

How Do Teachers View the Impact of Incorporating Technology
Into Their Grade 9 Curriculum?

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Abstract

The purpose of this research was to determine the impact on the 9th grade curriculum that teachers experience when incorporating technology. The research was conducted from June 14 until July 13, 2007, at two high schools in Massachusetts: Holy Name in Worcester and Walpole High School in Walpole.

There were three research methods employed during this study: (a) an online survey, (b) subsequent structured interviews, and (c) two classroom observations, one at each school, conducted by research team members. The research participants who completed the online survey and structured interview consisted of 12 teachers of 9th grade curriculum. The survey obtained quantitative answers to questions regarding the level of technology integration the participants were employing, as well as how students learning progressed with this technology. The subsequent structured interview allowed the researchers to gain an elaborated view of the participants' answers to the survey, as well as both the challenges and benefits participants view as the impact that technology has had. The classroom observations gave the researchers hands-on experience with technology integration in a 9th grade classroom.

The results of this research indicated that 9th grade teachers view the integration of technology as important, yet poorly guided by administration. Teachers are using a wide variety of teaching methods, are enhancing and enriching lessons through the integration of technology, but they feel that it is (a) time consuming, (b) they are not comfortable themselves with the technology, and (c) there is a lack of funding and administrative support to properly integrate technology. Research participants are at many different stages in terms of their own integration of technology in their curriculums, but can see the value that technology has to offer to future educational processes.

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The rapid development of technology has enhanced process and innovation in every aspect of our lives. Technological advancements have improved commerce, mass production, and communication methods. Business and industry have either adapted technological improvements or become casualties of the new information age. Therefore, it is no surprise that educational institutions are introducing themselves as disciples of technology and reinventing classroom curriculum for current and future generations.

The Massachusetts Department of Education (2001) has incorporated a standard for all public schools with regard to the effective use of instructional technology in the classroom. They have established three general standards for all students.

Standard 1 insures that the student is prepared to use a personal computer to effectively navigate through standard business applications in order to perform successfully on a professional level. The student must be immersed into the environment of computer connectivity and understand how to operate technology tools that have become staples of communication in the business environment.

Standard 2 provides for training and education in the ethical use of electronic media. Programs that insure proper research techniques, discerning the validity of a source for research, protection of personal and private information are all important topics which must be reinforced in the student learning process.

Standard 3 reflects an understanding that today's global marketplace seeks individuals who are well versed with electronic communications and technology. Today's educational institutions are challenged to offer students hands-on experiences with the Internet that build proficiency in web communication, development, and research. These opportunities prepare students for the professional occupations they place as the goal of their academic experience.

This research teams' members are currently teaching in different school systems throughout the State of Massachusetts. We bring experiences from the Boston Public Schools, Sturbridge Public Schools, Worcester Diocesan Schools, and Walpole Public Schools. Essentially we have two sets of frameworks to follow—the broad state frameworks and the specific curriculum frameworks that have been developed by the city or districts in which we teach. All schools, whether public or private, must maintain and exceed the standards set forth by both state and school district, to preserve the quality education they seek to provide.

The integration of technology has become an important aspect in the curriculum frameworks of all disciplines. To further this effort, some school administrators have added a category to all observations and summative evaluations, expecting each teacher to implement technology into their lesson plans. While we have a number of initiatives in our schools that will allow us to earn computers, projectors, and smart tablets for our classrooms, the limited number of technological supplies is a major factor in who will and will not integrate technology into their curriculum—regardless of the teachers' comfort level with such technology.

This insistence upon the use of technology has undoubtedly created a layer of frustration and anxiety for the traditional teacher. Many teachers who were previously recognized as outstanding educators in the “chalk and talk” (Marquis, 2001, p. 6) era now find it challenging to embrace and implement technology into their practice. For this reason, we have decided to investigate the question: How do teachers view the impact of incorporating technology into their Grade 9 curriculum? To properly determine the answer to this question, we have further categorized the concept by asking the following sub questions:

1. What is considered technology in schools today?
2. What percentages of teachers are currently implementing technology in the schools?

3. What are the Mass State Frameworks Technology Requirements for 9th grade curriculum?
4. What professional development programs have been offered in the area of technology-based lessons?
5. What is the knowledge base of the teachers in the school relating to technology?
6. What assessment strategies are required to accurately evaluate technology?

These questions will assist in planning our research in a logical manner.

It is our hope that the conclusions drawn will serve a three-fold purpose. First, they will help school administration to gain perspective through the comments of their faculty. Once an understanding is gathered, professional development might be planned by administrators to address the issue of using technology effectively in the classroom. Today's educators will also find information here that will assist them in relieving the potentially stressful nature of technology implementation. Finally, our research will deliver factual information on the current state of technology in 9th grade education and how it is viewed by the teachers at the schools in which we teach.

Literature Review

Throughout the last century, technological advances have been proclaimed as pliable solutions to advance the efforts of the American educational system. From the early 1920's when Thomas Edison predicted that motion pictures would supplant text books to the later development of radio and television, the implications for educational innovation were highly regarded (Oppenheimer, 1997). Computer technology was no exception to this trend. Introduced into many secondary education curriculums in the late 1970's, a device that looked like a "typewriter on steroids" (Russom, 2003, p. 1) was connected to a line printer to stimulate

educational progress. Twenty years later, school systems were investing millions of dollars into computer equipment for their students and faculty (Oppenheim, 1997).

Progress has certainly been made in terms of student access to technology in schools. According to the National Center for Educational Statistics [NCES] (2005) from 1994 to 2002, public schools with access to the Internet increased from 35% to 99% (Lanahan & Boysen, 2005) and during the 2001–02 school year, 87% of public schools with Internet access reported that professional development was available to show teachers how to integrate the use of the Internet into their curriculum (Kleiner & Lewis 2003). By the fall of 2003, nearly 100 % of schools in the US had access to the Internet (NCES, 2005). Recent research (Holcomb, 2005; O’Dwyer, Russell, & Bebell, 2004) has indicated the use of technology in the classroom can aid and improve the delivery of curriculum content while also providing workforce skills. Non-instructional activities such as data management, lesson preparation, and communication are also benefits of technology (O’Dwyer, Russell, & Bebell, 2004).

It is clear that school administrators have embraced technology implementation. However, McGrail (2006) summarized research conducted by Cuban and stated that: administrators in schools in America “who seem to be preoccupied predominantly with the issues surrounding computer availability ... often fail to realize that physical availability of technology is not enough to bring about the change that they advocate” (p. 1056). In essence, “the most important component in a change process is not the innovation itself, but the beliefs and practices of the people who are affected by it” (Fulkerth, 1992, p. 1)

A study done by Liu & Huang (March, 2005) focused on teacher concerns about technology integration. Using the 7 Stages of Concern (as cited in Hall, 1977), the researchers prepared a questionnaire for 86 teachers. The questions were prepared to evoke opinions about

each instructor's comfort level with technology implementation. Liu and Huang (2005) concluded that the teachers had very serious concerns about their ability to implement technology into their curriculum with confidence. The following conclusions were made:

- (a) providing more information and positive examples related to technology integration;
- (b) providing incentives and other related support such as release time and summer technology courses for teachers to learn how to effectively integrate technology into the classroom;
- (c) finding different ways of alleviating self concerns for various level teachers, such as related workshops and demonstrations of technology integration across the curriculum;
- (d) providing clear explanations of the universal benefits of technology integration into the classroom. (p.46)

In addition, research shows that those most affected by the implementation of technology are the students. Aside from teacher engagement, the main focus of instruction is to provide opportunities. Adams & Bailey (1993) pointed out that technology based solutions offered teachers and students attractive alternative approaches toward learning that could not be achieved through text books alone. While there are also negative aspects involved with such technological implementations, Sowell (1996) suggested that even though some software solutions provided disappointing results in quality, little teacher interest, or little or no gains in student achievement, by refocusing on the task at hand—educating children—we could see that the positives far outweigh the negatives. Within this decade alone Kerr (1990) observed the following:

Technology allows students access to materials found only in well-equipped libraries at the same time that students engage in controlling their own learning situation. New technology allows students in different physical spaces to collaborate and provides learners with a wider view of their places in the world. Word processing, spread sheets,

and data base programs provide opportunities for learning that were not available in the past (p. 58).

B. F. Skinner (1968) agreed that technology visuals helped teachers to present materials in the classroom but worried that the student would become bored and a “mere passive receiver of instruction” (p. 30). Through his classroom observation Skinner stated, “through no fault of her own the teacher was violating almost everything we knew about the learning process” (Skinner, 1967, p. 406). He noticed that some students were answering math questions with ease while others struggled, and wondered how one teacher can shape 20-30 students.

Skinner (1968) spent a great deal of time on the programs of *teaching machines* or what he called *Programmed Instruction*. The construction of these programs was in very small steps so that the student could easily move from one frame to the next. This allowed for a complex behavior to be learned through a series of conditioned responses, therefore allowing complex subjects such as physics to be taught so each student was able to learn the material presented. These programs were also designed in such a way to enable the teacher to see where students were having trouble and then the program could be enhanced or altered in order to be more effective.

Skinner believed that as the population grew and technology worked its way into the classroom, something needed to change to ensure that our children would play an active role in the learning process. Education itself needed to become more efficient.

In addition, certain barriers have existed for teachers trying to integrate technology into the classroom. Hoffman (1997) identified such barriers as: not having enough classroom computers, no teacher rewards for their extra effort, and no training to support their effort. Gibson and Hart (1997) reported lack of preparation and training, computer materials failing to

meet the required curriculum, and inconsistency in the success levels achieved by students and teachers as main reasons for teachers not using technology. Czubaj (2004) suggested that insufficient educator input into technology development and infrastructure planning and inadequate technology budgets are concerns. Researchers Vanatta and Fordham (Kadel, 2005) conducted a study to find which factors caused teachers' use of technology to increase or decrease. They found that there were three significant factors that determined the increase or decrease of classroom technology: the number of hours teachers put in after their contracted work time, the number of hours teachers received in technology training, and the teachers' willingness to change.

A large amount of research continues to assess the value of computer technology and how it can be best applied into the classroom curriculum. According to Eugene Judsen (2006) "Some teachers maintain tight control and use technology only for presentation purposes. Other teachers, with the same resources and access, allow students nearly full reign of technology decisions" (p. 581). Liu (2005) concluded an exploratory study by stating that, "the results indicated that online instruction can be a viable alternative and can be just as important as traditional instruction for higher education" (p. 71). In trying to determine how technology can best be integrated into the classroom, Judsen (2006) concluded that "Technology ... is a device best used at the moment when it enables students to gain deeper understanding" (p. 597).

Methodology

The purpose of this research was to determine the impact on the 9th grade curriculum that teachers experience when incorporating technology. Information was gathered from Walpole High School in Walpole, Massachusetts and Holy Name in Worcester, Massachusetts. Three different data gathering methods were employed to obtain the research. First, the researchers

collected information using an online survey regarding teacher opinions on the integration of technology in their classrooms. Next, the researchers conducted structured interviews with the teachers who completed surveys. These interviews enabled the researchers to gain more thoughtful responses from teachers concerning the technology based educational opportunities that existed in their classroom environments. Finally, the researchers conducted observations in several Grade 9 classrooms to observe the effectiveness of technology as a learning tool in the curriculum.

Participants

The research participants came from two different schools in Massachusetts. The first school was Holy Name, an urban, parochial school located in Worcester. During the study, Holy Name was educating approximately 900 students in Grades 7 to 12. The tuition for the school year 2006-07 was approximately \$6,000 with the availability of financial aid for qualified students. This allowed for a far more diverse population than would normally attend a private or parochial school. The school population reflected the ethnic diversity of the city of Worcester. Approximately 75% of the student population was Caucasian, 15% African-American, and 10% Asian. The school was operated and financed through the Diocese of Worcester. For each of the prior three years, Holy Name received approximately \$12,000 through No Child Left Behind (NCLB) and Diocesan grants for technology. That grant funding enabled Holy Name to execute a technology plan and purchase technology tools with a level of measured success. Still, limited budgetary funding for technology continued to slow requested technology acquisitions.

Each classroom had one computer for teacher use, and there were four computer labs of 20 computers each. Three of the labs had Windows XP operating systems, while one retained an outdated Windows 98 operating system. The school itself was on a Windows 2003 operating

network with a T1 connection available to each computer in the school. The school also had ten SMART tablets, ten LCD projectors and a full sized SMART board. There were over 50 teachers sharing the available technology. The staff was slowly beginning to embrace technology in their classroom lessons. The younger teachers were more likely to implement the technology into their classrooms than the older and more established teachers.

The second school studied was a suburban, public school in Walpole, Massachusetts. According to the 2006-2007 NCLB Report Card, Walpole High School educated 1,129 students in Grades 9 to 12. There were 73 teachers with one technology coordinator for the entire building. One teacher in each department was given the unofficial title of “technology liaison” to make up for the lack of funding for additional personnel. There was very little diversity in the school, which was representative of the community as a whole. Demographic statistics were reported on the NCLB Report Card as 93% White, 3.9% African American, 1.4% Asian, and 1.6% Hispanic or Latino. The student body was also reflective of the gap between the socioeconomic classes in the community. There was a large group of very wealthy community members, as well as a large group of blue collar, lower middle class community members. There were few students who fit into the traditional middle class and only 5.5% that were categorized as low-income (NCLB, 2006). The community was supportive of the educational goals of the schools, but not usually in the financial realm. The community was reluctant to provide additional funding to the schools to update technology, since many in the community viewed it as unnecessary to the education of the students.

The community, in large part, fell into the traditionalist camp and was reluctant and unwilling to embrace changes in educational technology. Walpole has not passed a Proposition 2 ½ override in recent years, many of which have had heavy technology and personnel focuses. It

has been difficult to upgrade technology on a school wide basis, but it has been done on a departmental basis through each department's budgetary funds. Teachers were encouraged to creatively integrate technology that is available, but there is little professional development to do so.

Those surveyed at Holy Name High School included instructors in the English, history, library sciences, and business departments. In addition, one of the researchers was a technology coordinator at Holy Name. This afforded the researchers the viewpoint of someone responsible for integrating technology into the high school curriculum. Of the teachers surveyed, two were male Caucasian and five are female Caucasian. Teaching experience ranged from 2 to 30 years, resulting in a median of 12 years of experience. One of the instructors was a licensed attorney, two held masters degrees in education, and four held bachelor degrees with some graduate credit.

Walpole High School survey results came from science, special education, art, and history teachers. All of these instructors taught at the ninth grade level. Teaching experience of the study participants ranged from 3 to 30 years, with median years of experience of 10. There was a gender balance of the participants with three Caucasian females and three Caucasian males. These educators all held advanced degrees in subjects such as history, education, instructional technology, special education and one teacher held a master of fine arts. From these educator perspectives, the researchers came to understand a variety of views that teachers had on the integration of technology into ninth grade classrooms.

Procedure

The first step in the research process was to have the researchers from Holy Name and Walpole High School obtain consent from the respective administrators (see Appendix A). Consent from all participating teachers was requested (see Appendix B) and received. Finally,

parental and student consent was requested when classroom observations were conducted (see Appendix C). Teachers, who completed the consent forms that were disseminated by the researchers, were then be asked to complete a survey that measured their attitudes about the integration of technology into their curriculums (see Appendix D). Researchers then conducted structured interviews with those teachers to understand the viewpoints further (see Appendix E). Lastly, the researchers used observations performed by research group members including one researcher who was a technology coordinator, to gain hands-on knowledge of the integration of technology in classrooms (see Appendix F).

Data Collection

Teacher survey. Each researcher disseminated a survey to pre-selected and consenting teachers (participants) in their respective schools. Participants chosen actively taught Grade 9 for the 2006-2007 school year. Researchers were careful to select equal representatives from those who were and were not actively integrating technology. Researchers also chose equally from participants with extensive teaching experience as well as instructors with less than five years experience. The participants were contacted to participate during the first week of June 14, 2007. Participants were asked in person to take part in the survey. The researchers explained that survey responses would measure the level to which each teacher integrated technology into their curriculum and the relative ease with which they did so. Thus, the survey revealed how comfortable the participants were with changes in instructional technology in their own classrooms. The survey was delivered on-line using zoomerang.com—a survey tool available on the Internet. A link to the survey was sent to each teacher through e-mail on July 3. Teachers were given until July 13 to submit their responses. The survey included 15 questions. Teachers were asked about (a) the level of technology integration already in place in their classrooms, (b)

relative comfort with technology, (c) impact they saw in their students with technology integration, (d) access to technological resources in their respective schools, (e) methods for implementation, and (f) support they received from administrators when integrating technology.

Structured interviews. The structured interviews allowed for the researchers to gain further perspective on the views that the participants expressed in the survey. Each participating subject responded to a series of 13 questions, with any ancillary follow-up questions being properly documented and appropriately recorded by the researcher. These interviews lasted approximately 25 minutes. Interview questions were integral to gaining a more in-depth understanding of the participants' style, reaction, and opinion on various technology related questions in education. The questions asked to the participants included (a) how the participants view their teaching style, (b) their effectiveness with using technology in their classrooms, (c) the impact on student learning with a further integration of a computer into everyday lessons, (d) how the participant enriches student learning through technology, (e) any anxiety or excitement felt by the participants regarding new technologies such as SMART boards or tablets, (f) decisions by school boards to introduce computerized grade book systems into the schools, (g) relative comfort levels in learning new technologies or programming, (h) viewpoints on responsible use of technology, (i) benefits to a fully technologically integrated classroom, (j) if the participants would prefer to go back to a technology-free classroom and why they would do that, and (k) what they anticipate the 5 year impact of technology to be.

Observation. There were two classroom observations completed. One researcher observed a technology lesson given at Holy Name High School in Worcester, Massachusetts. The class lesson took place in a computer lab room. The room consisted of 30 computers arranged in a U-shape. On one wall, accessible to all students, was a large 10 x 12 screen. A

projector hung suspended from the ceiling in the middle of the room connected to the computer at the teacher's desk. A clear display of the Windows XP desktop was projected on the screen. The class was composed of 25 students. Eight of the students were girls and 17 were boys. The class consisted of students with mixed academic abilities. The students were studying an introduction to computer programming and the lesson observed highlighted several computer programming techniques. The purpose of the observation was to examine the effectiveness of technology tools as instruments in educating the students. The researcher used a classroom observation sheet (Appendix F) to log pertinent information. The team of researchers then analyzed this information.

The second observation was completed by a second researcher who observed a world history class at Walpole High School. The class lesson took place in a regular classroom setting. The room consisted of one laptop for teacher use, and a liquid crystal display (LCD) projector that projected what was on the laptop onto the whiteboard at the front of the room. All components of the technology set up were mobile, since it was necessary for the department to share technology resources. The class was composed of 30 students. Ten of the students were girls and 20 were boys. The class was an honors level class, but the difference in academic ability levels within the class was evident. The class was reviewing for a final exam through student presentations on previously assigned topics. The lesson focused on student's knowledge of history and their use of technology to launch a successful presentation. Many different forms of multimedia were integrated by the students during this lesson. The purpose of the observation was to examine the impact technology had on students learning. The researcher used a classroom observation sheet (Appendix F) to log pertinent information. The team of researchers then analyzed this information.

In addition, the researchers had access to the viewpoints of Technology Coordinators in their respective buildings. Through these viewpoints, the researchers were able to gather opinions about ninth grade teachers from the point of view of someone who was in charge of coordinating technology for the entire building. The researchers collected notes of the Technology Coordinators in the respective buildings observing teachers of other disciplines, in a classroom setting, with and without the use of technology. Lastly, researchers used the classroom observations they conducted within their own buildings.

Time table. Due to the limited time frame, the research pool sample was small but representative of the target school communities. Consent was sought of administration between June 14 and June 21. Letters to parents explaining the research were sent home on June 14. Classroom observations were conducted from June 14 to June 21. Surveys were disseminated July 3, 2007 and returned July 13, 2007, and the interviews were conducted at the submission of the surveys. While the research was done at the end of the school year and over the summer vacation, researchers used the additional tools available to them to draw out observations that the researchers had made through classroom experiences, as well as the experiences of the individual research participants.

Data Analysis

After the teacher surveys were completed, the researchers compiled the information from the zoomerang.com website. This information was summarized to determine (a) how teachers feel about technology as a tool in the classroom, (b) how effective they have been at using it, (c) how technology could be used more effectively, and (d) how they feel about the future of technology in education. The survey gave the researchers a basic foundation in understanding the motivation and mindset of the ninth grade teacher. The survey also assisted the researchers to

identify what teachers see as roadblocks that stand in the way of successful technology implementation.

The structured interviews enabled the researchers to further evaluate teacher opinion about technology integration. Teacher responses were tracked for content and researchers examined survey results in order to find correlations between the two forms of data collection. Giving the teachers a forum to elaborate on pertinent questions assisted in uncovering ideas on (a) best practices for technology integration, (b) student performance measures, and (c) professional development pathways. This also allowed researchers to obtain more complete answers to the questions that were asked. All ancillary questions asked during the interview process were appropriately documented as part of the research process.

The researchers examined the classroom observation sheets to reach conclusions about the effectiveness of technology implementation in the curriculum. Through observations, the researchers found concrete evidence of the integration of technology as a stimulant to learning. Using the chart provided (see Appendix F), the researchers examined the responses from each observation to determine whether or not the use of technology was productive. The results of this analysis defined the effectiveness of technology as a tool in (a) presenting clear learning objectives, (b) maintaining discipline, (c) promoting understanding, (d) challenging the students to seek knowledge, (e) interactively involving the students, and (f) achieving learning objectives.

In summary, the teacher survey provided quantifiable information that assisted in defining the teacher's perceptions of technology integration. The teacher interviews provided further detail to support these perceptions, while also inspiring potential implementation paths to increase the affectivity of technology in the classroom. Lastly, the classroom observations provided documented examples of the teacher's approach toward implementing technology, and

the student response to technology integration. These observations enabled the researchers to analyze the productivity of technology tools in the classroom.

Results and Discussion

The principals of Holy Name High School and Walpole High School formally approved this research proposal (see Appendix A) and agreed to allow the study to be conducted at each school. The researchers developed consent forms for teachers that were involved in the survey and interview process (see Appendix B). The researchers also developed a consent form for parents of the students who participated in the classes observed (see Appendix C).

The researchers developed and implemented a teacher survey (see Appendix D) on the website zoomerang.com that was used to assemble quantitative data regarding opinions about technology integration. While 15 teachers were asked to complete the survey, only 10 teachers who were Grade 9 classroom instructors at either Holy Name High School or Walpole High School for the 2006-2007 school year completed the survey anonymously. Of the 10 participants, six had less than 10 years of teaching experience; four had more than 10 years of teaching experience. The results of the survey showed that 100% of the participants actively used technology in the classroom and 80% had been using technology for three or more years. Further evidence was found to support the idea that teachers welcomed the use of technology as the researchers discovered that 90% of the participants were confident that they would be using more technology in the coming year and 60% of them revealed that they would spend more than half of the class time on technology related activities if they had access to the required equipment. The participants overwhelmingly cited (90%) their need for more professional development related to technology implementations in the classroom and only 11% expressed any

apprehension to being held accountable for a technology use requirement on their classroom evaluations.

A series of interview questions were developed and conducted to allow research participants (see Appendix E) to qualify the answers given to the quantitative survey. Interviews were conducted and results showed that most participants' view their teaching style as more effective with the use of technology. Most participants agreed their students would learn more in their subject area with the use of a computer, but were apprehensive about simply using technology for technology's sake. They see the overwhelming need for teacher training through professional development or other course work in order to fully understand how to responsibly integrate technology into their curriculum. One of the participants felt that if technology was integrated irresponsibly, and the integrating teacher was unfamiliar or uncomfortable with the technology, they would be unable to use it effectively. The participant went on to say that they felt often teachers who want to try the latest technology, tend to lean on the technology instead of using the technology to enhance their own innate abilities to teach. This participant was concerned that if teachers begin to rely on technology in an inappropriate manner, student performance and learning will begin to suffer since there is no learning of substance or value occurring in the classroom.

The participants acknowledged that student learning could be enriched by a variety of technological advancements. Examples of this enrichment included remote broadcasts, YouTube, virtual field trips, podcasts, webquests, directed websites, and other hands on applications. New technologies such as a SMART board or SMART tablets are exciting resources that are coming into more widespread use in classrooms today. However, most of the participants expressed that they would feel apprehensive about integrating this new technology into their own classroom.

Again, the participants cited a lack of education and training on the technology. When interviewed about using technology as a resource for teacher planning such computerized grade books and attendance, most participants were in favor this type of grading system. Participants cited that it would allow for a more efficient method of grade collecting, but would be difficult to match one program to all of the various grading styles. Some participants thought that this would have a negative impact because it would involve more time spent on transferring grades from a traditional grade book into a program for report cards and progress reports. They see this change as being repetitive and unnecessary, since they prefer to use traditional grade books.

Even with the apprehension many of the participants felt about integrating large amounts of instructional technology into their curriculums, they overwhelmingly would not choose to return to a technology free classroom. They acknowledge that their students are living in this environment of ever changing technology, and are being exposed to new technologies every day. To return to the era of technology free classrooms would be doing the students a disservice, since it would not be preparing them for what they will encounter in their lives after high school. One participant cited that students need to be engaged in an interactive environment in the classroom, and increased technology would allow for more efficient facilitation of this type of classroom environment. Participants felt that students would be less likely to be engaged with the coursework if there was a disregard for the technology that they encounter on a daily basis. However, participants also cited the lack of funding for many of the technology initiatives that have been started at both the state and district levels. Often there is little money in school budgets to afford to implement technology that becomes obsolete very soon after it is purchased. Schools do not have the benefit of the large technology budgets that many other industries have.

Schools are expected to do more with less, and as technology becomes more and more expensive, it will become more and more difficult to convince traditionalist community members that additional funds are needed if the school is expected to keep up with the technology explosion. The participants see 5 year impacts in a variety of ways. From a freer flowing exchange of ideas between teachers in the same department or schools to teachers around the world. There are lesson plans all over the internet, that teachers may have implemented in their own classrooms, and then posted on the internet to share an effective teaching tool with others. Similarly, participants cited the availability of podcasts from various web services as well as the availability of primary sources on YouTube and similar sites. The participants see that there is an incredible amount of information at the fingertips of their students, and that the amount of information will only increase in the next 5 years. Some of the participants who did not see technology being implemented effectively or responsibly in their curriculum today, were skeptical about the 5 year impact of technology. They see it as having an impact, but a possibly harmful impact to the educational process of their students without proper training of those who are in charge of the implementation.

Finally, the researchers developed and implemented a form (see Appendix F) that was used to log information about technology integration obtained through classroom observations. The first observation was completed by the technology coordinator researcher, who was able to observe a teacher presenting a technology related lesson in computer programming. The researcher observed that through the use of technology tools, the instructor was able to present clear and visual objectives for the lesson that promoted the students understanding. By combining brief lecture and interactive computer methods, the instructor was able to reinforce the student's ability to grasp concepts about the learning material. Students exhibited an

eagerness to perform tasks successfully. This lively, interactive environment enabled a focused, goal-oriented lesson with no visible discipline issues. The researcher observed notable strengths in this lesson supported by the deployment of technological integration. The learning session was engaging to all students through visual reinforcement examples, interactive hands-on learning, and the introduction of skill-based and differential learning techniques.

The second observation was completed by another researcher who observed a teacher facilitating multimedia student presentations. Students were reviewing for a final exam, and had been given predetermined topics to present. It was evident to the observer that the teacher was effective in implementing technology into the classroom from the level of comfort the students exhibited when they used the technology. Through the use of technology tools, the teacher was able to have the students engaged in a discussion using a variety of multimedia presentation methods. Students were encouraged to use technology creatively for their presentation, and the students met that goal. The support that the observer saw from the teacher clearly showed the teacher's knowledge of technology, and the ability to responsibly and effectively facilitate the integration of technology into their classroom. The learning session was engaging to all students, of all ability levels and learning styles. Effective student learning occurred with the effective implementation of instructional technology.

Implications

The integration of technology has been a tenuous subject among the educational community for many years. Today, teachers are balancing initiatives to keep up with technology while maintaining the integrity of their existing curriculum. The traditionalist educator, who believes the "chalk and talk" (Marquis, 2001, p. 6) method has worked in American classrooms for decades, is often resistant to changes and technological integration. Many of these educators

believe that if they find something that works, they do not want to change that method. However, this research has shown that there needs to be a new approach, and that approach includes the integration of instructional technologies.

On the other side of the argument are teachers who are more than willing to be progressive and integrative of emerging academic technologies. They work to integrate this new technology into already existing curriculums believing that it will enhance the learning of their students who are living in a technology rich environment. They recognize that students are living in this environment and realize that their curriculums need to prepare them to enter a technology rich society.

Students who graduate from American high schools today will need to know how to use this technology, and to integrate it into their own knowledge base, in order to have more advanced employment opportunities. Teachers need to be able to integrate technology responsibly so that students get the opportunity to learn about the environment that they will need to function in when they leave secondary education and enter the rapidly advancing work force.

The trend is turning from courses that deal with word processing, spreadsheets, databases and power point, to courses that teach via podcasts, webquests, and beyond. Teachers and students will need to be able to keep up with the changing technology through educational opportunities.

The results of the data analysis provided valuable information to determine how a teacher views the impact of technology integration in education. Through reading the results of this study, administrators will learn more about the technological abilities of their faculty. The results of this analysis will assist them in understanding the technological path that their teachers see the

immediate need for, as well as what they envision as an area of high need for the future. Armed with this information, administrators can design effective strategies in budgeting and professional development programs that will have a positive impact on the use of technology in their respective schools. Teachers will understand that technology is a tool that can enhance educational opportunity when responsibly integrated and properly administered. Finally, parents and students will receive the benefit of a properly guided educational path with technology as a visible and effective tool in the educational curriculum.

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Appendix A

Principal Consent Form

June 14, 2007

Dear Principal:

I am presently pursuing a Masters Degree in Curriculum and Instructional Technology at Framingham State College. As a student of FSC, I am required to choose a topic of research. I have decided to use this opportunity to conduct a study on how teachers view the impact of incorporating technology into their curriculum. For the purposes of this study, I will be focusing on Grade 9. My efforts will be part of a group research project with educators Karen Ziminski from Boston Public Schools, Lee Barnum from Walpole Public Schools and Kelly Emrich, a Radiology Systems Analyst in Sturbridge, MA.

Our research will assist me in the work I do as a technology coordinator here at Holy Name. Through a short series of interviews and surveys conducted with cooperating teachers, we will gain greater understanding on the process of engaging instructor efforts toward implementing new technology opportunities in their classrooms. For my part in conducting this research, I will request the assistance of 3-4 teachers at Holy Name. They will be asked to fill out a few simple electronic surveys and communicate their opinions on various technology processes they currently utilize. I will also prepare my own observations, as a technology coordinator, about the issues that arise in providing a technology ready classroom.

The combined information we gather from our research will be discussed and analyzed in the group's final paper. Student names will not be used. You are welcome to read the final paper after its completion. I welcome the chance to discuss it, the research process, or any questions you may have. Please feel free to contact me through e-mail at bpenza@holyname.net.

I have also attached a copy of the letter I would like to present to all participating teachers informing them of and requesting their assistance on the research project.

I am honored and required to obtain your written permission to proceed with my research. Your signature indicates that you have read the information above and are granting permission for me to use faculty input in this project. Please sign and return this notice at your earliest convenience to my mailbox. I will then give you a copy of the signed form. Thank you.

Sincerely,

Brett Penza

Signature of Principal

Date

Appendix B
Teacher Consent Form

June 14, 2007

Dear Instructor:

I am working on an educational research paper for a graduate course I am taking for a Masters Degree at Framingham State College. I will be conducting research in an attempt to discover how teachers view the impact of incorporating technology into their curriculum. This project will fulfill the requirement for my graduate course as well as help gain insight into the technology needs of the teachers in this school. My efforts will be part of a group research project with educators Karen Ziminski from Boston Public Schools, Lee Barnum from Walpole Public Schools and Kelly Emrich, a Radiology Systems Analyst in Sturbridge, MA.

In order to conduct my portion of this research, I am requesting that teachers complete a survey. This should require fifteen minutes or less of your time. Your participation is voluntary, and you have the right to withdraw at any point of the study for any reason.

The information will be kept confidential. Your name will not be used at any point in the collection of information. The course instructor will read this research paper. I may discuss with the school principal, assistant principals, or technology support personnel in the school, common themes discovered regarding barriers to implementing computer technology into curriculum, for the sole purpose of assistance in providing information for future staff development opportunities.

You are welcome to view the final paper upon completion. If you have any questions about the survey or research process, please see me or send an e-mail at: bpenza@holyname.net

I need to obtain your written permission to use the results from the survey.

Your signature indicates that you have read the information above and have decided to participate.

Sincerely,

Brett Penza

Signature of Participant: _____ Date: _____

Appendix C

Parental Consent Form

Date: June 14, 2007

Dear Parents and Guardians,

I am working on an educational research paper for a graduate course I am taking for a Masters Degree at Framingham State College. I will be conducting research in an attempt to discover how teachers view the impact of incorporating technology into their curriculum. This project will fulfill the requirement for my graduate course as well as help gain insight into the technology needs of the teachers in this school. My efforts will be part of a group research project with educators Karen Ziminski from Boston Public Schools, Lee Barnum from Walpole Public Schools and Kelly Emrich, a Radiology Systems Analyst in Sturbridge, MA.

In order to conduct a portion of this research, we are requesting your permission to observe your child's class while in session. We will quietly observe and take notes on the classroom interaction for approximately 20-30 minutes. We will not interrupt the teacher or student during this time. Once completed, we will quietly leave the classroom. There will be no opinions or comments required of you or your child.

The information will be kept confidential. No child's name will be used at any point in the collection or reporting of information. The course instructor will read this research paper. I may discuss with the school principal, assistant principals, or technology support personnel in the school, common themes discovered regarding barriers to implementing computer technology into curriculum, for the sole purpose of assistance in providing information for future staff development opportunities.

If you are in agreement with this request, you are welcome to view the final paper upon completion. If you have any questions about the classroom observation or research process, please see me at the school or send an e-mail at: bpenza@holyname.net

I need to obtain your written permission to use the results from the observation. Your signature indicates that you have read the information above and have decided to allow your child to participate. Thank you for your consideration and support.

Sincerely,

Brett Penza

I grant permission for my child to be surveyed by this research team as part of a research assignment on teachers and the impact of technology on curriculum.

Signature of parent/s: _____

Date: _____

Name of child: _____

Appendix D

Teacher Survey

1. How long have you been teaching 9th grade?
 - a. 1 to 5 years
 - b. 6 to 10 years
 - c. 11 to 20 years
 - d. over 20 years
 - e. Other, please specify.

2. My students would say that I...
 - a. Lecture frequently in the classroom
 - b. Assign many group projects.
 - c. Assist them working individually with many interactive projects.
 - d. Use a variety of teaching techniques.
 - e. Other, please specify.

3. Are you currently incorporating technology into your curriculum?
 - a. Yes
 - b. No

4. How easy is it to access computers and technological tools for you and your students?
 - a. Very easy, I have everything I need in my classroom.
 - b. Reasonably easy, I can usually reserve what I need a day before the lesson.
 - c. Somewhat stressful. While we do have access to technology, there is sometimes a shortage and competition between teachers.
 - d. Not easy. There are not enough tools available in our school.
 - e. Other, please specify

5. How long have you been integrating technology into your curriculum?
 - a. Do not integrate
 - b. 1-2 years
 - c. 3-4 years
 - d. 5 or more years

6. Do you think your use of technology will increase greatly over the next year
 - a. Yes, significantly
 - b. Yes, somewhat
 - c. No, stay the same
 - d. No, decrease

Please explain

7. What prevents you from using technology more? Choose all that apply.
 - a. Not comfortable with technology.

- b. Not enough time for planning.
 - c. There are not enough tools available.
 - d. My subject is better taught without technology.
 - e. I have not been convinced of the value of technology.
 - f. Other, please specify.
8. What subjects do you think are best taught with interactive technology tools?
 - a. English- Creative Writing
 - b. English- Literature
 - c. Math- Algebra
 - d. Math- Geometry
 - e. Science- Chemistry
 - f. Science- Biology
 - g. Science- Physics
 - h. Foreign Language
 - i. Social Studies
 - j. History
 - k. Art
 - l. Music
 - m. Other- Please specify.
9. How would you rate your computer skills
 - a. Excellent
 - b. Very Good
 - c. Good
 - d. Fair
 - e. Needs improvement
10. What percentage of the time do you currently use the computer, or other forms of technology for instructional purposes?
 - a. More than 50% of the time
 - b. More than 25%, but less than 50%
 - c. More than 10%, but less than 25%
 - d. More than 5%, but less than 10%
 - e. Less than 5% of the time
11. How often would you use the computer for instructional purposes if you had unlimited access for all or most of your students on a regular basis?
 - a. More than 50% of the time
 - b. More than 25%, but less than 50%
 - c. More than 10%, but less than 25%
 - d. More than 5%, but less than 10%
 - e. Less than 5% of the time
12. If you currently use the computer less than 5% of the time for instructional purposes, what prevents you from using it more?

- a. I use the computer more than 5% of the time
 - b. Lack of training
 - c. Time constraints
 - d. Lack of motivation
 - e. Limited access to computers
 - f. Other: Please explain.
13. What would motivate you to invest more time and energy into implementing technology rich lesson plans?
- a. Monetary incentives
 - b. Proof that students do better in a technology rich environment
 - c. Paid professional development in instructional technology and to develop lesson plans to meet those goals
 - d. Nothing, technology in education is a fad that will pass
 - e. If other teachers start using it more.
 - f. Other, please specify
14. What if you came back to school in the fall to discover that the school administration is going to provide full funding to any teacher who comes up with an educational technology solution. You are immediately...
- a. Motivated to find technology solutions you can request and use
 - b. Unmotivated. You fear technology. It is new and unproven in its effectiveness.
 - c. Unaffected. You do not really care. It should not affect your teaching.
15. What if you came back to school in the fall and discover that the school administration is going to demand that all teachers begin showing evidence of technology use in their classroom. Teachers will be rated on their technology expertise as part of their evaluation process. You are...
- a. Glad that the administration is finally thinking ahead.
 - b. Unaffected. You know enough to make use of technology.
 - c. A little bit nervous. You begin investigating and talking to others who have a little bit more knowledge about technology integration
 - d. Extremely upset. You immediately call your union representative to see if this is legal.
 - e. Other, please specify.

Appendix E

Teacher Interview

1. How would you describe your teaching style?
2. Do you think your style of teaching is more effective with or without the use of technology?
3. Do you think your students would learn more about your subject if you allowed them to interact with a computer?
4. In what ways could you enrich student learning by using technology during class?
5. Please complete the following statement. When I hear about new technologies like SMART Boards or SMART Tablets, I am (anxious to put them to use in my classroom, reluctant to put them to use in my classroom) because...
6. If applicable- What was your reaction to the school's decision to computerize all grade books, grade postings, and attendance?
7. If applicable- What would be your reaction to a school decision to computerize grade books, grade postings, and attendance?
8. How long would it typically take for you to learn to navigate a new software program? Would this be a laborious task?
9. At this stage in your school system, do you think it is possible for teachers to lean too much on technology?
10. You have just started teaching your class in a room fully equipped with a computer for each student. In what ways would your students now be able to learn more about your subject?
11. Do you think your students would learn more about your subject if you allowed them to interact with your computer?
12. If you could erase the technological explosion and go back to a pure "chalk and talk" era, would you? Why?
13. In 5 years, what will have proven to have greatest technological impact on education?

Appendix F

Classroom Observation Sheet

Analyzing the effectiveness of technology integration during an actual class lesson.

Class to be Observed: _____

Grade Level: 9

1. Observation Chart: (N) The use of technology was not a factor.
 (S) Technology was used, but wasn't required.
 (Y) The use of technology played a favorable role.

INSTRUCTIONAL FACTOR	N	S	Y
The instructor presents clear objectives for the lesson.			
Classroom atmosphere and student discipline are maintained.			
Clear examples are given to promote understanding.			
The instructor challenges the students with questions.			
The students are interactively involved with the learning process.			
Lesson objectives have been met.			
Homework assignment is given for further study.			

2. Observation about class material and its potential for integration with technology.

3. Favorable/ Unfavorable impressions concerning the use of technology in the class.

4. Impression of student interest levels in relation to the use of technology.

5. Final commentary/ suggestions. Did technology assist in adding value to class lesson?
