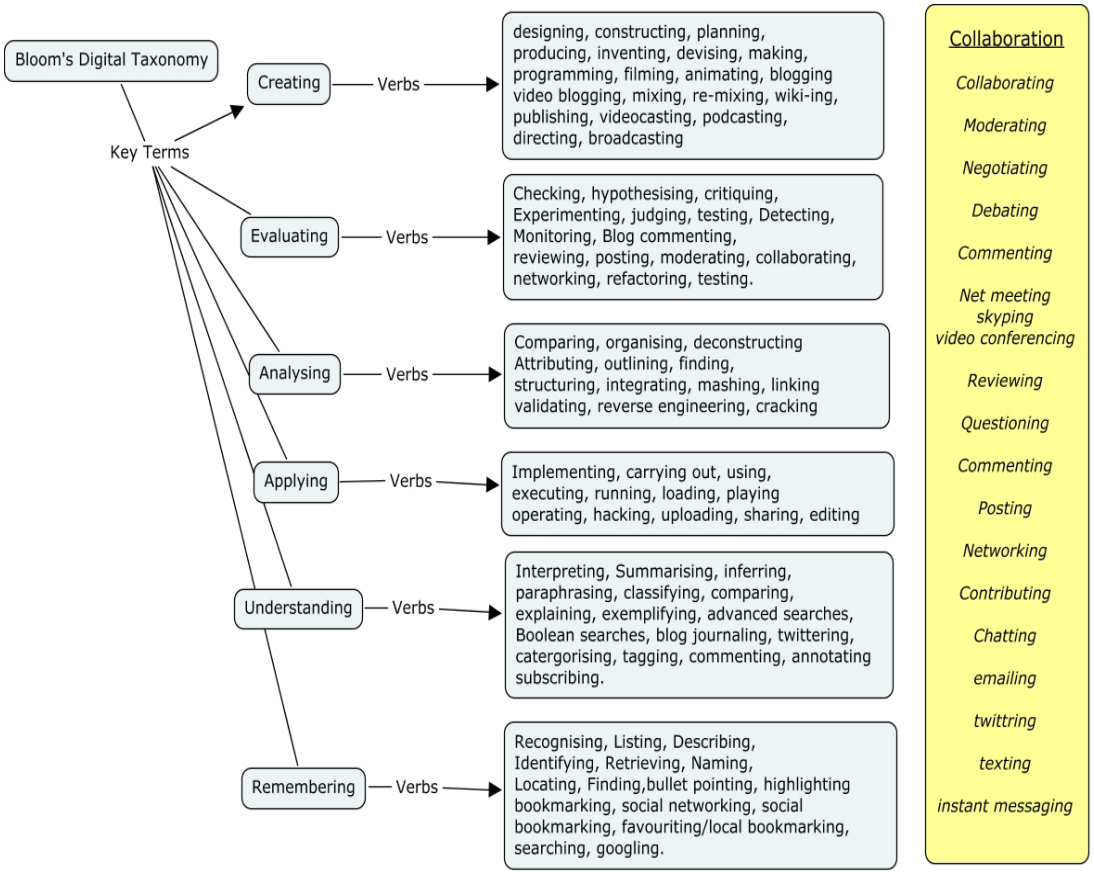
Figure 12: Bloom's Revised Taxonomy



Therefore, Andrew Churches' Digital Taxonomy (Figure 12) should strongly be considered for full adoption and implementation in the 21st century reform effort. **Teaching should be driving the technology rather than technology driving the teaching.** The Digital Taxonomy provides basics practices that a practitioner should use in their classroom daily. "The 21st century teacher is *student centric*, *holistic*, they are teaching about *how to learn* as much as teaching about the subject area" (Churches, 2007). We know too, that educators must also be 21st Century learners. According to an

old Siletz Indian proverb -- ***One who learns from one who is learning drinks from a running stream.*** Our students deserve to "drink from a running stream."

Figure 13: Mind map of Bloom's Revised Digital Taxonomy



Churches A, 2007, Edorigami, blooms taxonomy and digital approaches
http://edorigami.wikispaces.com/Bloom%27s+and+ICT+tools

Believing that schools will have to sooner rather than later make 21st century tools available to students 24/7, this final section includes a summary outline of recommendations from all aspects of this study. I also dovetailed, when appropriate, current lessons I learned as a researcher assisting in the North Carolina State University Friday Institute's study –NC 1:1 Learning Technology Initiative (NCLTI). I felt it was

important to combine both recommendations, one looking narrowly at the school level and the other "peeking" at a state level perspective. The list of recommendations is not meant to be all inclusive but rather to serve as a framework for anyone interested in transforming teaching and learning through the use of technology.

1. Leadership from the principal determines success or failure. Consistent, supportive, distributed leadership promotes adoption and buy-in from teachers and students for the 1:1 learning innovation. Choose the principal who will implement the 1:1 environment carefully. They should be familiar and comfortable with the change process, have a vision of what 1:1 learning in a school can do, inspire teachers to embrace that vision, model technology use, and be at ease with shared decision-making.
2. At least six months is required for planning and preparation before students receive one-to-one 24/7 mobile device. One full calendar year is optimal.
3. Involve the entire community.
4. Ongoing high quality differentiated professional development and teacher empowerment is imperative.
5. An adequate infrastructure with sufficient technical support is critical. Include electrical upgrades as part of the infrastructure investment.
6. Consider core classroom equipment (interactive whiteboard, projector, digital camera, video camera, classroom response systems, and digital science equipment) as a primary part of your initial infrastructure. Installing this

equipment as teachers are given their laptops gives them opportunity to learn how to use the tools effectively before adding student computers into the equation.

7. Defining the appropriate balance between student safety, acceptable use, and access to web-based resources is difficult but must be done.
8. Classroom management strategies and tools must be adequate.
9. Skilled Technology Facilitators and Media Specialists play a significant role in the success of technology integration into classroom practices. The North Carolina Educational Technology Plan (2007) recommends the following ratio:
    - A minimum of one technology facilitator per school, with additional positions once a school surpasses 1000 students.
    - One Technology Assistant per school, per thousand students
    - One Technician I, II, or III for every 400 computers. At least one of the Technicians should be a Technician III.
10. Careful budget planning and broad-based engagement of key stakeholders are important for success and sustainability.
11. Include loaner computers, extra battery chargers, replacement batteries, electronic textbook fees, and laptop bags in your initial budget—and make them a part of your total cost of ownership sustainability figures. Consider loaners that will equal 10% of the number of computers currently in the school.
12. Begin early to plan for laptop imaging, maintenance, storage, distribution and recollection. Re-visit these plans annually.
13. Laptop screens are fragile; consider mandating separate laptop and book bags.

14. Provide district-managed insurance policies for all computers, but consider asking students/parents to contribute a nominal amount toward the cost of that policy. Provide an easy-payment opportunity or even special service-learning projects for families that cannot afford the fee.
15. Clarify and/or augment school and district policies.
16. Consider forming a student technology team (help desk) as soon as possible so that teachers and fellow students, as well as the media and technology team, have assistance quickly (and techie students have an opportunity to channel their expertise and experimental nature in positive directions).
17. Provide resources such as secure servers, learning management systems, classroom monitoring systems, and e-mail accounts for all students.
18. Infuse 21st curriculum with skills necessary for living and working in an ever-changing society. Relevant real world education should include:
    a. Information and communication skills
    b. Thinking and problem solving skills
    c. Interpersonal and self-directional skills
19. Expect teachers to create instructional environments in which students use higher order cognitive skills to construct meaning or knowledge, engage in disciplined inquiry, and work on products that have value beyond school. Students should also be given the opportunity to demonstrate 21st C skills through the use of technology-infused, authentic assessments. Assessment should be more integrated with instruction.
20. Attending to the many details makes all the difference.

REFERENCES

Adams, S. & Burns, M. (1999). *Connecting student learning and technology*. Southwest Educational Development Laboratory. Retrieved May 30, 2001, from the World Wide Web: http://www.sedl.org/pubs/tec26/nonflash.html

Alliance for Excellent Education. (2006, March 1). *High school dropouts cost the U.S. billions in lost wages and taxes, according to Alliance for Excellent Education* [Press release]. Washington: Author. Retrieved May 8, 2007, from http://www.all4ed.org/press/pr_022806.htm

Alliance for Excellent Education. (n.d.). *The crisis in American high schools*. Washington: Author. Retrieved April 20, 2007, from http://www.all4ed.org/whats_at_stake/CrisisInHighSchools.pdf

Arthur, M. W., & Blitz, C. (2000). Bridging the gap between science and practice in drug abuse prevention through needs assessment and strategic community planning. *Journal of Community Psychology, 28*(3), 241-255.

Ayers, W. A. (2001). *To teach: the journey of a teacher* (2nd ed.). New York, NY: Teachers College Press.

Bagley, C. & Hunter, B. (July 1992). Constructivism and technology: forging a new relationship. *Educational Technology*, 22-27.

Balfanz, R., & Letgers, N. (2004). *Locating the dropout crisis: Which high schools produce the nation's dropouts, where are they located, who attends them? B*altimore, MD: Center for Research on the Education of Students Placed AtRisk, Johns Hopkins University. Retrieved March 9, 2007 from http://web.jhu.edu/CSOS/graduationgap/power/report70.pdf

Barack, L. (2005) Gauging the digital divide. *School Library Journal*, *51*(8), 21.

Barth, R. S. (1993). Coming to a vision. *Journal of Staff Development, 14* (1), 6-11.

Bauman, L. J., Stein, R. E. K., & Ireys, H. T. (1991). Reinventing fidelity: The transfer of social technology among settings. *American Journal of Community Psychology, 19,* 619-639.

Bitter, G. G. & Pierson, M. E. (1999). *Using technology in the classroom*. Boston: Allyn and Bacon.

Blau, A. (2002). Access isn't enough. *American Libraries*; *33*(6), 50-52.

Barth, R. S. (1991). *Improving schools from within: Teachers, parents and principals can make the difference*. San Francisco: Jossey-Bass.

Bracey, G. (1994). Computers improve teaching. *Electronic Learning* (Special Supplement), 1.

Brand, G. A. (1998). What research says: Training teachers for using technology. Journal of Staff Development, 19, 10-13.

Charp, S. (2003).Technology Integration in Teaching & Learning. *T.H.E. Journal, 30, 8*.

Christensen, C., Johnson, C., & Horn, M. (2008). *Disrupting Class: How disruptive Innovation will change the way the world learns.* New York, NY: McGraw Hill.

Churches A, 2007, Edorigami, blooms taxonomy and digital approaches http://edorigami.wikispaces.com/Bloom%27s+and+ICT+tools

Coppola, E. M. (2004). *Powering up: Learning to teach well with technology*. New York: Teachers College Press.

Corbin, J. & Strauss, A. (2008). *Basics of qualitative research: Techniques and procedures for developing grounded theory*, *3rd edition*. Thousand Oaks, CA: Sage Publications.

Crouch, N. R. (1999). Best practices in K-12 technology. [On-line]. Available: http://iccel.wfu.edu/publications/others/bp100899.htm

Cuban, L. (1993). How teachers taught: Constancy and change in American classrooms, 1890- 1990 (2nd ed.). New York: Teachers College Press.

Dale, N., Baker, A. J. L., & Racine, D. (2002). *Lessons Learned: What the WAY Program Can Teach Us About Program Replication.* Washington, DC: American Youth Policy Forum.

Darling-Hammond, L. (1997). The right to learn: A blueprint for creating schools that work. San Francisco: Jossey-Bass Inc.

Dexter, S. (1999). Collective representations and educational technology as school reform: How *not* to produce a Cargo Cult. Educational Technology & Society, 2(4).

Dexter, S., (1999). Teachers' views of computers as catalysts for changes in their teaching practice. *Journal of Research of Computing in Education*, 31 (3), 221-239. Retrieved July 7, 2001 from ProQuest Education Complete database.

DuFour, R., DuFour, R., Eaker, R., & Karhanek, G., (Ed.). (2004). *Whatever it takes: how professional learning communities respond when kids don't learn*. Bloomington, IN: Solution Tree.

DuFour, R., Eaker, R., & DuFour, R., (Eds.). (2005). *On common ground: the power of professional learning communities*. Bloomington, IN: Solution Tree.Dexter, S. L.,

Eaker, R., DuFour R., & DuFour, R. (2002). *Getting started: reculturing schools to become professional learning communities*. Bloomington, IN: National Educational Service.

Elliott, D. S. (1997). Implementing and evaluating crime prevention and control programs and policies. *Crime Law and Social Change, 28*(3-4), 287-310.

Embry, L. (2004). Funding, integrating technology into classroom top challenges, according to national school boards association survey. *National School Boards Association*. Retrieved July 19, 2008, from http://www.nsba.org/site/doc.asp?TRACKID=&VID=2&CID=1425&DID=34656

Ennett, S. T., Tobler, N. S., Ringwalt, C. L., & Flewelling, R. L. (1994). How effective is drug abuse resistance education? A meta-analysis of Project DARE outcome evaluations. *American Journal of Public Health, 84*(9), 1394-1401.

Evans, R. (1996). *The human side of school change: reform, resistance, and the real-life problems of innovation*. San Francisco: Jossey-Bass.

Ferraro, S., P. (1999). Increasing the use of instructional technology within the K-12 curriculum through staff development., Nova Southeastern University.

Fixsen, D. L., & Blase, K. A. (1993). Creating new realities: Program development and

dissemination. *Journal of Applied Behavior Analysis, 26,* 597-615.

Fixsen, D. L., Blase, K. A., Timbers, G. D., & Wolf, M. M. (2001). In search of program implementation: 792 replications of the Teaching-Family Model. In G. A. Bernfeld, D. P. Farrington & A. W. Leschied (Eds.), *Offender rehabilitation in practice: Implementing and evaluating eff ective programs* (pp. 149-166). London: Wiley.

Fryer, W. (2003). Technology integration lessons from the TLA. *Tools for the Teks: Integrating Technology in the classroom.* Retrieved July 15, 2008, from http://www.wtvi.com/teks/03_04_articles/tla_lessons.html

Fullan, M. (1997). Emotion and hope: Constructive concepts for complex times. In A Hargreaves (Ed.), *Rethinking educational change with heart and mind. ASCD Yearbook* (pp. 216-233). Alexandria, VA: ASCD.

Fullan, M. (2001b). *Leading in a culture of change*. San Francisco: Jossey-Bass.

Fullan, M. (2001a). *The new meaning of educational change*. (3rd edition). New York: Teachers College Press.

Fullan, M. (2005). *Leadership and sustainability*. Thousand Oaks, Ca: Corwin Press.

Fullan, M., Hill, P., Crevola, C. (2006). *Breakthrough*. Thousand Oaks, Ca: Corwin Press.

Glesne, C. (2005). *Becoming qualitative researchers: An introduction* (3rd ed.). New York: Longman.

Gordon, A., Dorr J., & Gordon M. (2003). Native American technology access: the Gates Foundation in Four Corners. *The Electronic Library*, *21*(5), 428- 434.

Greene, J. (2002). *High School Graduation Rates in the United States*. New York, New York: The Manhattan Institute.

Guhlin, M. (Jan. 1997). Integrating technology from the classroom up. *Technology Connection*, p. 25-26.

Halpin, R. (1999). A model of constructivist learning in practice: Computer literacy integrated into elementary mathematics and science teacher education. Journal of Research on Computing in Education, 32, 128-139.

Harless, S., & Harthun-Reed, A. (2005). Laptop initiative creates equal educational opportunities. *T.H.E. Journal*, *32*(10), 6-7.

Heide, A. & Henderson, D. (1994). *The technological classroom: A blueprint for success*. Irwin Publishing: Toronto, Canada.

Hirsch, E. D. J. (1996). The schools we need: And why we don't have them. New York: Doubleday.

Honey, M. & Moeller, B. (1990). *Teacher's beliefs and technology integration: Different values, different understandings.* [CTE Technical Report Issue No. 6] Education Development Center, Inc. Retrieved February 25, 2001 from http://www.edc.org/CCT/ccthome/reports/tr6.html

Hord, S. M. (Ed.). (2003). *Learning together, leading together: changing schools through professional learning communities*. New York: Teachers College Press.

Huffman, J. B. & Hipp, K. K. (2003). R*eculturing schools as professional learning communities*. Lanham, MD: Scarecrow Education. "Index of household charts." http://www.ntia.doc.gov/ntiahome/dn/hhs/HHSchartsindex.html

James, J. (1997). Thinking in the Future Tense. New York: Touchstone.

Jensen, D., & Boschee, F. (2003). Planning for technology: A guide for school administrators, technology coordinators, and curriculum leaders. Thousand Oaks, CA: Corwin Press, Inc.

Johnson, M. & Cooley, N. (2001). Supporting New Models of Teaching and Learning Through Technology. Arlington, VA. Educational Research Service.

Johnson, M., Schwab, R., Foa, L. (Winter 1999). Technology as a change agent for the teaching process. *Theory into Practice,* 38 (1) p. 24-31.

Jonassen, David H. (2000). *Computers as mindtools for schools: Engaging critical thinking*. Second edition. New Jersey: Prentice-Hall, Inc.

Jonassen, D. H., Peck, K. L. & Wilson, B. G. (1999). *Learning with technology: A constructivist perspective*. New Jersey: Prentice-Hall, Inc.

Jonassen, D. H. (2000). Computers as mind tools for schools. Upper Saddle River, NY: Prentice-Hall.

Jones, B. F. (1995). New times demand new ways of learning. [On-Line]. Available: http://www.ncrel.org/sdrs/edtalk/newtimes.htm

Katz, J. Y. (1992). Toward a personality profile of successful computer-using teacher. Educational Technology, 32, 39-40.

Kleiman, G. M. (2000). Myths and realities about technology in K-12 schools. In the Harvard Education Letter report, *The digital classroom: How technology is changing the way we teach and learn*. Retrieved February 8, 2009 from http://www.edtechleaders.org/documents/myths.pdf

Knapp, L. R.& Glenn A.D. (1996). *Restructuring schools with technology*. Boston: Allyn and Bacon.

Koehler, M.J., & Mishra, P. (2008). Introducing TPCK. AACTE Committee on Innovation and Technology (Ed.), *The handbook of technological pedagogical content knowledge (TPCK) for educators* (pp. 3-29). Mahwah, NJ: Lawrence Erlbaum Associates.

Koehler, M. J., & Mishra, P. (2009). What is technological pedagogical content knowledge? *Contemporary Issues in Technology and Teacher Education*, *9*(1). Retrieved from http://www.citejournal.org/vol9/iss1/general/article1.cfm

Koszalka, T., & Wang, X. (2002). Integrating technology into learning: a summary view of promises and problems. *International Forum of Educational Technology & Society, 5(1).* Retrieved July 20, 2006, from http://ifets.ieee.org/periodical/vol_1_2002/koszalka.html

Kotter, J.P. (1996). Leading Change. Boston: Harvard Business School Press.

Leschied, A. W., & Cunningham, A. (2002). *Seeking effective interventions for serious young offenders: Interim results of a four-year randomized study of Multisystemic Therapy in Ontario, Canada.* London, Ontario: Centre for Children and Families in the Justice System.

Lewin, R. & Regine, B. (2000). The Soul at Work. New York: Simon & Schuster.

Lincoln, Y. & Guba, E. (1985). Naturalistic Inquiry. CA: Sage Publishers.

MacArthur, C. A., Pilato, V., Kercher, M., Peterson, D., Malouf, D. & Jamison, P. (1995). Mentoring: An approach to technology education for teachers. *Journal of Research on Computing in Education, 28,* 46-62.

Martinez, M. (2005). *Advancing High School Reform in the States: Policies and Programs*. Reston, VA: The National Association of Secondary School Principals.

Maxwell, D. J. (1997). ConnecTEN: A case study of technology training for teachers. Tennessee.

McCain, T. & Jukes, I. (2001). Windows on the Future. CA: Corwin Press, Inc.

McNabb, M. (1999). Critical issues in evaluating the effectiveness of technology. [On-Line]. Available: www.ed.gov/Technology/TechConf/1999/confsum.html

Means, B., Blando, J., Olson, K., Middleton, T., Morocco, C., Remz, A., Zorfass, J. (1993). *Using technology to support education reform*. U.S. Department of Education. Retrieved March 2, 2008 from http://www.ed.gov/pubs/EdReformStudies/TechReforms/

Means, B., Coleman, E., Lewis, A., Quellmalz, E., Marder, C., & Valdes, K. (1997). *GLOBE Year 2 evaluation: Implementation and Progress*. Menlo Park, CA: SRI International.

Means, B., Coleman, E., Baisden, K., Haertel, G., Korbak, C., Lewis, A., McGhee, R., Penuel, W. R., & Valdes, K. (1999). *GLOBE Year 4 evaluation: Evolving implementation practices*. Menlo Park, CA: SRI International.

Means, B., Penuel, W. R., & Padilla, C. (2001). *The connected school: Technology and learning in high school.* San Francisco: Jossey-Bass.

Messmer, N. E. (1996). Technology lead teachers: Professional development for computer use in schools. Unpublished Dissertation, University of Washington, Ann Arbor.

Moe, T. & Chubb, J. (2009). *Liberating Learning: Technology, Politics, and the Future of American Education.* San Francisco: Jossey-Bass.

National Telecommunications and Information Administration. A Nation online: how Americans are expanding their use of the Internet. (February 2002). Available: http://www.digitaldivide.gov/

Norton, P. (1994). Integrating technology in schools: A cohort process for graduate level inquiry. Journal of Technology for Teacher Education, 3(2), 163-174.

O'Banion, T. (1996, August). Learning Communities, Learning Organizations and Learning Colleges. SCT Vo19, No. 8. Retrieved July 9, 2008 from http://www.league.org/publication/abstracts/leadership/labs0896.html

Ohler, J. & Warlick, D. (2001). A conversation on technology leadership. Teaching and Learning. [On-line]. Available: Internet, www.techlearning.com.

Oleson, V. (1998). Feminism and models of qualitative research. In N.K. Denzin & Y.S. Lincoln (Eds.), *The landscape of qualitative research theories and issues* (pp. 300 – 332). Thousand Oaks, CA: Sage.

Patton, M.Q. (1990). Qualitative Evaluation and Research Methods. CA: Sage Publishers.

Papa, R. Integrating technology in the classroom: Challenges schools and classroom Teachers face. Retrieved July 18, 2008, from http://www.sjsu.edu/depts/it/papa/documents/readingreport.pdf

Parr, J. M. (1999). Extending educational computing: A case of extensive teacher Development and support. Journal of Research on Computing in Education, 31(3), 280-292.

"Percent of U.S. households with a computer by income, by race/Hispanic origin, 2001." Available: http://www.ntia.doc.gov/ntiahome/dn/hhs/ChartH4.htm

Peters, T. (2000, May 22). What will we do for work. Time Magazine, 155 (21), 68 – 71.

Pew Internet and American life project. "Internet Activities." Available: http://www.pewinternet.org/reports/chart.asp?img=Interne2.htm

Pflaum, W. (2004). The technology fix: The promise and reality of computers in our schools. Alexandra, VA: Association for Supervision and Curriculum Development.

Poole, B. (2004). Eight pillars of successful technology implementation. *Education World*. Retrieved July 15, 2008, from http://www.educationworld.com/a_tech/tech/tech188.shtml

Reidl, J. (1995). *The integrated technology classroom: Building self-reliant learners*. Boston: Allan and Bacon.

Rogoff, B., Turkanis, C., Bartlett, L. (2001). *Learning together: Children and adults in a school community*. New York: Oxford University Press

Rogoff, B. (1994). Developing understanding of the idea of communities of learners. *Mind, Culture, and Activity*, 1(4), p.209-226.

Sandholtz, J. H., Ringstaff, C., & Dwyer, D. C. (1997). Teaching with technology: Creating Student-Centered Classrooms. New York: Teachers College Press.

Saye, J., (1998). Technology in the classroom: the role of dispositions in teacher gatekeeping. *Journal of Curriculum and Supervision*, 13 (3), 210-234. Retrieved July 7, 2001 from ProQuest Education Complete database.

Schrum, L. (1999). Technology professional development for teachers. Educational Technology Research and Development, 47(4), 83-90.

Schawndt, T.A. (1998). Constructivist, interpretivist approaches to human inquiry. In N.K. Denzin & Y.S. Lincoln (Eds.), *The landscape of qualitative research theories and issues* (pp. 221 – 259). Thousand Oaks, CA: Sage.

Senge, P., Kleiner, A., Roberts, C., Ross, R., Roth, G., & Smith, B. (1999). *The dance of change: the challenges to sustaining momentum in learning organizations*. New York: Currency Doubleday.

Senge, P. M., Cambron-McCabe, N., Lucas, T., Smith, B., Dutton, J., & Kleiner, A. (2000). *Schools that learn: a fifth discipline fieldbook for educators, parents, and everyone who cares about education*. New York: Currency Doubleday.

Sergiovanni, T.J. (1994). *Building community in school.* San Francisco, CA: Jossey-Bass

Shelly, R. W. (2000). From literacy to fluency in instructional technology: Taking your staff to the next level. NASSP Bulletin, 84(614), 61-70.

Silvernail, David L. and Dawn M. M. Lane (2004). "The Impact of Maine's One-to-One Laptop Program." Maine Department of Education. Available online at: http://www.maine.gov/mpuc/broadband/activities/MLTIPhaseOneEvaluationReport2004.

Sizer, T., R. (1992). Horace's school: Redesigning the American high school. New York: Houghton Mifflin Company.

Smith, B., & Munday, R. (1995). Prediction of teachers' use of technology based on personality type. Journal of Instructional Psychology, 22(3), 281-286

Soloway, E. (1996). Teachers are the key. *Communications of the ACM, 39* (6), 11-14.

SRI International (22 June 2004). SRI International and EDC Study of Largest District-Based Laptop Computer Initiative Demonstrates Benefits of "One-to-One Computing" in schools Available online at: http://www.sri.com/news/releases/06-22-04.html

States. RAND Corporation, 2004. http://www.rand.org/pubs/monographs/2004/RAND_MG164.pdf

Stone, R., Cuper, P. H. (2006). *Best practices for teacher leadership: what award-winning teachers do for their professional learning communities*. Thousand Oaks, Ca: Corwin Press.

Strauss, A. & Corbin, J. (1990). Basics of Qualitative Research. CA: Sage Publishers.

Thornburg, D. D. (1998). Reading the future. The American School Board Journal. [On-line]. Available: Internet, www.electronic-school.com.

The National Implementation Research Network, University of North Carolina, Chapel Hill, 2008. Retrieved August 21, 2009, from http://www.fpg.unc.edu/~nirn/implementation/01_implementationdefined.cfm

Thornburg, D. D. (1998). Reading the future. The American School Board Journal. [On-line]. Available: Internet, www.electronic-school.com.

Tyack, D. & Cuban, L. (1995). Tinkering Toward Utopia. Cambridge: Harvard University Press.

U. S. Bureau of Labor Statistics. (2000).United States Labor Department. Washington, DC.

Vannatta, R. A., & Beyerbach, B. (2000). Facilitating a constructivist vision of technology integration among education faculty and preservice teachers. Journal of Research on Computing in Education, 33(2), 132-147.

Wald, J. P. & Castleberry, M. (2000). *Educator as learners: Creating a professional learning community in your school.* Alexandria, VA., USA: Association for Supervision and Curriculum Development.

Warschauer, Mark. "Reconceptualizing the digital divide." First Monday Volume 7, number 7. (July 2002). Available: http://firstmonday.org/issues/issue7_7/warschauer/index.html communities: An investigation of the educational applications. In Townsend & Atcheson (Co-chair), *Bringing synergy to leadership.* Symposium conducted at the Summer Leadership Institute at the University of Lethbridge, Lethbridge, ABWhelan, C. S., Frantz, C., Guerin, J., & Bienvenu, S. (1997). A qualitative evaluation of

statewide networking infrastructure in education project. *Journal of Research on Computing in Education, 29,* (4), 403-422.

Warschauer, M., (2003). *Technology and social inclusion: Rethinking the digital divide*. Cambridge, MA: The MIT Press.

Warschauer, M., Knobel, M., & Stone, L., (2004). Technology and equity in schooling: Deconstructing the digital divide. *Educational Policy, 18*(4), 562-588.

Whitehead, B.

Warschauer, M. (2006). *Laptops and Literacy: Learning in the Wireless Classroom.* New York: Teachers College Press.

Washington State Institute for Public Policy. (2002). *Washington State's Implementation of Functional Family Therapy for Juvenile Off enders: Preliminary Findings* (No. 02-08-1201). Olympia, WA: Washington State Institute for Public Policy.

Willis, J. (2006). Creating a working model for technology integration through a lesson planning webquest. *Electronic Journal for the Integration of Technology in Education*, 5. Retrieved July 14, 2006, from http://ejite.isu.edu/Volume5/Willis.pdf

Wilson, V. B. (2003). *The shift to digitized teaching and learning: The leadership story*. Unpublished doctoral dissertation, The University of Virginia, Charlottesville.

Winter, S. G., & Szulanski, G. (2001). Replication as Strategy. *Organization Science, 12*(6), 730-743.

Yoklic, D. (1995). Issues in implementing technology in education: Curriculum reform. Retrieved July 16, 2008, from http://www.ic.arizona.edu/ic/imp.tech/curr.html

Zucker, A. A. (2008). Transforming schools with technology: How smart use of digital tools helps achieve six key education goals. Cambridge, MA: Harvard Education Press.

Zucker, A. A. (2008). The future of online high schools. Teachers College Record, www.tcrecord.org, ID number 15405.

Zucker, A. A. (2008). Smart thinking about educational technology. Education Week, 27:31 (April 2), 28-29.

APPENDIX A: RESEARCH DESIGN AND METHODOLOGY

A review of the literature revealed numerous studies on high school reform with regards to school leadership and the role of the principal in bringing about change; however, there was almost no discussion of the role teacher leaders' play in deploying and implementing one-to-one laptop use by students and teachers. Therefore, in examining the purpose of this study, it was clear that a phenomenon existed that warranted an in-depth, detailed study. My purpose was to understand and explain a phenomenon (Patton, 1990). This analysis utilized qualitative methods to discover the emergent teacher leadership story of seven participants within the context of their individual and collective experiences over the course of one school year.

To expand the limited body of knowledge about teacher leadership challenges in the implementation of a comprehensive one-to-one laptop deployment, open-ended interviews were utilized to provide direct quotations from teachers who have lived this experience. This direct feedback served as the basic source of raw data, revealing the participants' depths of emotion, knowledge of the phenomenon, reflections upon events, experiences, and basic perceptions of the process (Patton, 1990). Thus, this qualitative study was conducted in natural settings using verbal descriptions resulting in a rich, descriptive story.

Phenomenological inquiry using qualitative and naturalistic approaches to understand this unique human experience provided a structure to capture multiple realities (Lincoln & Guba, 1985) of the target population. Each participant had a unique

perspective on his/her role as a high school teacher in leading a massive technology deployment and integration. The emerging data and resulting story of *all* the participants offered evidence to inform practice and suggest further research.

For this study, I worked closely with seven high school teacher leaders at one high school in a small town outside a large urban area. The study was largely exploratory in nature, although I had some preconceived ideas with regards to how the teachers participating would accept and navigate the challenges of a full scale digital conversion. It was critical for me to develop a basic description of the process teachers underwent while focusing on the objective of the case study to address the "how" and "why" questions. I preferred this approach because I had the opportunity to utilize multiple sources of information. Given my previous job at the district level and my relationship with the high school principal, I already had access to many documents, archival records, and physical artifacts that I believe enriched this study.

I had to be very careful to suspend all judgments as I spent numerous hours interviewing and observing the participating teachers. Having been a successful high school teacher, principal, state level official and district supervisor, this task was difficult but one that I evaluated and reflected upon daily. I had to make a concerted effort to acknowledge all preconceived ideas that I had in order to systematically analyze the data found during my interviews and observations. I used a zigzag process of being out in the field to gather information, analyze the data, return to the field for more information, analyze the data, and so forth.

My approach during the Case Study used observations, open-ended interviews, emails, and document sources. Different data collection strategies were used to address each of the research questions and each question was examined in multiple ways. My purpose in collecting open-ended information was to elicit from teachers a deeper and richer discussion about all facets of the teachers' role in the Digital Conversion of Teaching and Learning. Furthermore, the open-ended interviews solicited the teachers' perceptions of what they actually did each day and how students were responding to the reform/change. It should be noted that my observations and interviews did not capture the diversity of tasks every teacher was engaged in, but it did provide an indicator of key elements to which teachers attended in the daily operation of instruction in a school. The data from the document sources – Strategic Plan, School Improvement Plan, Digital Conversion Initiative Implementation Plan, Professional Development documentation and State Testing Data - were analyzed descriptively and then correlated with observations and open-ended interviews. Interviews, document source data, and observational data were then compared and contrasted to identify common patterns. Findings from the documents and the observational and open-ended information were then triangulated to compare and confirm all three sources of data.

Standard content analysis methodology was used to produce the themes which emerged from the interviews, documents and the observations. The findings were organized and grouped according to recurrent themes. They represented the most frequent issues raised so that conclusions, implications and recommendations could be drawn that

would provide insight into how to best implement a digital reform effort as a means to increase student achievement and transform the traditional high school environment.

The selected teachers were observed in their classroom setting three different times for approximately forty-five minutes each observation over the course of the school year. Field notes were taken during the observation period using the observation protocol (Appendix L). All field notes were reviewed and analyzed looking for themes and evidence consistent with teacher accounts given during interviews. The observation field notes were also used to produce additional interview questions. Each teacher leader was interviewed individually three times, in a small group setting five times and in a large group setting with all participants present two times during this study. In order to protect the teachers time, each interview was prearranged and lasted from one hour to one and a half hour in length. Both formal and informal interviews were utilized. Teachers were encouraged to share any and all information, feelings, frustrations and success stories. No topic was off limits for discussion. The interviews were audio-taped and transcribed verbatim. Email was used as a means of communication between me and the teacher participants. Email was used as a means for teachers to document and communicate immediate perceptions, stories, or frustrations between interview and observation periods.

All teachers at J.E. Dennis High School were orally invited to participate in the study at a faculty meeting. They were invited to participate on a voluntary basis and were informed of the topic and purpose of the research. Observation and interview expectations were clearly defined. Confidentiality was also explained, as well as the need for a diverse group of participants with regards to experience, ethnicity, and gender. The

selection process by the principal and me was explained, as well as the benefits of gaining personal reflective insight into the reform effort, the ability to develop closer professional relationships with colleagues, and the ability to help future generations of teachers by being teacher participants. Teachers would also gain personal reflective insights into the reform effort, which would help in lesson planning, design, and delivery of instruction.

Teachers were asked to email or contact me if interested in participating in the research project. Teacher participants were selected to insure that the sample included: male/female representation; race/ethnicity representation; varied levels of teaching experience; and academic and non-academic subject teachers. The high school principal and I selected the participants using the inclusion criteria listed above.

Research Questions

The following research questions will be addressed:

1. What role do teacher leaders' play in deploying and implementing one-to-one laptop use by students and teachers?
2. What barriers do teacher leaders' face when implementing a digital conversion and what methods or strategies are used to overcome the barriers?
3. How do teachers experience the conversion? What is their perspective on the process and implementation?
4. What change processes must teachers undergo in order to successfully implement a complete digital conversion?

5. How does a digital conversion reform change the physical structure and design of the traditional high school classroom and/or building?
6. How does teacher instruction change once students have access to laptops 24/7?
7. How does technology affect curriculum and pedagogy at the high school level? Within professional learning communities?
8. How does one-to-one laptop access improve students' and teachers' engagement and motivation?
9. What are the essential components necessary to implement a successful 1:1 digital conversion?

Positionality and Ethics

I have been a successful high school teacher, middle school teacher, and assistant principal at all three levels – elementary, middle and high, as well as a nationally recognized high school principal, a supervisor at the state department for eighty-four low performing priority high schools, an executive director of secondary education and CTE – an Assistant Superintendent level position, a coach for beginning principals, an educational consultant, and an adjunct educational leadership professor. My love and passion has always been at the high school level. Under my leadership, I had the privilege of taking a traditional high school student base from 56% to over 85% proficient in a five year period. I had the opportunity to implement many new reform strategies to help the high school student population grow academically. The one area that I did not see grow during my tenure as a high school principal or as a high school supervisor was that of student and teacher engagement and motivation.

I have watched the digital world explode in the 21st century through the eyes of students each and every day, yet I have seen no real change taking place inside the walls of the 1950's high school. I have repeatedly watched teacher leaders leaving the school premises exhausted from playing the role of "sage on the stage" with no real excitement left for teaching and learning. In my mind, something needs to change or public education as we now know it will be a thing of the past. More and more students will continue to opt out of high school. Thus, my desire emerged to obtain my doctorate, seek new ways to transform public education and reform the teaching and learning process.

I agree with the constructivist viewpoint that concepts and theories are *constructed* by researchers out of stories that are constructed by research participants who are trying to explain and make sense out of their experiences and/or lives, both to the researcher and themselves. Out of these multiple constructions, I hope to construct knowledge (Corbin and Strauss, 2008).

Schawndt (1998) says that constructivism means that human beings do not find or discover knowledge so much as construct or make it. We invent concepts, models, and schemes to make sense of experience and, further, we continually test and modify these constructions in light of new experience (p. 237). Glense (2006) believes that this paradigm maintains that human beings construct their perceptions of the world and that no one perception is "right" or more "real" than another. I personally like this definition as it captures my postmodernist new ethnography approach to research.

Coming from a teaching and administrative background of over twenty years, I want to develop knowledge that will guide practice. In drawing upon my Pragmatist and

Interactionist theoretical orientations and keeping with the social justice aim of feminist research (Oleson, 1998), I want to bring about social change and make persons' lives better. Specifically, I want my research to provide knowledge that can help make teaching and learning relevant, rigorous, engaging, and motivational for both teachers and students. I want to research a strategy aimed at "syncing" with the "iKid."

My hope is that in telling these teachers' stories, people will understand the physical, emotional, and moral obligations that we as educators hold with regard to school reform and eliminating the digital divide. I agree with the feminists in that we do not separate who we are as persons from the research and analysis that we do. Therefore, I understood that I needed to be self-reflective about how I influenced the research process and, in turn, how it influenced me. Glesne (2006) reminds me that no matter how I view my role as a qualitative researcher that deep relationships will form with my research participants and that their privacy is not only expected but essential to my learning the truth during this conversion process. After having lived this research experience only one word comes to mind…Amen!

APPENDIX B: DEFINITIONS

24/7. The term, 24/7, means around the clock use of the computer, thus access to information 24 hours a day and seven days a week.

ANGEL. www.angellearning.com/ A learning management system used to create virtual learning environments for online learning and to offer hybrid or blended (web-enhanced) classes. ANGEL is used by K – 12 students to create an electronic portfolio of their digital work.

Atomic Learning**.** www.atomiclearning.com Atomic Learning provides web-based software training and curriculum resources for more than 110 applications used by students and teachers.

Capturing Kids Hearts. Capturing Kids' Hearts professional development program is designed to build trust and respect in school communities through student and teacher social contracts.

ClassScape. http://classscape.ncsu.edu/ ClassScape is an online formative assessment system that facilitates learning by focusing on curricular objectives.

Digital content. The term, digital content, refers to curriculum content and activities that can be accessed electronically.

Digital Conversion Initiative. The term, digital conversion initiative, refers to the process of changing traditional teaching practices such as paper and pencil to 21st Century digital media delivery of instruction using the World Wide Web in a wireless infrastructure.

Digital divide. The term, digital divide, means the difference of computer access between the affluent and the economically deprived.

Discovery Education. www.discoveryeducation.com Discovery Education provides engaging digital resources with the goal of increasing student achievement, and connecting classrooms and families to a world of learning by harnessing the proven power of high-quality video content for instruction.

EVAAS. EVAAS is a customized software system is now available to all NC school districts. EVAAS (Education Value-Added Assessment System) provides diagnostic reports quickly to district and school staff.

iWork. http://www.apple.com/iwork/ iWork features three powerful programs – Pages, Numbers and Keynote providing students and teachers' necessary tools for word processing, spreadsheets and presentations.

iLife. http://www.apple.com/ilife/ iLife is a suite of multimedia software applications that enable the user to create organize, view and publish digital content, such as pictures, movies, music, and web pages.

Keynote. http://www.apple.com/keynote/ Keynote is a presentation software application developed as a part of the iWork productivity suite by Apple Inc.

Leopard Features. http://www.apple.com/macosx/features/ Leopard has over 300 new features including those present in iCAL, Dictionary, Voice Over, Dashboard, Parental Controls, Spaces, Spotlight and Time Machine.

MacBook. The term, MacBook, refers to a battery-powered laptop that is 1.08 inches thin and weighing only 5 pounds that can connect to the school network and to the Internet anywhere in the school building or in the community.

NCWise Owl**.** www.ncwiseowl.org This site houses many online subscription databases for grades K-12 providing invaluable reference materials for research across the curriculum.

N-line wireless infrastructure. The term, N-line wireless infrastructure, means a wireless network that provides state of the art coverage and bandwidth to accelerate the adoption

of mobile applications and provide the opportunity for wireless to become the primary access method.

NetTrekker**.** www.nettrekker.com Over 180,000 of the best online resources aligned with state standards and carefully selected by educators to ensure it is safe, age-appropriate and 100% academically relevant.

One-to-one mobile computing. The term, one-to-one mobile computing, means a ratio of one computer per student for use.

Pages. http://www.apple.com/pages/ A word processor and page layout application developed by Apple Inc. and a part of the iWork productivity suite.

SMART Board. The term, SMART Board, means to combine the simplicity of a whiteboard with the power of a computer. The touch-sensitive display connects to your computer and digital projector to show your computer image. You can then control computer applications directly from the display, write notes in digital ink and save your work to share later.

Wireless. The term, wireless, refers to a wireless network that operates through multiple radio base stations called airports.

APPENDIX C: INITIAL INTERVIEW QUESTIONS

1. How long have you been teaching and in what capacity?
2. Tell me about your decision to go into the teaching profession?
3. What do you like most about teaching?
4. What do you like least about teaching?
5. What keeps you in the teaching profession given the drawbacks just mentioned?
6. What is the school's philosophy or set of belief statements regarding teaching and learning? Regarding student achievement?
7. What are your particular beliefs and personal philosophy regarding teaching and learning?
8. How would you describe the teaching faculty at your high school?
9. How would you describe the students who attend your high school?
10. How do you feel about the District's 21st Century Digital Conversion Initiative?
11. What are your particular beliefs and personal philosophy regarding the shift to digital teaching and learning?
12. What role do you feel teachers play in this digitized shift?
13. What concerns do you have regarding this shift? What challenges does this shift bring?
14. Are there any additional concerns or comments that you would like to share at this phase of the initiative?

Curriculum Resources **Appendix D**					
Name	**Web Address**	**Target Audience/ Grade**	**Alignment**	**Access**	**Description**
Atomic Learning	atomiclearning.com	student, parents and teachers	n/a	District-wide access (currently signed up for four months)	Web-based on-line training and video training on +110 software applications. Supplements curriculum
Apex Learning	apexlearning.com	Grades 6-12	Standards based; integrated assessments		Digital curriculum for differentiated instruction
Renzulli Learning	renzullilearning.com	Gifted and talented	Not aligned		Enrichment and differentiated activities
Explore Learning	explorelearning.com	Grades 6-12			Math & Science Gizmos. Supplemental modular instructive simulations in math and science that support state and nat'l standards
Excel Math	excelmath.com	Grades K-6	Lessons correlate to state standards by objective	Purchase class or student packages. **Not online service**	Uses spiral approach (Everyday Math)
Intel®Education Initiative		K-12	n/a	Free	Online tools and resources for teachers
ThinkFinity	thinkfinity.org	K-12 and teachers	No, except for link to LearnNC for lesson plans		Content and professional development. Includes 55,000 standards-based lesson plans, interactive tools and reference materials.
SASinSchool	sasinschool.com	Grades 8-12		Provided by state legislature	Standards-based online exercises, quizzes
Angel Learning	angellearning.com	Students, teachers and parents	Yes, but we must loaded from state or other sites		Portal offering variety of online services, including professional development, online classes, assessments. Parent portal for tracking grades, homework, etc.

Curriculum Resources **Appendix D**					
Name	**Web Address**	**Target Audience/ Grade**	**Alignment**	**Access**	**Description**
Everyday Math Resources	www.center.k12.mo.us/Edtech.edm	Teachers			Free Lessons, activities, links to teaching Everyday Math
Henrico County Parent Tips Site	http://staffdev.henrico.k12.va.us/parents/index.html	Parents	n/a		Website link to common parent technology questions
Henrico County Teacher Site	http://teachers.henrico.k12.va.us/elearning/index.html	Teachers	n/a		Links to online resources
Henrico County Internet Safety Page	http://staffdev.henrico.k12.va.us/students/safety/Home.html	Students, parents and teachers	n/a		Links to information on staying safe on the Internet
Henrico County Parent technology orientation Site	http://staffdev.henrico.k12.va.us/parents/assessment.htm	Parents	n/a		Information requiring parents to complete an i-book orientation
Green County, NC	http://www.gcsedu.org/site_view_resources.aspx				General Information about teaching via technology
AIMSweb	http://www.edformation.com/	K-8		Annual subscription by site	On-line curriculum based measurement testing and progress report system (assessments)
OdessyWare	http://www.odysseyware.com/	3-12	correlated to state standards for benchmarking using the Align to Achieve + academic benchmarking.		On-line curriculum (50 courses currently available). Includes tests, and grade reporting

Curriculum Resources **Appendix D**					
Name	**Web Address**	**Target Audience/ Grade**	**Alignment**	**Access**	**Description**
StudyWiz	http://www.studywizspark.com/	K-12 Students, teachers, parents			Portal…assessments, classroom management, grades and homework access. First and only Dynamic LearnSpace for K-12 education, enhances mobile learning through iPhone, iPod and iPod touch customization.
NC WiseOwl	http://www.ncwiseowl.org/	K-12 students, parents & teachers		Free	On-line databases of information of students, parents and teachers. Web links and online professional development
NetTrekker	http://www.nettrekker.com/	K-12 students, parents & teachers		District-wide subscription	Customized Search engine for educational resources
Discovery Education	http://www.discoveryeducation.com/	K-12 students, parents & Teachers		annual subscription	On-line video streaming via and other resources. Searchable by state objective.
EducationCity	Educationcity.com (currently set up for trial use)	K-6 students, teachers	Yes, aligned to state standards. Can select games by objective	Annual Site License fee per module (Language/ Math/Science). K-2 $245; 3-5 $245, 6 $80	On-line games in Math, Language Arts and Science. Includes SuccessTracker which monitors/reports on student/class progress. Can purchase Homework module that allows students to access site from home ($4 per student). Can use with White Boards
Math Playground	mathplayground.com			Free	On-line Math Games

APPENDIX E: PROFESSIONAL DEVELOPMENT

One to One Laptop Initiative
Professional Development
December 12, 2007 --- Advanced Users

Times listed are approximate and subject to change based on the needs of the group.

8:00 - 8:15: Welcome

8:15 - 9:00: Introduction to the Language Arts Bundle Software Part I: Get a Clue
Hands on experience working with this vocabulary development software. "Get A Clue® revolutionizes vocabulary study using the WATS™ ("Words And Their Stories") System — a vocabulary acquisition process based on inductive reasoning. WATS requires students to apply etymology and critical thinking skills (application, analysis, synthesis) in a sequential, inductive process to develop true understanding of word meaning." http://www.getaclue.com/

9:00-9:30: Introduction to the Language Arts Bundle Software Part II: Vital Source Bookshelf:
A demonstration of this collaborative reading tool. VitalSource Bookshelf is the most advanced e-book software in the world. Now, your friends' notes and highlights can even show up right in your copy of the book. The world's best known titles—textbooks, study guides, best sellers, classics—are becoming available in the patented VitalBook format. http://www.vitalsource.com/index/bookshelf

9:30 – 9:45: Break

9:45-11:00: Intro to iMovie 08
Teachers will work with the built in iSight camera and iMovie 08 to create a video book report.

11:00-11:30: Introduction to iWork
An opportunity to explore the templates in Pages that help support the creation of newsletters, journals, brochures, reports, scripts and more.

11:30 - 12:00: Lunch

12:00 – 12:45: iWork Continued: Working with Keynote
Designing Keynote slides; Using Smart Builds; Animating Slides; Recording narrations; Adding music to a Keynote presentation; Opening PowerPoint presentations in Keynote; Exporting Keynote presentations as PowerPoint; Using Keynote slides as Podcast graphics; Saving Keynote files as QuickTime files for use in iWeb

12:45-2:45 (Break during this time period): Working with iWeb:
Time to create a class webpage to feature projects students have been working on. Teachers should bring photos, slide shows, movies and ideas of content they would like to feature on their site. (Topics, URLs, assignments)

2:45 - 3:00: Sharing with the group.
Teachers will have an opportunity to share their websites with the rest of the cohort.

One to One Laptop Initiative
Professional Development
December 11, 2007 --- Novice Users

Times listed are approximate and subject to change based on the needs of the group.

8:00 - 8:15: Welcome

8:15 - 9:15: Review of the Mac

- Short cuts for working in the OS
- Understanding the Home Area
- Working with the Hard Drive
- Saving/Finding Files

9:15-10:00: Introduction to the Language Arts Bundle Software Part I: Get a Clue
Hands on experience working with this vocabulary development software.
"Get A Clue® revolutionizes vocabulary study using the WATS™ ("Words And Their Stories") System — a vocabulary acquisition process based on inductive reasoning. WATS requires students to apply etymology and critical thinking skills (application, analysis, synthesis) in a sequential, inductive process to develop true understanding of word meaning."
http://www.getaclue.com/

10:00 - 10:15: Break

10:15 - 10:45: Introduction to the Language Arts Bundle Software Part II: Vital Source Bookshelf:
A demonstration of this collaborative reading tool. VitalSource Bookshelf is the most advanced e-book software in the world. Now, your friends' notes and highlights can even show up right in your copy of the book. The world's best known titles—textbooks, study guides, best sellers, classics—are becoming available in the patented VitalBook format. http://www.vitalsource.com/index/bookshelf

10:45-11:30: Introduction to iWork
An opportunity to explore the templates in Pages that help support the creation of newsletters, journals, brochures, reports, scripts and more.

11:30 - 12:00: Lunch

12:00 – 2:45: (Break during this time period) Planning activities for second semester
Teachers will work independently, or in small groups to plan activities to incorporate technology into their lessons. We'll start with their curriculum, look at the activities they presently work with and look for ways to enhance those with technology.

2:45 - 3:00: Sharing with the group. An opportunity for teachers to share the ideas they've come up with and learn from those that others have created.

APPENDIX F: VISION, GOALS AND EXPECTATIONS

J.E. Dennis High School
21st Century Digital Conversion Initiative

Future Ready Students for the 21st Century. Every public school student will graduate from high school, globally competitive for work and postsecondary education and prepared for life in the 21st Century. *Mission of the North Carolina State Board of Education*

What Is 1 to 1 Learning?
By definition, 1 to 1 learning involves one student, one computer, one interactive, personalized learning experience in a wireless environment with anytime access to the Internet (24 hours per day, 7 days per week) guided by highly qualified teachers and informed parents/guardians.

Why 1 to 1 Learning?
Today's learners have grown up in a digital world with cell phones, computers, video entertainment, iPod technology, and the Internet. They are hyper communicators, goals planners, multi-taskers, expert technologists, and active learners. Yet, students experience a huge disconnect every day when they walk into a classroom. A classroom where pencil, paper, lecture, textbook, review, and test are still the norm. Engaging these students and making education relevant once again is critical. All learning is highly personal. A laptop in the hands of each student builds on that concept. High-tech tools serve as an extension of the students' thoughts and learning process. They provide a place to explore ideas, research questions, test hypotheses, compose thoughts, and come to conclusions—in other words, to learn. 1 to 1 learning adds authenticity into the mix, enabling students to explore rigorous academic concepts in the context of the world around them.

Goals for Digital Conversion Initiative:

- Attainment of 21st century skills (e.g., critical thinking, problem-solving, team work, communications skills and Information & Communication Technology literacy);
- Improved writing skills, academic achievement, and student attitudes and work habits;
- Increases in the quantity and improvements in the quality of student work;
- Increases in student motivation, engagement, interest, organization, and self-directed learning;
- Improvements in student attendance and reduced student attrition;
- Improved student-teacher interaction and relations;
- Improvements in information and communication skills among students and teachers;
- Transformation of teacher practice;
- Increased teacher enthusiasm and retention;
- Increased professional productivity and greater collaboration among educators;
- Positive changes in the teaching and learning environment; and increased parental and community involvement and improved home-school communication;
- Eliminating the digital divide;
- Preparing students for the world of work and/or college academic work;
- Preparing students to be lifelong learners.

Learning Anywhere in Real Time!

APPENDIX G: MASTER PLAN TEMPLATE SAMPLE

J.E. Dennis High School
21st Century Digital Conversion Initiative
"The Future is Today!"

SAMPLE MASTER PLAN PAGE - DEPLOYMENT

Category	*Deployment Activity Name*	*Start Date*	*Finish Date*	*Person Responsible*
Collection/Scheduled Maintenance				
Distribution				
Help Desk				
Imaging				
Insurance and Warranty				
Inventory				

APPENDIX H: ACCEPTABLE USE POLICY

Acceptable Use Policy

STUDENT ACCEPTABLE USE AND INTERNET SAFETY POLICY
(in accordance with Children's Internet Protection Act [CIPA] and North Carolina Public Law 106-554)

PURPOSE: J.E. Dennis School District provides all students' access to the Internet, network resources as well as laptop computers at designated graded levels, as a means to promote achievement and provide diverse opportunities during the educational experience. This policy provides guidelines and information about the limitations that the school imposes on use of these resources. In addition to this policy, the use of any school computer, including laptop computers, also requires students to abide by the JEDSD Technology Use Guidelines as stated in the Student Code of Conduct. Additional rules may be added as necessary and will become a part of this policy.

TERMS OF THE ACCEPTABLE USE AND INTERNET SAFETY POLICY
Specifically, the student: Will adhere to these guidelines each time the Internet is used at home and school.

Will make available for inspection by an administrator or teacher upon request any messages or files sent or received at any Internet location. Files stored and information accessed, downloaded or transferred on district-owned technology are not private.

Will use appropriate language in all communications avoiding profanity, obscenity and offensive or inflammatory speech. Cyber Bullying such as personal attacks and/or threats on/against anyone made while using district owned technology to access the Internet or local school networks are to be reported to responsible school personnel. Rules of netiquette should be followed conducting oneself in a responsible, ethical and polite manner.

Will follow copyright laws and should only download/import music or other files to a district owned technology that he/she is authorized or legally permitted to reproduce, or for which he/she has the copyright.

Will never reveal identifying information, files or communications to others through email or post to the Internet.

Will not attempt access to networks and other technologies beyond the point of authorized access. This includes attempts to use another person's account and/or password.

Will not share passwords or attempt to discover passwords. Sharing a password could make you liable if problems arise with its use and subject to disciplinary action.

Will not download and/or install any programs, files, or games from the Internet or other sources onto any district owned technology. This includes the intentional introduction of computer viruses and other malicious software.

Will not tamper with computer hardware or software, unauthorized entry into computers, and vandalism or destruction of the computer or computer files. Damage to computers may result in felony criminal charges.

Will not attempt to override, bypass or otherwise change the Internet filtering software or other network configurations.

Will not access or attempt to access instant messages, chat rooms, social networking sites, forums, e-mail, message boards, or host personal web pages, except school-approved, teacher-supervised filtered Internet communication.

Will use technology for school-related purposes only during the instructional day while refraining from use related to commercial, political or other private purposes.

Will not make use of materials or attempt to locate materials that are unacceptable in a school setting. This includes, but is not limited to pornographic, obscene, graphically violent, or vulgar images, sounds, music, language, video or other materials. The criteria for acceptability is demonstrated in the types of material made available to students by administrators, teachers, and the school media center. Specifically, all district owned technologies should be free at all times of any pornographic, obscene, graphically violent, or vulgar images, sounds, music, language, video or other materials (files).

Will not connect any personal technologies such as laptops and workstations, wireless access points and routers, printers, etc to district owned and maintained local, wide or metro area network. Connection of personal devices such as iPods, smartphones, PDAs and printers is permitted but not supported by JEDSD technical staff. Home Internet use and cost is the responsibility of the student both in cost and configuration. Dial-up is not an option as recent laptop configurations do not include modems.

Will keep laptop secure and damage free. Each laptop is issued with a protective book bag style case. Use of provided laptop bags is required at all times. Follow these general guidelines: Do not loan your laptop. Do not leave the laptop in vehicle. Do not leave your laptop unattended. Do not eat or drink while using the laptop or have food or drinks in close proximity to the laptop. Do not allow pets near your laptop. Do not place the laptop in floor or in sitting area such as couches or chairs. Do not leave the laptop near table or desk edges. Do not stack objects on top of your laptop. Do not leave the laptop outside or use near water such as a pool. Do not check the laptop as luggage at the airport.

Will back up data and other important files regularly. JEDSD will at times maintenance the laptops by imaging. All files not backed up to server storage space or other storage media will be deleted during these processes. Students are ultimately responsible for backing up all personal files on their own storage media.

By signing this agreement you agree to abide by the conditions listed above and assume responsibility for the care and proper use of JEDSD technology, including personally backing up personal data. JEDSD is not responsible for any loss resulting from delays, non-deliveries, missed deliveries, lost data, or service interruptions caused by user errors, omissions or reasons beyond the district's control. Information obtained via the internet and other sources using JEDSD technologies is not guaranteed as to its accuracy or quality. I understand that should I fail to honor all the terms of this Policy, future Internet and other electronic media accessibility may be denied. Furthermore, I may be subject to disciplinary action outlined in the JEDSD Student Code of Conduct and, if applicable, my Laptop computer may be recalled. By signing below, I give permission for the school to allow my son or daughter to have access to the Internet under the conditions set forth above.

APPENDIX I: 21ST CENTURY TECHNO SAVVY TEST

Synching up with the iKid!

21st Century Techno Savvy Test

1. **Skype -** is a software program that allows users to make video conferencing calls over the Internet free of charge.

2. **Twitter -** is a free social networking and micro-blogging service that allows users to send "updates" or "tweets"; text-based posts, to the Twitter website, via short message service on a cell phone allowing instant messaging on Face book.

3. **Blogs -** is a website, usually maintained by an individual, with regular entries of commentary, descriptions of events, or other material such as graphics or video.

4. **Wikis -** is a collection of web pages designed to enable anyone who accesses it to contribute or modify content. For example, the collaborative encyclopedia Wikipedia is one of the best known wikis. http://en.wikipedia.org/wiki/Wiki - cite_note-Britannica-1#cite_note-Britannica-1

5. **Podcast** – is a series of digital-media files which are distributed over the Internet using syndication feeds for playback on portable media players and computers. Podcasting is becoming increasingly popular in education. Podcasts enable students and teachers to share information with anyone at any time. An absent student can download the podcast of the recorded lesson.

6. **iPod -** is a brand of portable media players designed and marketed by Apple Inc. It can also serve as external data storage devices. Apple has sold over 140 Million iPods to date.

7. **iTunes-**is a digital media player application that allows the user to manage audio and video on a personal computer.

8. **Kindle -** is an electronic book (e-book) device launched in the U.S by Amazon.com in Nov. 2007.

9. **2nd Life** – ***(SL)*** is an Internet-based virtual world. Residents (called Avatars) can explore, meet other Residents, socialize, participate in individual and group activities, have virtual sex, and create and trade items (virtual property) and services from one another. At the end of March 2008, approximately 13 million accounts were registered.

10. **RSS -** is a Web feed formats used to publish frequently updated content such as blog entries, news headlines, and podcasts. The RSS reader checks the user's subscribed feeds regularly for new content, downloading any updates that it finds and provides a user interface to monitor and read the feeds. Example - http://www.myfoxwghp.com

11. **Google Alerts –** is a service offered by search engine company Google which notifies its users (by email) about the latest web and news pages of their choice. www.google.com/alerts

12. **Social Networking -** uses software to build online social networks for communities of people who share interests and activities or who are interested in exploring the interests and activities of others. MySpace and Face Book are currently the most popular.

13. **IM -** Instant Messaging is a form of real-time communication between two or more people based on typed text. The text is conveyed via computers connected over a network such as the Internet.

14. **Web 2.0 -** is a trend in the use of World Wide Web technology and web design that aims to facilitate creativity, information sharing, and, most notably, collaboration among users.

15. **Craigslist -** provides local classifieds and forums for jobs, housing, for sale, personals, services, local community, and events.

16. **Flickr –** is an image/video hosting website, web services suite and an online community platform. It is a popular Web site for users to share personal photographs. www.flickr.com

17. **PayPal -** is an e-commerce business allowing payments and money transfers to be made through the Internet. It serves as an electronic alternative to traditional paper methods.

18. **Wii -** is the fifth home video game console released by Nintendo. A distinguishing feature of the console is its wireless controller which can be used as a handheld pointing device and can detect acceleration in three dimensions. 24.45 million have been sold as of March 31, 2008 Worldwide.

19. **Geocaching -** an outdoor treasure-hunting game in which the participants use a GPS receiver or other navigational techniques to hide and seek containers anywhere in the world.

20. **Del.ici.ous -** a social bookmarking website -- the primary use is to store your bookmarks online, which allows you to access the same bookmarks from any computer and add bookmarks from anywhere, too. Writing an article? Researching an industry? Slaving away on your dissertation? Use this to keep track of all the source materials and commentary that you find online.

APPENDIX J. THE DIGITAL NATIVE'S LANGUAGE

The Digital Native's Language

100 Acronyms Every Educator/Parent Should Know

1. AEAP - As Early As Possible
2. 2nite - Tonight
3. ALAP - As Late As Possible
4. AWGTHTGTTA - Are We Going To Have To Go Through This Again
5. B4YKI - Before You Know It
6. BRB - Be Right Back
7. BRT - Be Right There
8. CWYL - Chat With You Later
9. C-P - Sleepy
10. CYT or SYT - See You Tomorrow
11. E123 - Easy as 1, 2, 3
12. EM? - Excuse Me?
13. EOD - End Of Day
14. F2F - Face To Face
15. FOAF - Friend Of A Friend
16. HAK - Hugs And Kisses
17. ILU or ILY - I Love You
18. IMNSHO - In My Not So Humble Opinion
19. J/C - Just Checking
20. KOTL - Kiss On The Lips
21. L8R - Later
22. LD - Long Distance
23. LMK - Let Me Know
24. LOL - Laugh Out Loud
25. NAZ - Name, Address, Zip
26. N-A-Y-L - In A While
27. NM - Never Mind or Nothing Much
28. OTP - On The Phone
29. QT - Cutie
30. RN - Right Now
31. ROTFL - Rolling on the Floor Laughing
32. RU - Are You...?
33. SITD - Still In The Dark
34. SMIM - Send Me an Instant Message
35. SMEM - Send Me an E-Mail
36. SO - Significant Other
37. SWDYT - So What Do You Think?
38. TOM - Tomorrow
39. TTFN - Ta Ta for Now
40. UR - You Are..?
41. WFM - Works For Me
42. WTH - What The Heck
43. WYRN - What's Your Real Name?
44. 143 - I love you
45. 182 - I hate you
46. 459 - it also means I love you
47. 420 - it refers to marijuana
48. ADR or addy - Address
49. ASL - Age/Sex/Location
50. CD9 - it means Code 9 = parents are around
51. GYPO - Get Your Pants Off
52. KFY - Kiss For You
53. KPC - Keeping Parents Clueless
54. LMIRL - Let's Meet In Real Life
55. MOS - Mom Over Shoulder
56. NMU - Not Much, You?
57. P911 - Parent Alert

58. PAL - Parents Are Listening
59. PAW - Parents Are Watching
60. PIR - Parent In Room
61. POS - Parent Over Shoulder
62. 2moro - Tomorrow
63. 2nite - Tonight
64. BRB - Be Right Back
65. BTW - By The Way
66. B4N - Bye For Now
67. BCNU - Be Seeing You
68. BFF - Best Friends Forever
69. DBEYR - Don't Believe Everything You Read
70. FWIW - For What It's Worth
71. GR8 - Great
72. ILY - I Love You
73. IMHO - In My Humble Opinion
74. IRL - In Real Life
75. ISO - In Search Of
76. J/K - Just Kidding
77. L8R - Later
78. LOL - Laughing Out Loud -or- Lots Of Love
79. LYLAS - Love You Like A Sister
80. MHOTY - My Hat's Off To You
81. NIMBY - Not In My Back Yard
82. NP - No Problem
83. NUB - it stands for a new person
84. OIC - Oh, I See
85. OMG - Oh My God
86. OT - Off Topic
87. POV - Point Of View
88. RBTL - Read Between The Lines
89. SWAK - Sealed With A Kiss
90. TFH - Thread From Hell
91. THX - Thanks
92. TLC - Tender Loving Care
93. TMI - Too Much Information
94. TTYL - Talk To You Later
95. TYVM - Thank You Very Much
96. VBG - Very Big Grin
97. WEG - Wicked Evil Grin
98. WTF - What The F***
99. WYWH - Wish You Were Here
100. XOXO - it means Hugs and Kisses

We must change for our kids!

APPENDIX K: CONSENT TO ACT AS A HUMAN PARTICIPANT

Project Title: ***Syncing up with the iKid: Portrait of seven High School Teacher Leaders Transforming the American High School through a Digital Conversion of Teaching and Learning.***

Project Director: Ann W. Davis

Participant's Name:

As a participant in this research, you are entitled to know the nature of my research. You are free to decline to participate, and you are free to stop the interview or withdraw from the study at any time. There is no penalty for withdrawing your participation. You are free to ask any questions at any time about the nature of the research and the methods I am using. Your suggestions and concerns are important to me. Please feel free to contact me at any time with questions.

What is the study about?
The purpose of this study is to investigate and determine the change and reform process through research of a traditional high school undergoing a 21st century digital conversion by a selected group of teacher leaders in order to improve classroom instructional practices.

Why are you asking me?
I am asking you to participate as one of seven teacher leaders to give voice to the classroom teachers' emerging experiences, including challenges, successes, and the lessons learned during the actual implementation of a 21st Century Digital Conversion. The number seven was selected to give voice to the various departments on a traditional high school campus. A deliberate attempt has been made to allow for a diverse representative group of teachers with regards to experience, ethnicity and gender.

What will you ask me to do if I agree to be in the study?
If you agree to participate in the research study you will be observed in your regular classroom. You will also participate in interviews lasting from thirty to forty-five minutes and will be asked to use email as a communication device as desired for immediate sharing of successes, failures, issues and/or concerns. The research study duration will be from October 2008 to January 2009.

Is there any audio/video recording?
The interviews will be audio-taped and then transcribed. Because your voice will be potentially identifiable by anyone who hears the tape, your confidentiality for things you say on the tape cannot be guaranteed although the researcher will try to limit access to the tape as described below.

What are the dangers to me?
The Institutional Review Board at the University of North Carolina at Greensboro has determined that participation in this study poses minimal risks to participants. You may miss planning time for interviews and may have to complete job related duties in the evening on your own time. I will work with you to carefully schedule interview time which will minimize loss of your planning period time.

If you have any concerns about your rights or how you are being treated please contact Eric Allen in the Office of Research and Compliance at UNCG at (336) 256-1482. Questions about this project or your benefits or risks associated with being in this study can be answered by Dr. Rick Reitzug, UNCG faculty principal investigator who may be contacted at (336) 334-3460 or ucreitzu@uncg.edu.

Are there any benefits to me for taking part in this research study?
You may benefit from: developing closer professional relationships with colleagues; helping future generations of teachers; and gaining personal reflective insights into the reform effort, which may help in lesson planning, design, and delivery of instruction.

Are there any benefits to society as a result of me taking part in this research?
The education profession and society may better understand what elements of effective instructional practice contribute to transforming the American High School.

Will I get paid for being in the study? Will it cost me anything?
There are no costs to you or payments made for participating in this study.

How will you keep my information confidential?
All information obtained in this study is strictly confidential unless disclosure is required by law. The researcher shall safeguard all written information as well as audio tapes by keeping these items in a locked cabinet. Any discussions related to observations, interviews, and findings will be limited to the doctoral advisor setting at UNC-Greensboro. Pseudonyms will also be used in order not to reveal the identity of any research participants or their respective school. The student researcher has procured a secured (locked) filing cabinet where all data and materials will be stored at her home in Burlington, NC. Only the researcher has a key to this secure cabinet. The UNCG faculty principal investigator, Dr. Rick Reitzug, will maintain an original copy of the consent

forms in a locked filing cabinet on the UNCG campus. After five years, all audio tapes shall be deleted and then crushed. Likewise, all written documents related to this study, including consent forms, will be shredded. Electronic files shall be permanently deleted from the hard drive and recycle bin.

What if I want to leave the study?

You have the right to refuse to participate or to withdraw at any time, without penalty. If you do withdraw, it will not affect your in any way. If you choose to withdraw, you may request that any of your data which has been collected be destroyed unless it is in a de-identifiable state.

What about new information/changes in the study?

If significant new information relating to the study becomes available which may relate to your willingness to continue to participate, this information will be provided to you.

Voluntary Consent by Participant:

By signing this consent form you are agreeing that you read, or it has been read to you, and you fully understand the contents of this document and are openly willing consent to take part in this study. All of your questions concerning this study have been answered. By signing this form, you are agreeing that you are 18 years of age or older and are agreeing to participate, or have the individual specified above as a participant participate, in this study described to you by Ann W. Davis.

Signature: _____ Date: _____

APPENDIX L: OBSERVATION PROTOCOL

(Classroom observation: Gauging instructional climate & technology integration activities)

Date/Visit: _____ **Grade Level:** _____

Teacher/s: _____ **Period:** _____

Purposes: To get to know the teacher;
To help ask more informed questions in interviews;
To get a glimpse of technology integration into the teacher's curriculum and pedagogy;
To view the physical structure of the general classroom set-up;
To get a sense of student and teacher engagement in the classroom;
To observe professional collaboration

Content Area

English Language Arts ☐	Math ☐	Science ☐	Social Studies ☐	Health ☐	Specials ☐ Title	Elective ☐ Title

Learning Environment

Classroom ☐	Lab ☐	Media Center ☐	Auditorium ☐	Cafeteria ☐	Outside ☐	Gym ☐	Virtual ☐

Classroom Design

Rows ☐	Pods ☐	Centers ☐	Circle ☐	Other ☐ Explain

Student Applications

☐Word processing	☐Assessment	☐Web page
☐Newsletters	☐Database	☐Spreadsheet
☐E-mail	☐Scrapbook	☐Graphing
☐Simulation	☐E-Books	☐Tutorial
☐GIS	☐Chat	☐WebQuests
☐Hot lists	☐Subject sampler	☐Multimedia
☐On-line course	☐Web Inquiries	☐Discussion board
☐Video Conference	☐Graphic Organizers	☐Virtual field trips
☐AV streaming	☐Scavenger hunt	☐Integrated Learning System

Student Use of Resources

☐Desktops ☐Laptops ☐Printer
☐Handheld ☐Books / Print ☐Scanner
☐Internet ☐Camera ☐Digital projector
☐VCR / DVD ☐Camcorder ☐Speakers
☐TV-link ☐Microscopes ☐Probeware
☐Wireless ☐Tablet PC ☐GPS
☐Audio Player ☐Interactive Device ☐Interactive Whiteboard
☐Assistive Technology ☐Word Processor ☐Document Camera

Instructional Strategies

☐HOTS ☐Differentiated ☐Thematic
☐Facilitation ☐Learning styles ☐Research
☐Workshops ☐Interdisciplinary ☐Project-based
☐Drill and Practice ☐Cooperative Learning ☐Student- Centered
☐Multiple Intelligences ☐Computer-Assisted Instruction ☐Direct Instruction
☐Learning Centers

Assessment Instruments

☐Checklists ☐Reading logs ☐Observation
☐Portfolios ☐Retelling ☐Rubrics
☐Conferencing ☐Product specific. ☐Investigations
☐Open-ended questions ☐Self-assessment ☐Peer assessment
☐Teacher made test or quiz ☐Problem-solving logs ☐Assessment Cards

Student Levels of Engagement

☐Involved ☐Prepared ☐Focused
☐Withdrawn ☐Unprepared ☐Inattentive
☐Cooperative ☐Disruptive ☐Enthusiastic
☐Curious

Learning Outcomes: Using technology, students

☐Demonstrate and/or reinforce knowledge
☐ Communicate or depict subject matter
☐ Solve problems
☐ Conduct research
☐ Apply learning to real-world problems
☐ Self-monitor and self-assess

Teacher Description: (Demeanor, tone of voice….)

Teacher/Student Interactions: (Include how students are grouped, how students and teacher(s) move in the classroom, how transitions are handled; prominence of written and spoken rules; technology integration; discipline issues…)

Classroom Description:

Who is in the room? (Number of students, aides, parents, teacher(s), principal; Ethnicity, gender, observable special ed. or second-language learners…)

What is on the walls? (Students' academic and art work, rules, slogans, posters, teacher-created stuff, posters from lessons…)

What equipment/technology is in the room? (Computers, printers, overheads, digital cameras, probeware, phones, intercoms, quality and kind of furniture…)

What books or curricular materials are evident? (Reading corner, boxes or kits, tubs or blocks or math materials, learning toys…)

How is the room arranged? (Chairs desks, tables, rug space, teacher's desk, student space…Make a sketch if it helps.)

Instruction: (Choose one activity to focus on. A new activity starts when kids change grouping, or the subject is changed, or when materials/books change…)

Topic of the Activity:

Briefly describe the Activity:

Teacher/Student Roles: (What students and teacher do in this activity; how often the teacher compared to students; who initiates talk or inquiry; teacher's reactions to student activity; student talk, movement.)

How learning is assessed:

Materials:

Practice and Homework:

Additional Comments:

APPENDIX M: DIGITAL 1:1 STUDENT INSURANCE

J.E. Dennis School District will have a self-insured program to provide for theft, loss, damages and other repairs to the Apple Computers provided to the students of J.E. Dennis School District.

The fee will be $50 per year. It is payable when the computer is assigned to the student. A receipt will be given to the student/parent at the time of payment. A payment plan can be set up if a student is unable to pay the full fee upfront. Payments will be in the amount of $25 for each semester. It will be the individual school's responsibility to monitor and maintain the accounting record of the fees collected on installments. A spreadsheet, which will be placed in a shared folder to be accessed by the Technology Department, will be established for each school for students that are on installment payments. The spreadsheet will allow easy access to determine if a student is making timely payments on the insurance fee. It will also allow the Technology Department to hold a computer for repairs until the fee is up to date if needed. There will be no refunds of payments.

All collections will be submitted to Central Services. A separate account should be established at the school level to deposit the collections into. Monthly checks should be sent to Central Services to the attention of the Finance Officer along with a printout of the account. The funds will be maintained in an account in Local Current Expense that is separate from other funds. Funds will be used to provide for the repair and maintenance of the computers.

Willful and deliberate damages to the computers will cause J.E. Dennis School District to charge the student/parent the full cost of the replacement or repairs of the computer. Such cases will be turned over to the Police Department.

APPENDIX N: ABOUT THE AUTHOR

Ann W. Davis, Educational Leadership Consultant and Support Coach, received a Bachelor of Science degree from Wingate College, a Master of School Administration from UNC-Charlotte as a North Carolina Principal Fellow (Class 2) and an Educational Specialist degree from UNC-Greensboro. She currently works for the NCSU Friday Institute as a Support Coach in the NC Learning Technology Readiness Initiative (NCLTRI) funded by the Golden LEAF Foundation and is a consultant on the NC 1:1 Learning Technology Feasibility Study. She is an adjunct professor at UNCG where she serves as the University Supervisor for future school executives and is also a Principal Support Coach for beginning principals. Her background includes: Mathematics Teacher, Assistant Principal, Principal, Department of Public Instruction High School Turnaround Portfolio Manager, Central Office Executive and 1:1 Project Manager. In 2006, Ann was named *North Carolina's High School Principal of the Year* by the National Association of Secondary School Principals (NASSP). Her professional affiliations are with the Horace Mann League, the Association of Supervision and Curriculum Development, the North Carolina Association of School Administrators, the National Association of Secondary School Principals, the North Carolina Technology in Education Society and the International Society for Technology in Education. Ann is the wife of Mark A. Davis and the mother of Stephen and Christina Davis all residents of Burlington, NC. She is the daughter of Norman and Julia Dennis Wilson of China Grove, NC. She has two sisters – Julie W. Henderson of Kannapolis, NC and Norma W. Honeycutt of China Grove, NC.