

**Informal Training Makes it Go:
Technology Implementation in Schools**



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Abstract and Key Findings

Public schools continually make large investments in new technology initiatives to ensure that students are equipped with the skills that will be required of a new generation of workers.

Despite the large investment, new technologies are often not implemented in the classroom as effectively as one would hope. These issues are not new. According to Legget (1998), the same obstacles that classroom teachers faced when they attempted to integrate the use of film into their classrooms in the 1950s continued to affect teachers as they attempted to implement telecommunications technology in their classrooms in the 1990s. The issues that face teachers and other school staff when implementing new technologies in the classroom affect not only teaching practices but also student performance. If students are to leave school equipped with essential technology skills, issues affecting technology implementation in the classroom must be addressed.

Years of research have shed light on the varying factors that affect the success or failure of new technology initiatives in classrooms. This study explores issues that affect technology integration in public schools, with special attention paid to the role that leadership, the social dynamics within a school and individual teacher characteristics play in technology integration. This study also uses the diffusion of innovation theory to investigate whether or not social capital can be leveraged to help teachers implement technology better than what would be expected were they working in a more hierarchical, less social environment. Primary research into the communication and implementation strategies that two schools used when implementing a new technology initiative in their classrooms was conducted.

The results of the study point to several communication strategies that can help ensure the proper implementation of new technology in the classroom. This study's main finding is that instead of formal training, informal training opportunities have the greatest positive effect on technology implementation in the classroom. Informal training differs from formal training in that opportunities for informal training arise in the context of a teachers's everyday work environment as well as a teacher's life outside of work, rather than taking place at a designated time and place outside of the usual work environment. Examples of informal training include interactions with friends or family and collaborating with colleagues or students to discover new ways to use a new technology.

Several recommendations are put forth based on the results of the study. Those recommendations are defined as primarily affecting leadership, school dynamics, and individual teacher characteristics. The recommendations are described further in the conclusion of the study.

Recommendations for Leadership:

1. Determine the comfort level of staff and pre-existing attitudes staff have towards the new technology
2. Communicate an open-ended vision of how the new technology will be used.

3. Designate non-supervisory staff as implementation leads.
4. Apply the authority innovation-decision model when necessary.

Recommendations Regarding Social Dynamics:

5. Leverage social capital to inspire informal training and address computer anxiety

Recommendations Regarding Individual Teacher Characteristics

6. Expose teachers to new technologies as much as possible prior to implementation.
7. When possible, allow teachers to interact independently with new technologies outside the classroom environment.

Literature Review

Research into the implementation of new technologies is broad and wide-ranging. This study will focus on how leadership factors and the social dynamics within a school affect the implementation of new technologies. It will also explore how individual teacher characteristics affect technology implementation, with special attention paid to computer anxiety. The Diffusion of Innovation theory will be examined to determine whether it can be applied to situations where the adoption of a new innovation is mandatory; a new model based on technology innovations in schools will also be explored.

In an effort to seek new variables that may affect technology implementation, the concept of brand loyalty is also investigated. Research into brand loyalty typically focuses on purchasing behavior; this study will attempt to gauge how brand loyalty may act on a consumer's behavior when implementing technology in the workplace.

Leadership

Peled (2011) describes a longitudinal study of teachers and principals in Israeli junior high schools that explores how interactions between the teachers and principals affects technology implementation in the classroom. Fourteen principals and 19 teachers were observed and interviewed during a study that took place from 1998 to 2001 and again in 2005.

Teachers were classified into four types based on the ways in which they implemented technology in the classroom:

1. **Initiators** will apply web-based inquiry teaching in any instance, find ways to cope with organizational and technical difficulties related to technology-based instruction, and will find ways to improve their teaching skills with regard to technology.
2. **Followers** will apply web-based teaching when it is suitable and convenient but do not view web-based inquiry learning as extremely relevant to his/her students.
3. **Evaders** will agree to utilize aspects of web-based teaching, but only when required, and will not initiate the use of web-based inquiry.
4. **Objectors** do not use technology-based instruction under any condition and are unfamiliar with advances in information technology.

Principals were also classified into four categories based on the ways they motivated or discouraged technology use in the classroom:

1. **Initiating** principals lead the process of change, identify and define needs and act as mentors during the required organizational changes.
2. **Empowering** principals are interested in changing teaching methods, including web-based teaching, and allow teachers to proceed with their own technology initiatives.
3. **Permitting yet Preventing** principals seem to support technology-based teaching initiatives but continue to advocate traditional policies regarding lesson structure and curriculum.
4. **Resisting** principals knowingly object to web-based teaching elements often on the basis of tradition.

The longitudinal study found that all 14 principals remained consistent in the type of support they gave to technology implementation in the classroom and often became even more extreme in their approach. However, the approach of the teachers included in the studies often

changed considerably. All teachers not classified as *Objectors* that worked with *Initiating* and *Empowering* principals progressed in their technology use; teachers classified as *Followers* often moved to the *Initiator* category while teachers classified as *Evaders* often became a part of the *Follower* category. The opposite held true for teachers working with *Permitting yet Preventing* or *Resisting* principals; *Initiator* and *Follower* teachers often stopped implementing technology-based learning activities due to a lack of support. Peled's study indicates that school leadership affects teachers' ability to implement technology in the classroom, and that teacher attitudes towards technology are unlikely to affect attitudes held by school leadership.

Peled suggests that principals interested in technology assimilation in the classroom become involved in teacher professional development and select teams of teachers with the potential to lead technology-based curricular changes when initiating technology implementation projects. Peled suggests that those teachers can be identified as having direct practice with information communication technology in a teaching context.

In a separate study, Ertmer (1999) suggests ways to overcome barriers to technology integration. The author states that early models of technology implementation implied that access to equipment and training would lead to the successful integration of technology in classrooms. Ertmer disagrees with those models as, unlike many previous changes, integrating technology into the classroom requires change along multiple dimensions of teacher practice. Ertmer focuses on two types of barriers to change: first-order barriers (extrinsic) and second-order barriers (intrinsic), then argues that strategies for dealing with both types of barriers must be developed as either could halt technology implementation in the classroom.

Ertmer suggests that successful technology integration should involve developing a vision (including time for modeling, reflection and collaboration), identifying curricular opportunities, obtaining resources (including access to technology, time, training and support), managing resources and classroom activities and assessing student learning. Ertmer's roadmap to technology integration in the classroom makes clear the important role communication plays in technology integration and suggests that a principal's ability to communicate an effective vision of technology integration is as important as teachers developing technical skills necessary for technological change.

Orlikowski (1997) put forth a theory on change management that suggested a way for organizations to better manage the change that occurs when open-ended, customizable types of technology are introduced into the workplace. He distinguished three types of change: anticipated change (changes that are planned ahead of time), emergent change (unanticipated change that arises spontaneously due to innovation), and opportunity-based change (change that is not anticipated ahead of time but is implemented purposely due to an unexpected opportunity or event). Orlikowski went on to suggest that organizations that are open to all potential capabilities offered by new technology and are willing to embrace an improvisational model can achieve innovative organizational change.

The author tested the theory by conducting an observational study of a software company as it implemented new technology in its call center. Several unanticipated benefits of the new technology led to a system that makes use of the shared knowledge of the whole department, rather than depending solely on the knowledge of the one person answering the phone. The research conducted at the software company suggests that two sets of enabling conditions are

critical to an improvisational change model: ensuring that key dimensions of the change process are aligned and ensuring that proper resources are dedicated to providing ongoing support to the change process. The case study and discussion make clear the idea that the successful implementation of new technology often requires deviating from a pre-ordained plan, and that such deviation should not be looked at as a failure of planning but as an essential part of implementing successful change.

It is evident from these studies that leadership style can either inspire or disrupt technology implementation in the classroom, and that a proper communication strategy is necessary to ensure that teachers feel empowered to make necessary changes in their classrooms. In addition, while school leaders must communicate a vision for using new technologies in the classroom, they must remain open to new uses of technology that may deviate from the original plan. This will enable staff to advance the use of new technologies and eventually move past any inherent limitations built into the original plan. It is also obvious that social dynamics have a great impact on the implementation of new technologies.

Social Dynamics

Zhao looks at technology use in schools from an ecological perspective by creating a framework meant to represent a teaching ecosystem and then testing the validity of that framework by surveying teachers in nineteen schools (2003). He found that most variation in computer use was found within individual schools rather than between schools, so suggests that the focus should be on teacher-level change when promoting technology use in schools. Zhao found that four factors worked as basic mechanisms for changing technology use in schools:

1. **Recruitment/Selection:** Zhao states that a teacher's adaptability to computer technologies should be considered during the hiring process.
2. **Training/Socialization:** Zhao suggests that training opportunities such as in-service and professional development conferences may have little effect on computer use in the classroom, and that it is more likely that teachers are socialized by other teachers to change beliefs regarding computer use in the classroom.
3. **Providing opportunities to explore and learn:** Zhao believes that providing teachers opportunities to explore and learn about new technologies has a strong effect on both teacher and student use of computers. School districts should provide time for teachers to engage with new technologies and explore potential uses in the classroom.
4. **Leveraging change through social context:** Zhao believes that giving teachers the opportunity to help one another and interact with one another when using new technology has a strong positive effect on teacher and student technology use in the classroom. Zhao warns that social pressure can work both for and against technology implementation, so social structure and school culture must be considered when implementing new technologies.

Granger (2002) analyzed qualitative data from four Canadian schools and found that informal training in information and communication technologies was the most influential factor in ensuring successful information and communication technology implementation. Additional factors that helped support technology implementation in the schools included supportive and

collaborative relationships among teachers and principals who encourage teachers to engage in their own learning.

Informal (also described as just-in-time) training is described as “Internet surfing, reading, or interactions with family and friends; on-the-job discussions; and collaboration with peers and/or students.” Granger goes on to state that, “because it takes place in the context of teachers’ immediate curiosity, needs or desires, this need-to-know approach...transforms teachers into active knowledge builders possessing substantial autonomy regarding the specific skills acquired (483).”

Informal training depends on positive relationships between those that are interacting around a new technology. In fact, several teachers included in Granger’s study stated that they learned the most from students in their classrooms when they encountered difficulties with technology implementation in the classroom. A positive relationship between a teacher and the students in his or her classroom would be required for that type of informal learning to take place. Granger’s study is not alone in suggesting that inter-personal relationships play a large part in the success of technology implementation projects.

Janet Fulk describes the results of a research study meant to test the idea that the social world of work directly influences the adoption and use of new technologies. Fulk proposed five hypotheses predicting employee attitudes towards technology, then tested those hypotheses with an email survey given to the employees of a large petrochemical corporation. The hypotheses were based on past research; Fulk and colleagues determined that social physiological processes can help explain behaviors towards technology in social groupings. Two psychological processes in particular stood out: those described by Albert Bandura’s social learning theory and

Salancik and Pfeffer's social informational processing theory. These theories both propose that social systems produce convergent patterns of thought and behavior that ultimately result in group members being likely to share similar attitudes.

The results of the survey supported the validity of all five of Fulk's hypotheses:

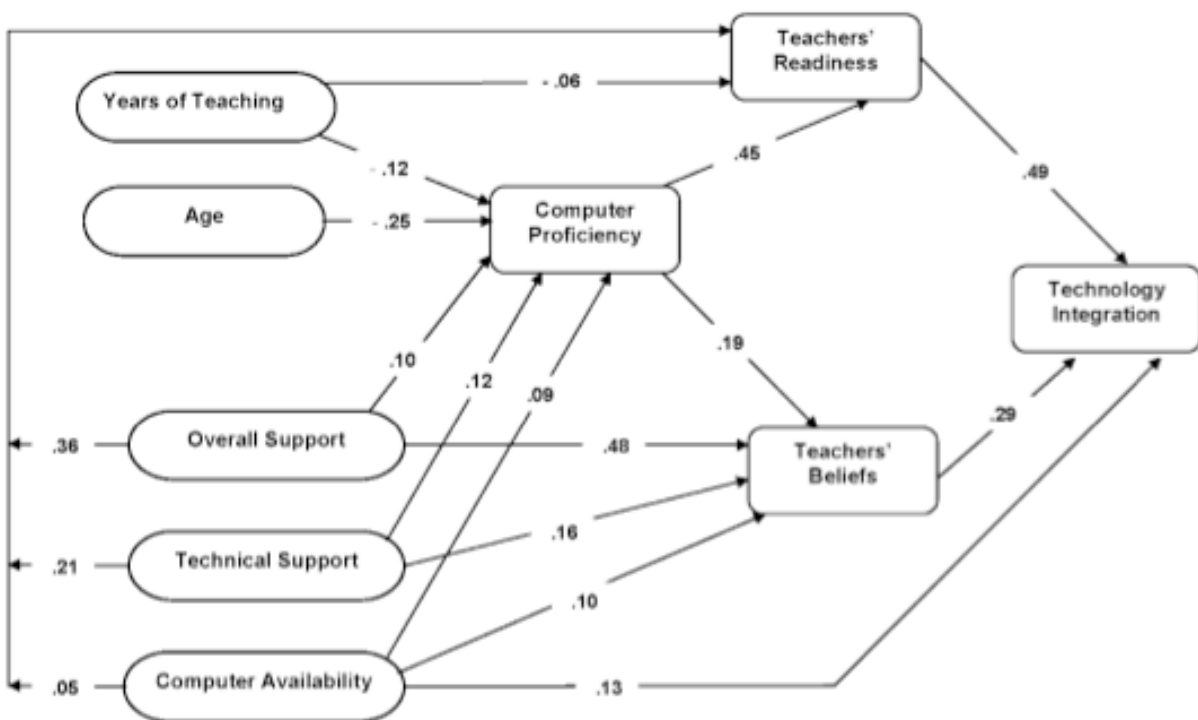
1. Work group technology attitudes will be a positive predictor of technology attitudes for individuals who exhibit high attraction to the group, but not for individuals who exhibit low attraction.
2. Work group members' technology use behavior as a whole will be a positive predictor of an individual work group member's technology use behavior.
3. Work group members' technology use behavior will be a stronger predictor of technology use for individuals who exhibit high rather than low attraction to the group.
4. Work group members' attitudes and use of technology will explain variance in individuals' communication technology use and attitudes beyond that explained by ego-network-based social influence variables.
5. For individuals who exhibit high attraction to a work group, work-group-based social influence variables will be stronger predictors of individual attitudes and behaviors than ego-network-based social influence variables.

Fulk goes on to describe management implications of her findings, focusing on the importance of the social system of an organization as well as the importance of informal collaboration when learning a new technology. Fulk's findings give a good starting point for understanding the social processes that influence the implementation of new technology.

Both of these studies support the idea that social processes affect the ways in which new technologies are implemented in the workplace. Several studies also give insight into how the characteristics of individual teachers affect the success of technology implementation in the classroom.

Teacher characteristics

Inan (2010) created a research-based path model (figure 1) to explain how teachers' individual characteristics and perceptions influence technology integration in the classroom. In order to test the path model, they conducted a study of 1,382 teachers in Tennessee using the Teacher Technology Questionnaire, which is commonly used in research and evaluation studies (figure 1 - numbers correspond to strength of correlation).



In summary, Inan found that:

- Teachers' demographic characteristics (years of teaching and age) negatively affect their computer proficiency.
- Teachers' demographic characteristics (years of teaching and age) negatively and teachers' computer proficiency positively affect their technology integration.
- Teachers' beliefs and readiness positively influence their technology integration.
- School-level factors (availability of computers, technical support, and overall support) positively influence teachers' beliefs and teachers' readiness.
- Teachers' beliefs and readiness mediated the indirect effects of school and teacher-level factors on teachers' technology integration.

According to Inan's study, more experienced teachers are less likely to be able to successfully implement new technologies in the classroom. This is profoundly different from what is typically expected, that is, those with more experience will be more prepared to lead new initiatives. Inan also found that age and years of experience negatively affect computer proficiency; this is likely due to a lack of comfort when using computers and other types of new technology.

In 1995, Rosen and Weil conducted a research study to assess technophobia in a large urban public school system. The study defined technophobia as including anxiety about current and future interactions with computers, negative global attitudes towards computers, and specific negative cognitions when using or contemplating computer interaction. A pilot study was performed before questionnaires were distributed to 54 schools across five school districts in

Southern California; the responses from the pilot study were combined with the responses from the questionnaire for a total of 587 respondents.

The study found that approximately 52 percent of elementary teachers, 45 percent of secondary humanities teachers and 35 percent of secondary science teachers that responded to the survey were technophobic (as defined above). Three aspects of computer use stood out as being particularly troubling to those teachers: dealing with computer machinery itself (i.e. being in charge of computers, setting up computers, helping others with computers), computer errors that “victimize” the user (i.e. error messages, the computer being “down”), and learning about computers (due to the fact, for these teachers, computers make life more difficult instead of easier).

One aspect of this study makes one wonder if those percentages would be smaller today (it was conducted in 1995). The survey respondents were asked if they had used computers as a student; 42 percent of elementary teachers, 30 percent of secondary science teachers and 45 percent of secondary humanities teachers responded that they had never used computers as a student. Those figures likely correspond to age and years of teaching, so would support Inan’s finding that teacher demographics negatively affect computer proficiency. The number of teachers reporting that they had not used computers as a student would likely be lower today, and it would be interesting to see if a corresponding drop in technophobia also occurred. However, when one looks at the three aspects of computer use that particularly troubled the technophobic teachers involved in the study, it is easy to see how similar issues could plague teachers that are currently comfortable with computers but will be asked to implement new, as yet undeveloped technologies in the future.

Chua (1999) performed a meta-analysis on the findings of 36 studies done between 1990 and 1996 so as to compile the results of then-recent studies on computer anxiety, sort through conflicting data related to computer anxiety, explain the implications of the then-current research and suggest future studies related to computer anxiety. The meta-analysis utilized Cooper's five-stage model of integrative review as a research process to arrive at its findings. The meta-analysis focuses on the three most commonly examined correlates of computer anxiety: gender, age and computer experience. The results of the meta-analysis suggested that studies on the relationship between computer anxiety and gender are inconclusive, that the relationship between age and computer anxiety is only observed when the age range is very wide, and that there is a strong correlation between computer anxiety and prior computer experience.

One significant implication of the findings of the meta-analysis is that computer anxiety is a "state anxiety," so can be changed if appropriate measures are taken. Additionally, lack of past computer exposure is the most significant predictor of computer anxiety. Again, lack of computer exposure will likely be less of an issue moving forward than it was at the time of Chua's meta-analysis, but if we are to assume that new types of technology will be continually introduced, it follows that a lack of exposure to those new types of technology will continue to affect those expected to utilize those technologies.

While Chua found that computer anxiety was a "state anxiety," Marcoulides found that computer anxiety is a mental construct that remains consistent across cultures and individuals (2007). Marcoulides was testing the validity of the Computer Anxiety Scale, "A measure of perceptions by students of their anxiety in different situations related to computers (1989)." Marcoulides found that two specific factors influenced computer anxiety in students: a general

computer anxiety factor (stemming from direct use of computer technology) and an equipment factor (focused on more specific aspects of operating computer equipment). An additional study of 181 Nigerian pre-service teachers found that the Computer Anxiety Scale was applicable in additional contexts and supported Marcoulides' claim that computer anxiety is a mental construct that remains consistent across cultures (Arigbabu, 2009).

So, if computer anxiety is a "state anxiety" that can be changed, and is also consistent across cultures and individuals, strategies used to combat computer anxiety should be also effective across cultures and individuals. As a lack of computer exposure is the most significant predictor of computer anxiety, it follows that exposing teachers to new types of technology should be a vital part of any plan to use new types of technology in the classroom.

Diffusion of Innovation Theory

Everett Rogers' Diffusion of Innovation Theory attempts to explain the ways in which innovations spread through a system (Rogers, 2003). While the theory was initially applied to rural farming techniques, it has been found to be applicable to a wide variety of technological innovations.

Rogers describes four key elements in the diffusion of innovations: (1) Innovation, or "an idea, practice or object perceived as new by an individual or other unit of adoption (2003)," (2) Communications Channels, or "the means by which messages get from one individual to another (2003)," (3) Time, and (4) the Social System, or "a set of interrelated units that are engaged in joint problem solving to accomplish a common goal (2003)." Each element has an effect on whether or not an innovation is taken up by an individual in a social system.

Rogers goes on to describe the decision-making process that individuals go through when deciding whether or not to adopt an innovation. The innovation-decision process consists of five elements: “(1) knowledge, when the individual is exposed to the innovation's existence and gains an understanding of how it functions; (2) persuasion, when the individual forms a favorable or unfavorable attitude toward the innovation; (3) decision, when the individual engages in activities that lead to a choice to adopt or reject the innovation; (4) implementation, when the individual puts an innovation into use; and (5) confirmation, when the individual seeks reinforcement for an innovation-decision already made but may reverse the decision if exposed to conflicting messages about it (2003).”

Rogers also describes five adopter categories that distinguish members of a social system from one another based on the degree to which an individual is earlier in adopting a new idea when compared to other members of the social system. The five adopter categories are: (1) Innovators, who are expected to make up approximately 2.5% of a population, (2) Early Adopters, who are expected to make up approximately 13.5% of a population, (3) Early Majority, who are expected to make up approximately 34% of a population, (4) Late Majority, who are also expected to make up approximately 34% of a population, and (5) Laggards, who are expected to make up 16% of a population.

The Diffusion of Innovation theory posits that there are three types of decisions that are made within a social system regarding a new innovations. The three types of decisions are (1) Optional Innovation-Decision, or when the decision is made by an individual that is in some way distinguished from the other individuals in a social system, (2) Collective Innovation-Decision, or when the decision is made collectively by all individuals of a social system, (3) Authority

Innovation-Decision, or when the decision is made for the entire social system by a few individuals in positions of power. When implementing new technologies in schools, decisions are most likely fall into the Authority Innovation-Decision category, as funding, planning and curricular decisions are usually finalized by a small leadership core at the school.

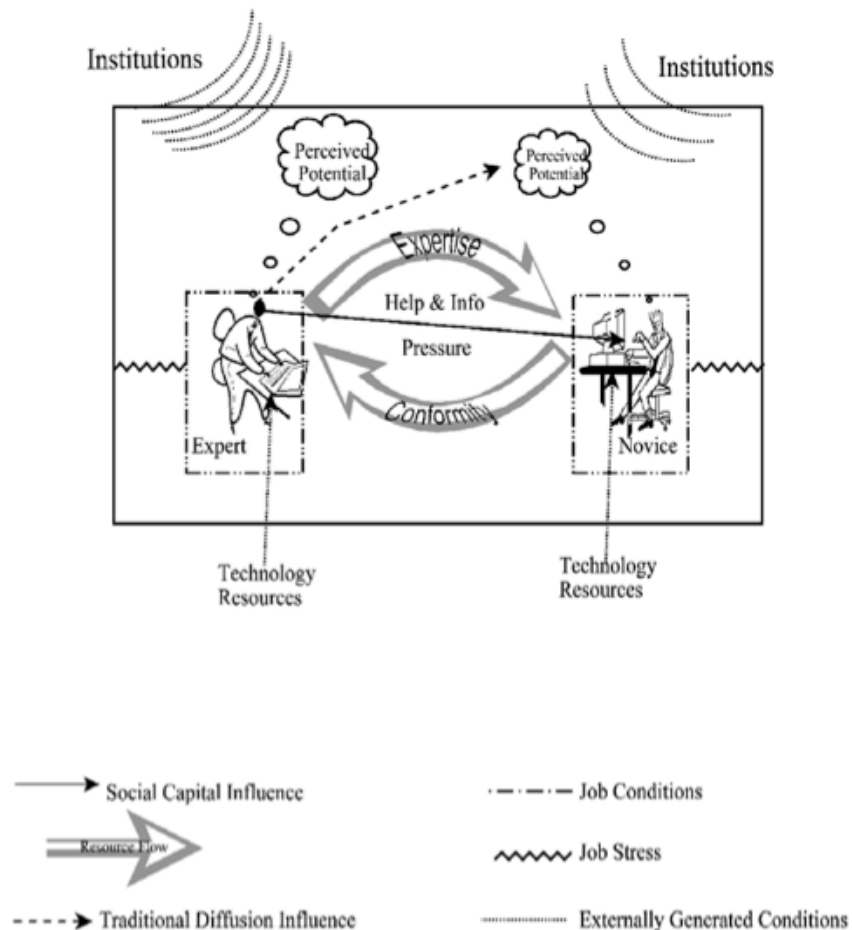
A study conducted by Anna Flanagan tested the effectiveness of the authority innovation-decision model versus the optional innovation-decision model (1982). Sixty undergraduate students enrolled in a Communications and Human relations course were exposed to the authority innovation-decision model in regards to pronoun usage in papers written for the course (they were told that inclusive pronoun use would be required). Forty-one undergraduate students enrolled in a Nonverbal Communication course were exposed to the optional innovation-decision model in regards to pronoun usage (inclusive pronoun use was presented as optional).

Contrary to Flanagan's expectations, students exposed to the authority innovation-decision model were no more likely than students exposed to the optional innovation-decision model to resist using inclusive pronouns, feel that they would discontinue inclusive pronoun use in the future, or express negative feelings towards the use of inclusive pronouns (1982). In other words, being forced to make a change by those in a position of power may not have inherently negative affects on the adoption of a new innovation within a social system.

Frank proposes that as schools are fundamentally social organizations, reform and innovations are implemented through localized social processes (2004). Frank explores the differences between organizations with simple, hierarchical decision making structures (such as manufacturing plants) and schools, where decision making is more complex, due to the greater amount of autonomy that is usually afforded classroom teachers. According to Frank, "In these

organizations, it is not a simple matter of making a collective decision to adopt and then implement an innovation. Instead, the process is more one of diffusion of innovation within the organization, since each actor has some autonomy to make his or her own decision partly in response to the ideas, information, and other social forces to which he or she is exposed (2004).”

Like Granger, Frank believes that informal training is a critical element of implementing complex new innovations (2004). Informal help and social pressure can be combined into the general idea of social capital, which Frank defines as, “the potential to access resources through social relations (2004).” Frank integrates the idea of social capital into the overall framework of the diffusion of innovation theory to posit a new model of intraorganizational diffusion (figure 2).



Frank conducted a study of the implementation of computer technology in six schools with varied demographic profiles to evaluate his model. Frank found that the effects of social capital can bypass the usual effects of diffusion, particularly that of perceived potential, which affects the implementation stage of innovation adoption.

This paper will use the traditional Diffusion of Innovation theory to judge whether or not the effects of social capital in a school environment can move a population of teachers further along the diffusion of innovation scale than what would be expected were they to adapt to new innovations independent of the school's social system.

Brand Loyalty

An additional factor that could potentially affect technology implementation is brand loyalty. Brand loyalty can be defined as “the biased (i.e., nonrandom), behavioral response (i.e., purchase), expressed over time, by some decision-making unit, with respect to one or more alternative brands out of a set of such brands, and is a function of psychological (decision-making, evaluative) processes (Jacoby, 1973).” In other words, brand loyalty differs from simple repeat purchasing behavior in that brand loyalty derives from underlying psychological processes.

The processes that create brand loyalty in a consumer are based not only on the functional aspects of a brand but also how consumers view the symbolic identity of the brand.

Bhattacharya (2003) states that, “some of the strongest consumer-company relationships are based on consumers' identification with the companies that help them satisfy one or more key self-definitional needs. Such consumer-company identification is active, selective and volitional

on the consumers' part and causes them to engage in favorable as well as potentially unfavorable company-related behaviors (77).”

Consumers will seek out brands that match their own personal identities; this concept is referred to as “self-congruence.” Self-congruence with a brand not only has an effect on brand loyalty; it may also have an effect on how consumers view the functional-congruence of a brand's product. Functional-congruence is defined as the aspect of brand evaluation that forms a consumer's view of how well the functional aspects of a brand will meet their needs (Kressmann, 2006). According to Kressmann, functional-congruence, self-congruence, product involvement and brand relationship quality combine to form brand loyalty (2006). In a study of 600 automobile owners, Kresseman found that self-congruence with a brand biases the ways that consumers view the functional-congruence of a brand. In other words, if a consumer identifies personally with a brand, the consumer is more likely to believe that the functional aspects of a brand will meet his needs, and vice-versa.

Additional studies have shown that consumers do personally identify with companies and that this identification influences not only the ways in which the consumer uses the company's products but also how the consumer communicates about the product (Ahearne, 2005). In particular, consumers that identify more strongly with a company end up purchasing more of the company's products and recommending the company and the products it produces more often. In addition, brand loyalty has been shown to result from a strong brand identity (He, 2011). As technology products typically have strong brand identities, they are likely to inspire brand loyalty in consumers.

All of these behaviors may positively or negatively affect technology implementation in schools or other organizations. As a brand-loyal consumer would likely have a deep understanding of the products that they are brand loyal to (due to repeated use), and a lesser understanding of products they are not loyal to, it is possible that the brand loyalties of those implementing technology in the workplace may have some affect on the success of the implementation. It is also possible that asking a brand-loyal person to implement a technology other than that of a brand they are loyal to would be tantamount to asking that person to reject or change a piece of their own personal identity. Asking a teacher or other employee to change in such a profound way is likely have an effect on that individual's success or failure when implementing new technologies. It is also possible that a teacher that is brand loyal to a product other than the one they are asked to use may be biased against the functional aspects of the product due to the self-congruence they experience with their preferred brand. The opposite may hold true if a teacher is brand loyal to a the product they are asked to use in the classroom.

Primary Research

Studies were conducted at two schools that were in the process of implementing new technologies in a classroom setting. Each school was beginning to offer Apple iPads for student use in the classroom, though the scope of the project differed in each case. At the first school (presently referred to as School One), a survey was conducted that measured how teachers felt about the success of the iPad implementation project. Interviews were also conducted with two teachers that led the iPad implementation project as well as the Director of Technology and Media Services for the school district that the school is located in. At the second school

(presently referred to as School Two), a focus group was conducted with teachers that were in the process of implementing iPads in their classroom.

Apple offers a discount on all of their products to teachers (whether they use the products in the classroom or not) as well as volume purchasing options for school districts. Apple has developed a multitude of educational applications that are designed for use in the classroom and also offers textbooks for use with the iPad through their on-line store. Apple offers on-site professional training to schools and school districts that are in the process implementing iPads for use in the classroom as well as a variety of other professional services including on-line mentoring and IT assistance. These initiatives indicate that Apple may be attempting to increase their market share by replacing existing curricular tools (textbooks for example) with iPads and other Apple products. If they succeed in doing so, proper implementation of these tools will become even more essential.

The two iPad implementation projects differ in a few key ways. School One is a high school in the process of providing each student in the ninth grade with an iPad meant to be used as a primary tool for learning in and outside of the classroom. School Two is an elementary school that is beginning to use iPads in the classroom on a project-based basis. Each implementation project will be looked at individually; insights gained from the research conducted at each school will then be used to answer the following research questions and determine the validity of the following hypotheses.

Research Questions

1. How can school districts ensure that technology is appropriately implemented in the classroom?
2. How does brand loyalty affect technology implementation?

Hypotheses

1. Due to each school's use of teachers as the primary support system for iPad implementation in the classroom, teachers implementing the iPad pilot program will report results that exceed those predicted by the Diffusion of Innovation Theory. More than half of respondents will agree or strongly agree with the statements included with the survey, which will correspond with the innovator, early adopter and early majority categories of the Diffusion of Innovation Theory.
2. Teachers reporting a high level of brand loyalty towards technology-based products will report better results than those exhibiting low brand loyalty towards technology-based products.

School One - Background

School One is part of a public school district located in the southwest Minneapolis-St. Paul metro area. Approximately 9,000 students attend school in the district. The school district has earned national awards for its use of educational technology and has used SMART boards

(electronic interactive whiteboards) in the classroom since 2002. School One is a high performing school that serves students in grades 9 through 12. Approximately 2,850 students attend School One; 99 percent of students graduate, 93 percent go on to college and the average ACT score is 25.5 (“iPads at Minnetonka High School - media backgrounder,” 2012).

School One launched a one to one iPad pilot with half of the ninth grade class (approximately 360 students) in September 2011, coinciding with the beginning of the school year. Fifteen teachers in the subjects of Math, Science and English were involved with the initial implementation. Students involved in the original iPad pilot used the iPads in three of six classes. Students and teachers were selected to participate in the iPad implementation due solely to class schedule; technology experience and academic ability were not considered. Teachers were given six days of training in iPad implementation before implementing the technology in the classroom. Prior to issuing the iPads, the school district pre-populated the iPads with appropriate educational apps and disabled the app store, iTunes and the facetime feature (a program that allows users to watch one another on the iPad screen).

Students and teachers were each issued their own iPad for use in and outside the classroom. Students signed an agreement stating that the device is to be used only for educational, school related purposes during instructional time. Students are allowed to use the iPad for personal use outside school hours, as the district felt that would lead to an increase in student learning and productivity when using the device. The school district’s acceptable use policy continues to apply to the device outside school hours. The iPads remain property of the school district and are checked out to students in the same manner a textbook would be.

The iPad is meant to be a primary learning, organization and productivity tool in the classroom; it is not considered an add-on but a vital piece of the students' classroom experience and teachers were expected to use the iPad to conduct formative testing in the classroom. The vision and expectations for the iPad project were delivered to students and teachers through a variety of communications strategies, including face-to-face meetings, online quizzes, and videos shown in class.

The iPad pilot expanded to the full freshman class (approximately 720 students total) in January 2012, coinciding with the beginning of the second semester. The expansion was supported by data showing measurable increases in student achievement, students collaboration and an increase in the number of formative assessments used by teachers ("iPads at Minnetonka High School - media background," 2012). Thirty seven additional teachers were involved with the second implementation; subjects taught now included Social Studies and Health. All ninth grade students now used an iPad for two-thirds of their school day. Feedback on the success of the project was collected from teachers throughout the process; that feedback was used to continually support the iPad implementation project.

Funding for the iPad one to one implementation project came from a voter-approved technology levy. Each iPad cost the district approximately \$550; as those funds came from a funding stream specifically dedicated to technology and could not be used for operating expenses, the iPad pilot did not compete with other needs for funding.

One unique aspect of the implementation was the use of classroom teachers as implementation support staff. Two teachers were taken out of the classroom, assigned "Teacher

on Special Assignment” status and given the responsibility of ensuring that all classroom teachers implementing the iPad pilot program were given appropriate support.

Methods and Data Collection - School One

Data was collected on the School One iPad implementation project in three ways. A web-based survey was distributed to all teachers participating in the iPad implementation project. The survey sought to measure how well iPads were being implemented in individual classrooms and to determine the extent to which those teachers exhibited brand loyalty towards technology-based products. The survey was sent to all 53 teachers involved in the iPad pilot project and received 43 responses.

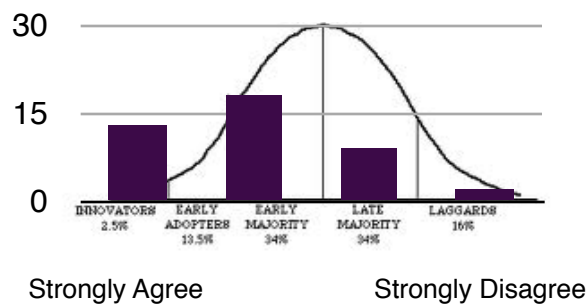
An interview was conducted with the two teachers on special assignment tasked with assisting teachers with implementing the iPad pilot project. An additional interview was conducted with the school district’s Director of Instructional Technology and Media Services, who led the iPad pilot project implementation.

Survey Results - Classroom Implementation

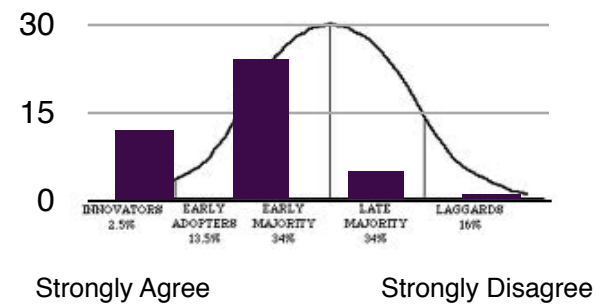
Teachers were asked to indicate their level of agreement with a variety of statements related to the iPad implementation on a four point Likert scale. A four point scale was used to ensure that teachers were not able to select a neutral response. A four point scale was chosen due to past experience with the teachers involved in the project. Those designing the survey deemed

it likely that respondents would choose to remain neutral rather than express an opinion on the success of the iPad project in most cases. Responses to each question were graphed against a representation of the Diffusion of Innovation theory. As a group, teachers responding to the survey consistently gave answers that exceeded what would be expected based on the Diffusion of Innovation theory (figure 3).

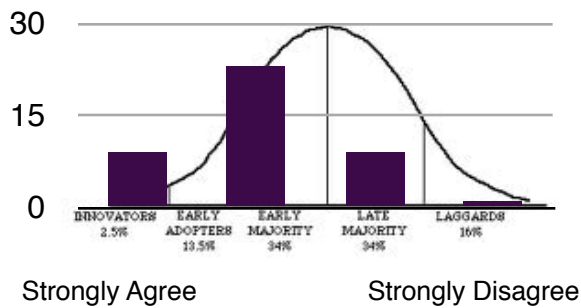
■ Using the iPad has changed how I access information



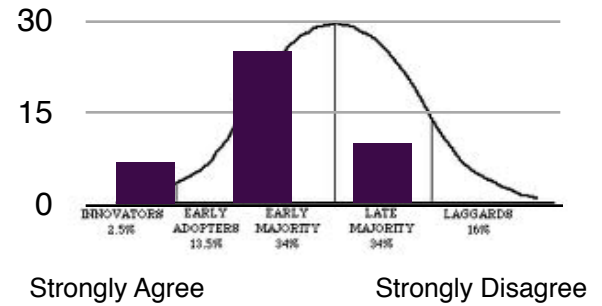
■ Using the iPad has changed my instructional practices



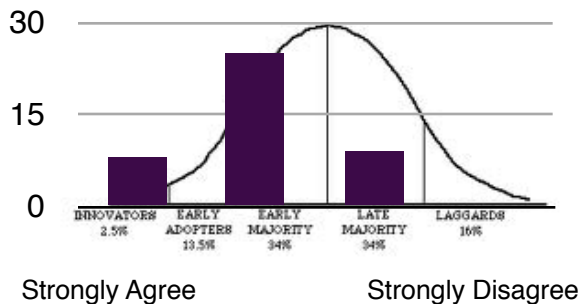
■ The use of iPads has led to an increase in student engagement



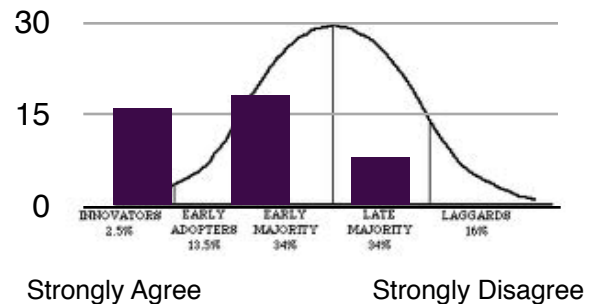
■ The use of iPads has led to an increase in student learning



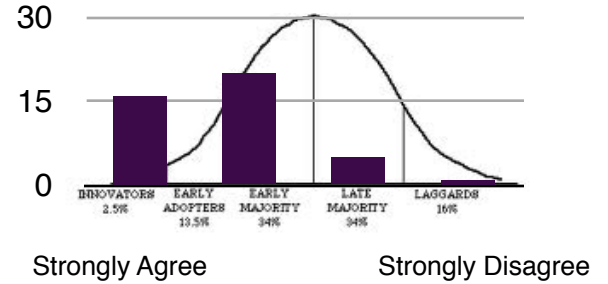
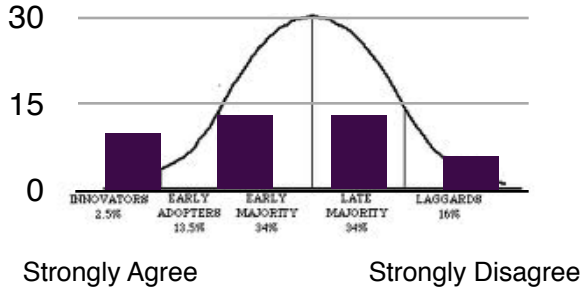
■ The use of iPads has led to an increase in student collaboration



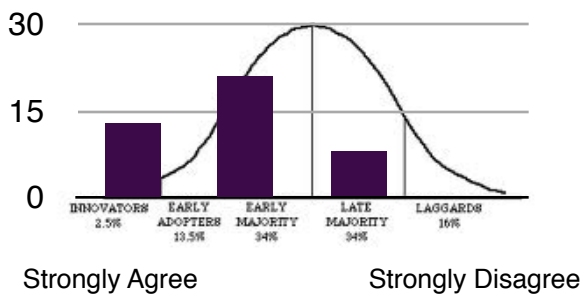
■ The use of iPads has led to an increase in student communication



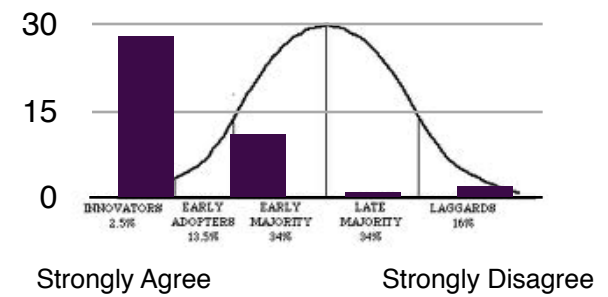
■ The use of iPads has led to an increase in instructional time ■ Students will be better prepared for the future due to the use of iPads



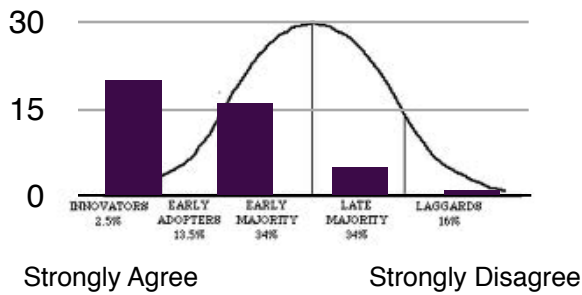
■ I am better able to track student learning



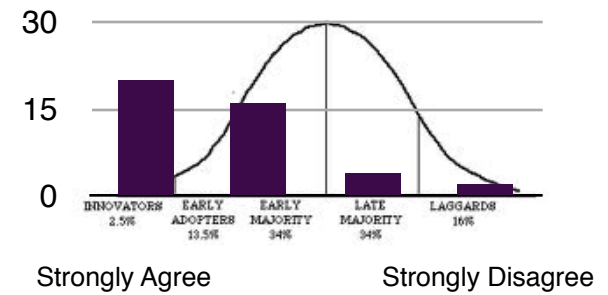
■ I believe that using new types of technology in the classroom is important



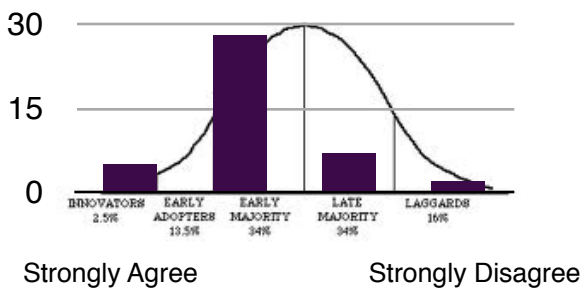
■ I enjoy using new types of technology in the classroom



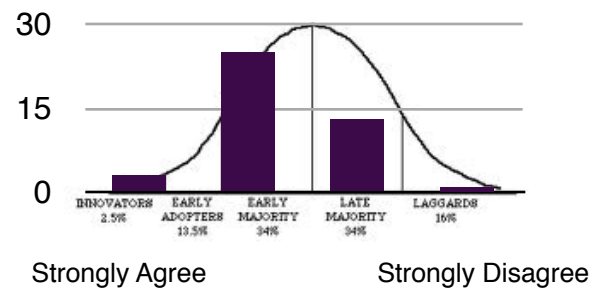
■ I recieved adequate training in the use of iPads



■ The use of iPads has led to an increase in problem solving



■ The use of iPads has led to an increase in critical thinking



The number of teachers reporting successful use of iPads in the classroom outnumber the number of teachers reporting a lack of success in every case. These figures indicate that School One's iPad communication and implementation support strategies were successful in moving teachers towards a place where they could successfully implement the new technology in their classroom, giving credence to the first hypothesis.

This is not surprising. School One's implementation procedure followed several of the recommendations laid out in the literature review, and the teachers involved in the project generally fit the definition of those that would be likely to succeed when implementing new technology in schools. 67% of teachers surveyed strongly believe that using new types of technology in the classroom is important, while only 5% of those surveyed strongly disagree with that statement. In addition, 48% of teachers surveyed strongly agree that they enjoy using new types of technology in the classroom, while only 2% disagree with that statement. Those figures may also indicate high degree of teacher comfort with technology. The results of the teacher survey indicate that a majority of teachers felt that School One's iPad pilot project was highly successful.

An assessment of student performance in School One supports those claims. Students that were issued an iPad received better grades than those not using an iPad during the initial phases of the iPad implementation at School One. End year test scores in Algebra also rose in the first year of the iPad implementation when compared to the year previous. Writing assessments given to Special Education Students also showed marked improvement.

Survey Results - Brand Loyalty

Respondents were also asked to indicate levels of brand loyalty for three technology related products: personal/laptop computers, cellular phones and automobiles. Respondents were asked whether or not they owned a personal/laptop computer, cellphone and automobile, what brand the product was, how many they had owned over the past 10 years and how many different brands of the product they'd owned over the past 10 years. Respondents were considered brand loyal if they had purchased only one brand of a product over the past ten years and had owned more than one of the product.

Four of 43 respondents indicated brand loyalty towards a particular brand of cellular phone (Samsung in each case). One of the teachers that exhibited brand loyalty towards cellular phones indicated moderate to strong disagreement with at least 50% of the statements about iPad use in the classroom included in the survey.

Seven of 43 respondents indicated brand loyalty towards a particular brand of personal/laptop computer (brands varied, but Apple, the same brand that produces iPads, was indicated in four cases). Four of the seven teachers that exhibited brand loyalty towards a particular brand of personal/laptop computer indicated moderate to strong disagreement with over 50% of the statements about iPad use in the classroom. Interestingly, three of those four teachers indicated brand loyalty towards Apple personal/laptop computers.

Eight of 43 respondents indicated brand loyalty towards a particular brand of automobile (brands varied). Two of the teachers that exhibited brand loyalty towards a particular brand of

automobile indicated moderate to strong disagreement with over 50% of the statements about iPad use in the classroom included in the survey.

One respondent indicated brand loyalty towards both a personal/laptop computer brand (Apple) and an automobile brand (Honda). That respondent indicated moderate to strong disagreement with over 50% of the statements about iPad use in the classroom included in the survey.

Overall, 18 of 43 respondents indicated brand loyalty towards a technology-related product. Six of those 18 indicated that a moderate to strong disagreement with over 50% of the statements about iPad use in the classroom included in the survey.

Of the 18 respondents that indicated brand loyalty towards a technology-related product, one third indicated moderate to strong disagreement with over 50% of the statements about iPad use in the classroom. Zero of the 25 teachers that did not indicate brand loyalty toward a technology product indicated moderate to strong disagreement with over 50% of the statements about iPad use in the classroom. Contrary to the second hypothesis, teachers exhibiting brand loyalty towards a technology related product reported more negative results than those that did not exhibit brand loyalty towards a technology product.

What is particularly interesting is the response of the teachers that exhibited brand loyalty towards Apple computers. The sample size is small, but one would expect, due to a presumed familiarity with the operating system, that those respondents would report more success than those without brand loyalty or with brand loyalty towards another brand. One possibility is that those teachers are more aware of the limitations of the iPad itself, and may

focus on what the product cannot do rather than what it can. Another possibility is that those respondents are so used to using the product in their personal lives that they view their and their students' use of the product in the classroom through a more critical lens than those without experience using the product. A third possibility is that the teachers' feelings of self-congruence towards Apple products somehow conflicts with the way that they are asked to use the products in their work life.

While the results of the survey are interesting, definitive conclusions on the effects of brand loyalty on teacher technology implementation cannot be made. Additional research into the affects of brand loyalty on technology would be needed, as well as a much larger pool of survey respondents.

Interview Results - Teachers on Special Assignment

An interview with the teachers on special assignment tasked with supporting the iPad classroom implementation was conducted at School One on April 11, 2012. The interview took approximately one hour. The purpose of the interview was to gauge teacher response to the iPad implementation project and gain an understanding of how the iPad implementation strategies assisted teachers when using the new technology.

Both teachers involved in the iPad implementation agreed that their being seen as colleagues, instead of evaluators, had a positive effect on their ability to assist teachers. Said one, "Teachers aren't fazed by our presence, because usually that's an evaluator that comes into

their classroom, but we're there as support...to be able to go into a classroom in the role of support, as a non-evaluator, has really been positive.”

When asked about the differences in how a teacher may look at their involvement in the iPad implementation versus the involvement of a supervisor or IT professional, both teachers focused on the social dynamics involved. “It lets you relate to the frustrations that they have. They are more comfortable asking a question, because they are not going to be intimidated (because) they don't have the answer or because they think it's a stupid or silly question,” said one. The other responded, “I think when teachers know that they're talking to teachers who understand a classroom situation that's important. Because when an iPad can do something, but not do it well, then I as a teacher can say...‘you know what, it's easier on a desktop’...whereas I think there's sometimes a tendency for (others) to say, ‘If you can do it on an iPad, you need to do it on the iPad, because we need to do everything on the iPad.’ I think if it weren't coming from a classroom teacher that might be the tone of some of the conversations with classroom teachers.”

The interview with the teachers on special assignment gives additional support to the first hypothesis. The social dynamics that exist between teachers on special assignment and the teachers using the iPads in the classroom seems to have played a large part in the success of the iPad implementation project. Intrinsic barriers that may have existed if support had been mainly delivered by superiors or IT staff seem to have dissolved when teachers worked with fellow teachers on the implementation.

Interview Results - Director of Instructional Technology and Media Services

An interview with the school district's Director of Instructional Technology was conducted at School One on April 11, 2012. The interview took place immediately after the interview with the two teachers on special assignment and took approximately one hour. The purpose of the interview was to determine the overall comfort level of the teachers as they progressed through the iPad implementation project.

When asked about the initial preparedness of the teachers implementing iPads in the classroom, he replied, "(The) comfort level for teachers was pretty minimal. We started with sixteen teachers and I don't know that any of them had an iPad prior to this. A few had iPhones so were able to make that jump...but I'd say their comfort level was pretty basic."

When asked about general teacher attitudes toward the iPad implementation project, he responded, "Initially they quite didn't feel comfortable with it but now they feel better, (as) the support has been great. They have been supported way more than they have with...similar implementations. The fact that (Teacher #1) or (Teacher #2) or I can be right in their room if they shoot an email or call with a question (helps)...as well as (the fact that) we're proactively trying to get into their classrooms."

The responses of the Director of Instructional Technology mirror those of the two teachers in that they suggest that teacher comfort with those leading the implementation contributed towards better implementation of the new technology. The first hypothesis is supported by the Director of Instructional Technology's remarks.

Background - School Two

School Two serves students in Kindergarten through the sixth grade. Approximately 750 students attend the school. The school is located in the northwest Minneapolis metro area. School Two is a magnet school that is open to students living in eight school districts, so its student population is drawn from a wider geographic area than a typical elementary school; in addition, the school's curriculum focuses on science, technology, engineering and math. School Two has won national awards for magnet school excellence and teachers working at the school have won awards for excelling in the use of technology and for technology innovation in education.

School Two began offering iPads for use in the classroom to teachers that completed an application with a partner to undergo training on the use of the devices (personal communication, June 4, 2012). The application process required teachers to submit a plan that detailed a vision of how they planned to use the iPads as instructional tools. Eight teachers applied with a partner for the trainings. After the trainings, each teacher was provided with an iPad that they were allowed to take home with them and use outside of school hours (the iPads remain property of the school district). Teachers were given two half-days of training in the use of iPads (approximately four hours for each training) prior to using them in the classroom; the teachers will be given additional training over the summer. The teachers also receive support from the school's in-house Technology Integration Coordinator.

School Two received 12 iPads for student use in the classroom in early May 2012. Teachers use a calendar to reserve times for their students to use iPads in the classroom. The

iPads are typically reserved for approximately one hour, and are used for a variety of projects, including creating iMovies, using apps that assist in the teaching of math, and creating cross-classroom learning opportunities.

Methods and Data Collection - School Two

A focus group with four of the eight teachers involved in the iPad project at School Two was conducted on June 4, 2012. Teachers had been using the iPads in the classroom for approximately one month at the time of the focus group. The focus group took place at the school and lasted for approximately one hour. Two of the teachers that participated in the focus group taught 4th grade, one taught 1st grade, and one taught 6th grade. All of the teachers that participated in the focus group were responsible for teaching lessons in all areas of study.

Focus Group Results - School Two

All participating teachers indicated that the support received from the school's Technology Integration Coordinator was essential to their use of iPads in the classroom. One teacher said, "I don't even need her there, but the idea that there's somebody I can go to when there's a problem or a suggestion...it's critical." Another teacher said, "I think it just gives you that ability to take risks...she's invaluable to have." A third teacher added, "I don't think I'd do 90% of the things I do without that resource."

The focus group participants were unanimous in thinking that the Technology Integration Coordinator was not seen by teachers at the school as someone in a supervisory role, but as a fellow teacher. “Think of her as the technology lead teacher, but without classroom responsibilities,” said one teacher.

The participants were also unanimous in thinking that it would be more difficult for them to go to someone in a supervisory role and ask for support for issues relating to new pieces of technology. When asked directly about what it would be like if the person helping to implement new technologies was in a supervisory role, one teacher said, “I think it would be scarier.” Another teacher added, “Yes, because then it’s not enabling...right now we think of her (the technology integration coordinator) as being on our side of the table. If she was principal and did our evaluation she would then be on the other side of the table.” A third teacher added that for those that don’t feel comfortable with technology, “that would be so intimidating, because now I know someone’s looking at me and I’m not doing the same things as the teacher next door is doing, and you know, and what are they going to be saying about me.”

Like the results of the interviews done with staff from School One, the results of the focus group with teachers from School Two strongly support the first hypothesis, that teachers will report better results than what would be expected if the Diffusion of Innovation theory was applied to adoption of new technologies in the classroom.

Overall Conclusions - Primary Research

Each school's success in using classroom teachers as the main support system for other teachers implementing a new technology in the classroom suggests that, when considering the first research question, the social dynamics surrounding technology implementation in schools need to be addressed above all else. This finding falls in line with three of Zhao and Frank's four factors that influence technology integration in schools (one factor being outside the hands of the implementation staff). Teachers learning from other teachers seems to positively influence socialization of the wanted behavior, provide opportunities to learn about and explore the new technology in a classroom setting, and leverage the wanted change through social contexts. Fulk's focus on the social system of an organization and the importance of informal collaboration also correspond with each school's efforts. The schools' implementation strategies also fall in line with Ertmer's roadmap towards technology implementation. By developing and communicating a vision, allowing teachers to identify curricular opportunities and resources with other teachers and using non-supervisors as the primary support staff, each school gave teachers a strong support system that enabled them to implement the new technology. More importantly, the student assessments conducted by School One indicate that student learning was positively affected as well.

The first hypothesis is supported by both survey, interview and focus group data. All participants indicated that having teachers as the primary support staff during the implementation process was a positive, and survey data collected from School One indicated that teachers were having more success implementing iPads in the classroom than what would be predicted by the diffusion of innovation theory.

Answers to the second research question and hypothesis are not clear. While the data collected is interesting, the scope of this study is not broad enough to provide definitive answers regarding the effects of brand loyalty on technology implementation in the classroom.

These findings have several implications for school districts looking to implement new technologies. The communication and staffing strategies employed by each district allowed teachers to feel comfortable when implementing a new technology. The focus on informal training opportunities with fellow teachers in particular seems to have had a great positive effect on successful implementation of the new technology. Teachers that are comfortable learning and collaborating with fellow teachers when implementing new technologies are likely to be better equipped to help students in their classrooms feel comfortable when using new technologies and gaining new technological skills.

Limitations and Ideas for Further Study

Information on prior student experience with iPads and data on student attitudes towards the iPad implementation projects would have provided additional opportunities to assess the success of iPad implementation projects. Data on student achievement before and after using the iPads in the classroom would also be useful. Survey samples were small; additional research with a larger group of teachers would be useful. Follow-up interviews with staff at both schools would also give a better idea of the long-term success of both iPad implementation projects.

Most research into brand loyalty focuses on purchasing behavior or how consumers identify with a brand. Additional research into the affects of brand loyalty on behavior other than

purchasing behavior would give valuable insight into how brand loyalty affects consumers' day to day lives. Research into the affects of brand loyalty on the behavior of consumers with products outside the specified brand would also be useful. Models for measuring brand loyalty in individual consumers would also have helped determine which teachers included in the survey were in fact brand loyal towards particular technology products.

Recommendations for Implementing New Technologies in Schools

The results of the primary research and insights gained from the literature review point towards several communications strategies that can be employed to address factors that affect technology implementation in schools. The following recommendations are categorized as primarily affecting either leadership, the social dynamics of a school, or individual teachers. However, as there is significant overlap between those three categories, inclusion in one is not meant to indicate that a strategy should not be employed when addressing a separate category. Rather, these recommendations should be taken as a whole and implemented as appropriate depending on the situation.

Recommendations for Leadership

1. Determine the comfort levels of staff and pre-existing attitudes staff have towards the new technology.

Inan's path model indicates that teachers' beliefs positively influence technology integration, and that those beliefs will mediate factors including overall support, technical support and computer availability when those teachers integrate technology in the classroom. So, it is important for leadership to be aware of teacher beliefs if they are to begin implementing a new technology in the classroom. Determining teachers' comfort level with the new technology will also help leadership address any anxiety issues that may exist within their teaching staff. As those anxieties are likely to be similar for each teacher that exhibits them (Chua, 1999; Marcoulides, 2007), strategies to address those issues can be built into the technology implementation plan and should be applicable to each individual teacher that experiences anxiety towards the new technology. Being aware of teacher attitudes will also provide early warning of any negative attitudes towards the new technology that may manifest as social pressure against the implementation of the new technology.

Strategies to determine existing beliefs about a new technology could include surveys, focus groups, and meetings with individual teachers. It can be inferred from the information collected during the interviews and focus groups conducted with schools one and two that it would likely be more effective if those strategies were delivered by non-supervisory staff, in order to ensure the comfort levels and honesty of the teachers being queried.

2. Communicate an open-ended vision of how the new technology will be used.

Ertmer's suggestion that a vision of how a new technology should be used is as important as the technical skills of teachers using the new technology should be taken seriously (1999). It

is vitally important that teachers understand how a new technology is expected to be implemented if they are to do so properly. However, Orlikowski's theory of change management (1997) makes a compelling case that a vision for change must not be limiting; instead, employees should feel empowered to find new uses for the technology, even if those uses were not a part of the initial vision.

School One offers some effective ways for school leaders to communicate a vision of change to teachers and students that will be using a new technology in the classroom. School One used strategies such as face to face meetings, online quizzes, and videos to ensure that a vision for technology integration was understood. That said, actual implementation of the devices was left up to individual teachers. In addition, consistent monitoring of how the new technology is being used as it is implemented would allow school leaders to be aware of any new, innovative uses of the new technology that their teachers discover. Those new innovations could then be shared with and implemented where appropriate by other teachers.

3. Designate non-supervisory staff as implementation leads.

Data collected from both School One and School Two indicates that designating non-supervisory staff as the technology implementation leads led to more effective technology implementation in the classroom. It seems that having non-supervisory staff in those positions helped to increase the amount of informal training that teachers received in the new technologies and also helped reduce teacher anxiety towards using the new technology. As Granger found that informal training is the most influential factor in the successful implementation of new

technologies (2002), finding ways to increase informal training opportunities should be prioritized.

While some school leaders may be hesitant to give up some control of technology implementation, Peled's study (2011) indicates that both principals that fall into the initiating category (leads the process of change, acts as a mentor during the change) and principals that fall into the empowering category (interested in technology change, allows teachers to proceed with new technology initiatives) are successful in moving teachers towards successful technology implementation. So, as long as teachers feel that school leadership is supportive of the new technology, they are likely to implement it effectively. The benefits that can be gained by giving up a modicum of control and increasing the amount of informal training that takes place are likely to outweigh any problems that may result from doing so.

4. Apply the authority innovation-decision model when necessary.

Flanagan's research into the effectiveness of the authority innovation-decision model versus the optional innovation-decision model indicates that requiring the adoption of a new innovation in a social system may be just as effective as allowing members to adopt to the new innovation on their own. Data from School One reinforces this claim, as the teachers were required to adopt to using iPads in the classroom but reported successful adoption of those technologies at a higher rate than what would be predicted by the Diffusion of Innovation theory. School leaders should not hesitate to require the adoption of new technologies if such a change is needed.

Recommendation Regarding Social Dynamics

5. Leverage social capital to inspire informal training and address computer anxiety

The value of ensuring that the social dynamics of a school positively inform the implementation of new technologies cannot be overstated. Fulk's study shows that group attitudes towards new technology help determine the success of any new technology implementation project. Zhao believes that formal training opportunities have little effect on computer use in the classroom, and that teachers are more likely to adopt to new technologies due to interactions with other teachers. Granger's belief that informal training is the most important factor of any technology also indicates the importance of positive relationships and attitudes towards a new technology.

Frank's model of intraorganizational diffusion gives a good starting point for considering ways to leverage social capital in order to inspire informal training. Frank's proposes that the perceived potential of a new technology is transmitted from a teacher that is an expert to a teacher that is a novice through the same processes that typically govern the diffusion of an innovation. According to the model, the novice also can receive help and expertise from the expert while also being pressured to conform to the expert's level of implementation of the new technology through the exertion of social capital. If the novice implements the new technology in response to social pressure from the expert, the expert also receives a benefit in the form of greater conformity within the organization. That also reinforces the fifth and final element of the decision process that Rogers describes in his Diffusion of Innovation theory, confirmation, so

supports the innovation-decisions already made by the expert teacher as well as others in the social system.

There are several ways that schools can create an environment where social capital works to inspire informal training opportunities and reduce computer anxiety. Determining existing attitudes and expertise in regards to the new technology would be an important first step. Once that is determined, small groups could be set up where teachers work together to explore the new technology and find curricular opportunities (this falls in line with Ertmer's roadmap for technology integration). Fulk's finding that work group technology attitudes are a positive predictor of technology attitudes for individuals suggests that when possible, each group should be comprised in such a way that teachers exhibiting positive attitudes towards the new technology make up a majority of the group. If that is not possible, the groups should be set up in a way that limits the spread of negative attitudes, with the overall goal being that a majority of the teachers working on implementing the new technology are interacting with those with positive attitudes towards the new technology.

As the groups work together, they should be asked to report back not only how the implementation itself is going but how they feel about the implementation. Any teachers experiencing anxiety towards the new technology would likely find out that others are experiencing anxiety in the same way. Strategies for addressing those anxieties through informal training could be developed with teachers that have positive relationships with the anxious individuals. Depending on the culture of the school, addressing those anxieties through informal training could help reinforce a positive social dynamic in the school. Anxious teachers would be

able to access support while non-anxious teachers would see that support is available should they ever be in need.

Recommendations Regarding Individual Teacher Characteristics

6. Expose teachers to new technologies as much as possible prior to implementation.

Much of the literature on technology implementation suggests that giving teachers the opportunity to explore new technologies before beginning to use them in the classroom is beneficial (Zhao, 2003; Ertmer, 1999). Additionally, a lack of computer exposure is the most significant predictor of computer anxiety (Chua 1999). It follows that exposing teachers to new technologies early and often would help mitigate any anxieties that they may feel towards using the new technology. Doing so may also help overcome any negative views that brand loyal teachers may have towards the technology implementation project.

7. When possible, allow teachers to interact independently with new technologies outside the classroom environment.

Primary data collected for this study indicates that allowing teachers to interact with new technologies outside of the classroom helps teachers implement those technologies in the classroom. In each case, teachers were able to use the iPads outside of work hours; one teacher from School Two stated that, “I think it’s something we absolutely have to do...I need time to find apps at home, try some of the free apps, how easy is it...I needed to have that time outside.”

One of Zhao's four factors that influence technology implementation in schools supports this recommendation as well. Providing opportunities to explore and learn about new technologies need not take place only during work hours; if a school is in a position to encourage exploration of new technologies outside of the work environment it will likely benefit from doing so.

While some new types of technology may not lend themselves to use outside the work environment, strategies to encourage additional, non-classroom specific learning may assist teachers as they learn to use the new technology.

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iPad Teacher Survey April 2012

The following survey should take approximately five minutes to complete. Your response will be used to write a case study on iPad implementation in the classroom. All information collected will be anonymous. Thank you very much for your response.

* Required

What subject do you teach? *

- English
- ELL
- Math
- Science
- Social Studies
- Special Ed
- Health

When did you start the iPad pilot? *

- Semester 1
- Semester 2

I believe that using the iPad has changed how I access information. *

1 2 3 4

Strongly Agree Strongly Disagree

I believe that using the iPad has changed my instructional practices. *

1 2 3 4

Strongly Agree Strongly Disagree

The use of iPads has led to increased student engagement in my classroom *

1 2 3 4

Strongly Agree Strongly Disagree

The use of iPads has led to an increase in student learning in my classroom *

1 2 3 4

Strongly Agree Strongly Disagree

The use of iPads has led to an increase in student collaboration in my classroom *

1 2 3 4

Strongly Agree

Strongly Disagree

The use of iPads has led to an increase in student communication in my classroom *

1 2 3 4

Strongly Agree

Strongly Disagree

The use of iPads has led to an increase in problem solving among students in my classroom *

1 2 3 4

Strongly Agree

Strongly Disagree

The use of iPads has led to an increase in critical thinking among students in my classroom *

1 2 3 4

Strongly Agree

Strongly Disagree

The use of iPads has allowed for an increase of instructional time in my classroom. *
(Collecting and returning papers, grading, etc.)

1 2 3 4

Strongly Agree

Strongly Disagree

I believe that students will be better prepared for the future due to the use of iPads in my classroom *

1 2 3 4

Strongly Agree

Strongly Disagree

I am better able to track student learning due to the use of iPads in my classroom *

1 2 3 4

Strongly Agree

Strongly Disagree

I believe that using new types of technology in the classroom is important *

1 2 3 4

Strongly Agree

Strongly Disagree

I enjoy using new types of technology in the classroom *

1 2 3 4

Strongly Agree

Strongly Disagree

I received adequate training in the use of iPads prior to using them in my classroom *

1 2 3 4

Strongly Agree

Strongly Disagree

Do you own a cellular phone?

Yes

If yes, what brand is your cellular phone?

Don't know

How many cellular phones have you owned in the past ten years?

0

How many different brands of cellular phone have you owned in the past 10 years?

0

Do you own a personal/laptop computer?

Yes

If yes, what brand is your personal/laptop computer?

Don't know

How many personal/laptop computers have you owned in the past ten years?

0

How many different brands of personal/laptop computer have you owned in the past ten years?

0

Do you own an automobile?

Yes

If yes, what brand is your automobile?

Don't know

How many automobiles have you owned in the past ten years?

0

How many different brands of automobile have you owned in the past ten years?

0

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All Respondents	The use of iPads has led to increased student engagement in my classroom	The use of iPads has led to an increase in student learning in my classroom	I believe that students will be better prepared for the future due to the use of iPads in my classroom	I am better able to track student learning due to the use of iPads in my classroom	I believe that using new types of technology in the classroom is important	I enjoy using new types of technology in the classroom	I received adequate training in the use of iPads prior to using them in my classroom
Timestamp							
4/17/12 7:36	3	2	3	2	2	2	2
4/11/12 10:10	3	3	4	3	4	4	2
4/11/12 11:36	2	2	2	3	4	3	1
4/11/12 14:25	2	1	1	2	1	1	2
4/13/12 13:11	1	3	1	2	1	2	1
4/13/12 11:11	3	3	3	2	3	3	2
4/13/12 14:28	3	2	2	2	1	2	1
4/15/12 14:53	3	3	2	2	1	2	2
4/11/12 14:00	1	1	1	2	1	1	2
4/12/12 12:08	3	4	3	4	2	2	2
4/11/12 9:19	2	3	1	1	1	1	1
4/11/12 9:12	3	2	3	3	2	2	2
4/13/12 9:45	1	1	1	1	1	1	2
4/11/12 8:50	3	2	2	2	2	2	2
4/11/12 9:47	1	2	1	2	1	1	1
4/11/12 9:39	1	1	1	1	1	2	1
4/13/12 9:33	1	1	1	3	1	1	3
4/11/12 8:40	2	2	2	2	2	2	1
4/13/12 9:32	2	3	3	3	1	1	2
4/11/12 14:32	2	2	1	2	1	1	1
4/11/12 12:18	2	2	2	2	1	1	1
4/11/12 10:04	2	2	2	1	1	1	1
4/11/12 13:41	2	3	1	2	1	1	1
4/12/12 7:16	3	2	2	2	1	2	1
4/17/12 14:50	2	1	2	2	1	1	2
4/11/12 11:32	1	2	2	1	1	1	2
4/13/12 9:09	2	2	2	2	2	2	1
4/13/12 9:00	2	2	2	1	2	1	1
4/13/12 9:22	2	2	1	1	1	2	2
4/11/12 9:12	2	2	2	3	1	2	1
4/15/12 13:28	2	2	2	2	2	3	1
4/13/12 10:40	4	3	2	3	2	3	1
4/11/12 15:00	1	1	1	1	1	1	1
4/11/12 8:39	1	2	2	1	2	1	2
4/18/12 14:39	2	2	1	2	1	2	3
4/13/12 18:59	2	2	2	1	1	1	1
4/13/12 16:24	2	3	2	3	2	2	2
4/12/12 7:27	2	2	2	1	2	3	3
4/13/12 10:19	2	2	1	2	1	1	3
4/11/12 10:27	3	2	3	1	1	1	4
4/11/12 13:07	2	2	1	1	1	1	1
4/16/12 13:32	2	3	2	2	1	2	2
4/11/12 9:37	3	2	1	2	1	2	4

What subject do you teach?	When did you start the iPad pilot?	Do you own a cellular phone?	If yes, what brand is your cellular phone?	How many cellular phones have you owned in the past ten years?	How many different brands of cellular phone have you owned in the past 10 years?	Do you own a personal/ laptop computer?
English	Semester 1	Yes	Don't know	0	0	No
Science	Semester 2	Yes	Samsung	2	1	Yes
English	Semester 2	Yes	Nokia	3	0	Yes
Special Ed	Semester 2	Yes	LG	3	2	Yes
English	Semester 1	Yes	Other	4	3	Yes
Math	Semester 1	Yes	Apple	5	0	Yes
Math	Semester 1	Yes	Other	5	3	Yes
Special Ed	Semester 2	Yes	Apple	3	5	Yes
Special Ed	Semester 2	Yes	Other	3	2	Yes
Social Studies	Semester 2	Yes	Apple	3	2	Yes
English	Semester 1	Yes	Samsung	3	2	Yes
Special Ed	Semester 2	Yes	LG	2	2	Yes
Health	Semester 2	Yes	LG	3	3	Yes
Social Studies	Semester 2	Yes	LG	5	2	Yes
Math	Semester 2	Yes	Other	2	2	Yes
Special Ed	Semester 2	Yes	Apple	7	0	Yes
Social Studies	Semester 2	Yes	Other	2	2	No
English	Semester 1	Yes	Samsung	2	1	Yes
Special Ed	Semester 1	Yes	Samsung	3	2	Yes
Math	Semester 2	Yes	Apple	3	3	Yes
Science	Semester 2	Yes	LG	2	2	Yes
Math	Semester 1	Yes	Samsung	4	3	Yes
English	Semester 1	Yes	Apple	4	3	Yes
English	Semester 1	Yes	Apple	4	4	Yes
Math	Semester 2	Yes	Apple	0	7	Yes
Science	Semester 2	Yes	Other	5	0	Yes
English	Semester 2	Yes	Other	3	2	Yes
Math	Semester 2	Yes	Samsung	3	2	Yes
Health	Semester 2	Yes	Samsung	3	1	Yes
Science	Semester 2	Yes	Samsung	8	3	Yes
Math	Semester 1	Yes	Samsung	2	2	Yes
English	Semester 2	Yes	LG	7	2	Yes
Math	Semester 2	Yes	Apple	4	4	Yes
Special Ed	Semester 2	Yes	LG	5	3	Yes
Special Ed	Semester 2	Yes	Apple	3	3	Yes
Science	Semester 1	Yes	Other	4	3	Yes
English	Semester 2	Yes	Samsung	3	1	Yes
Social Studies	Semester 2	Yes	Apple	5	4	No
Social Studies	Semester 2	Yes	Apple	7	4	Yes
Social Studies	Semester 2	Yes	Samsung	5	2	Yes
Science	Semester 1	Yes	Samsung	4	7	Yes
Special Ed	Semester 2	Yes	Other	4	3	Yes
Social Studies	Semester 2	Yes	Apple	8	4	Yes

If yes, what brand is your personal/laptop computer?	How many personal/laptop computers have you owned in the past ten years?	How many different brands of personal/laptop computer have you owned in the past ten years?	Do you own an automobile?	If yes, what brand is your automobile?	How many automobiles have you owned in the past ten years?	How many different brands of automobile have you owned in the past ten years?
Don't know	0	0	No	Don't know	0	0
Hewlett Packard (HP)	2	2	Yes	Chevrolet	1	0
Dell	2	0	Yes	Toyota	1	1
Hewlett Packard (HP)	1	1	Yes	Other	1	1
Apple	1	1	Yes	Other	1	1
Apple	2	1	Yes	Honda	1	1
Hewlett Packard (HP)	2	1	Yes	Other	1	1
Dell	2	3	Yes	Dodge	1	1
Don't know	1	1	Yes	Ford	2	1
Apple	3	1	Yes	Honda	2	1
Apple	1	2	Yes	Honda	2	1
Dell	2	2	Yes	Ford	2	1
Sony	2	2	Yes	Other	2	1
Other	6	4	Yes	GMC	2	1
Dell	0	2	Yes	Chevrolet	3	1
Dell	1	1	Yes	Ford	7	1
Don't know	0	0	Yes	Other	2	2
Dell	1	1	Yes	Other	2	2
Dell	2	1	Yes	Chevrolet	2	2
Apple	3	1	Yes	Honda	2	2
Apple	2	2	Yes	Honda	2	2
Apple	2	2	Yes	Ford	2	2
Apple	3	2	Yes	Toyota	2	2
Hewlett Packard (HP)	3	2	Yes	Honda	2	2
Apple	4	2	Yes	Other	2	2
Hewlett Packard (HP)	3	3	Yes	Honda	2	2
Toshiba	1	1	Yes	Toyota	3	2
Dell	2	1	Yes	Toyota	3	2
Apple	2	2	Yes	Other	3	2
Hewlett Packard (HP)	2	2	Yes	Don't know	3	2
Don't know	1	1	Yes	GMC	4	2
Apple	4	1	Yes	Toyota	4	2
Hewlett Packard (HP)	7	3	Yes	Toyota	4	2
Dell	3	2	Yes	Nissan	3	3
Hewlett Packard (HP)	3	2	Yes	Dodge	4	3
Dell	3	2	Yes	Toyota	4	3
Apple	3	3	Yes	Subaru	4	3
Dell	2	2	Yes	Ford	5	3
Other	4	4	Yes	Other	5	3
Other	3	3	Yes	Hyundai	4	4
Hewlett Packard (HP)	3	3	Yes	Ford	5	4
Apple	1	1	Yes	Other	7	6
Apple	4	3	Yes	Ford	7	6

Non-Brand Loyal Respondents	The use of iPads has led to increased student engagement in my classroom	The use of iPads has led to an increase in student learning in my classroom	I believe that students will be better prepared for the future due to the use of iPads in my classroom	I am better able to track student learning due to the use of iPads in my classroom	I believe that using new types of technology in the classroom is important	I enjoy using new types of technology in the classroom	I received adequate training in the use of iPads prior to using them in my classroom	The use of iPads has led to an increase in student collaboration in my classroom
Timestamp								
4/18/12 14:39	2	2	1	2	1	2	3	2
4/17/12 14:50	2	1	2	2	2	1	2	2
4/17/12 7:36	3	2	3	2	2	2	2	3
4/16/12 13:32	2	3	2	2	1	2	2	2
4/15/12 14:53	3	3	2	2	1	2	2	2
4/15/12 13:28	2	2	2	2	2	3	1	2
4/13/12 18:59	2	2	2	1	1	1	1	3
4/13/12 13:11	1	3	1	2	1	2	1	2
4/13/12 10:19	2	2	1	2	1	1	3	2
4/13/12 9:33	1	1	1	3	1	1	3	1
4/13/12 9:09	2	2	2	2	2	2	1	2
4/12/12 7:27	2	2	2	2	1	2	3	2
4/12/12 7:16	3	2	2	2	1	2	1	2
4/11/12 15:00	1	1	1	1	1	1	1	2
4/11/12 14:25	2	1	1	2	1	1	2	1
4/11/12 13:41	2	3	1	2	1	1	1	3
4/11/12 13:07	2	2	1	1	1	1	1	2
4/11/12 12:18	2	2	2	2	1	1	1	3
4/11/12 11:36	2	2	2	2	3	4	3	1
4/11/12 11:32	1	2	2	1	1	1	1	2
4/11/12 10:27	2	2	3	1	1	1	4	1
4/11/12 10:04	2	2	2	2	1	1	1	1
4/11/12 9:37	3	2	1	2	1	2	4	2
4/11/12 9:12	2	2	2	3	1	2	1	1
4/11/12 8:39	1	2	2	1	2	1	2	2

The use of iPads has led to an increase in student communication in my classroom	The use of iPads has led to an increase in problem solving among students in my classroom	The use of iPads has led to an increase in critical thinking among students in my classroom	The use of iPads has allowed for an increase of instructional time in my classroom.	I believe that using the iPad has changed how I access information.	I believe that using the iPad has changed my instructional practices.	What subject do you teach?	When did you start the iPad pilot?	Do you own a cellular phone?
3	2	2	3	2	2	Special Ed	Semester 2	Yes
2	3	3	3	2	1	Math	Semester 2	Yes
3	2	3	2	2	2	English	Semester 1	Yes
3	2	2	2	3	2	Special Ed	Semester 2	Yes
2	2	2	2	2	2	Special Ed	Semester 2	Yes
1	2	3	2	2	2	Math	Semester 1	Yes
1	2	2	2	3	1	Science	Semester 1	Yes
2	2	2	2	3	1	English	Semester 1	Yes
1	3	2	2	1	1	Social Studies	Semester 2	Yes
1	2	2	2	1	2	Social Studies	Semester 2	Yes
3	2	3	3	4	2	English	Semester 2	Yes
2	4	2	2	3	3	Social Studies	Semester 2	Yes
2	1	2	2	3	1	English	Semester 1	Yes
2	1	2	2	1	1	Math	Semester 2	Yes
1	2	2	1	2	2	Special Ed	Semester 2	Yes
2	2	2	2	2	1	English	Semester 1	Yes
2	2	2	2	2	1	Science	Semester 1	Yes
3	3	2	2	2	3	Science	Semester 2	Yes
1	3	4	3	3	3	English	Semester 2	Yes
2	2	2	2	1	1	Science	Semester 2	Yes
1	1	3	4	4	3	Social Studies	Semester 2	Yes
1	2	1	1	1	1	Math	Semester 1	Yes
2	2	2	2	4	4	Social Studies	Semester 2	Yes
2	2	2	2	3	2	Science	Semester 2	Yes
1	2	2	2	2	2	Special Ed	Semester 2	Yes

If yes, what brand is your cellular phone?	How many cellular phones have you owned in the past ten years?	How many different brands of cellular phone have you owned in the past 10 years?	Do you own a personal/laptop computer?	If yes, what brand is your personal/laptop computer?	How many personal/laptop computers have you owned in the past ten years?	How many different brands of personal/laptop computer have you owned in the past ten years?	Do you own an automobile?	If yes, what brand is your automobile?
Apple	3	3	Yes	Hewlett Packard (HP)	3	2	Yes	Dodge
Apple	0	7	Yes	Apple	4	2	Yes	Other
Don't know	0	0	No	Don't know	0	0	No	Don't know
Other	4	3	Yes	Apple	1	1	Yes	Other
Apple	3	5	Yes	Dell	2	3	Yes	Dodge
Samsung	2	2	Yes	Don't know	1	1	Yes	GMC
Other	4	3	Yes	Dell	3	2	Yes	Toyota
Other	4	3	Yes	Apple	1	1	Yes	Other
Apple	7	4	Yes	Other	4	4	Yes	Other
Other	2	2	No	Don't know	0	0	Yes	Other
Other	3	2	Yes	Toshiba	1	1	Yes	Toyota
Apple	5	4	No	Dell	2	2	Yes	Ford
Apple	4	4	Yes	Hewlett Packard (HP)	3	2	Yes	Honda
Apple	4	4	Yes	Hewlett Packard (HP)	7	3	Yes	Toyota
LG	3	2	Yes	Hewlett Packard (HP)	1	1	Yes	Other
Apple	4	3	Yes	Apple	3	2	Yes	Toyota
Samsung	4	7	Yes	Hewlett Packard (HP)	3	3	Yes	Ford
LG	2	2	Yes	Apple	2	2	Yes	Honda
Nokia	3	0	Yes	Dell	2	0	Yes	Toyota
Other	5	0	Yes	Hewlett Packard (HP)	3	3	Yes	Honda
Samsung	5	2	Yes	Other	3	3	Yes	Hyundai
Samsung	4	3	Yes	Apple	2	2	Yes	Ford
Apple	8	4	Yes	Apple	4	3	Yes	Ford
Samsung	8	3	Yes	Hewlett Packard (HP)	2	2	Yes	Don't know
LG	5	3	Yes	Dell	3	2	Yes	Nissan

How many automobiles have you owned in the past ten years?	How many different brands of automobile have you owned in the past ten years?
4	3
2	2
0	0
7	6
1	1
4	2
4	3
1	1
5	3
2	2
3	2
5	3
2	2
4	2
1	1
2	2
5	4
2	2
1	1
2	2
4	4
2	2
7	6
3	2
3	3

How many different brands of personal/laptop computer have you owned in the past ten years?	Do you own an automobile?	If yes, what brand is your automobile?	How many automobiles have you owned in the past ten years?	How many different brands of automobile have you owned in the past ten years?
1	Yes	Other	2	2
2	Yes	Other	3	2
2	Yes	Chevrolet	1	0
3	Yes	Subaru	4	3

Brand Loyal - Personal/Laptop Computer	The use of iPads has led to increased student engagement in my classroom	The use of iPads has led to an increase in student learning in my classroom	I believe that students will be better prepared for the future due to the use of iPads in my classroom	I am better able to track student learning due to the use of iPads in my classroom	I believe that using the iPad has changed how I access information.	I believe that using the iPad has changed my instructional practices.
Timestamp						
4/13/12 11:11	3	3	3	2	3	3
4/12/12 12:08	3	4	3	4	4	3
4/11/12 14:32	2	2	1	2	2	1
4/13/12 10:40	4	3	2	3	2	3
4/13/12 9:00	2	2	2	1	3	1
4/13/12 9:32	2	3	3	3	2	3
4/13/12 14:28	3	2	2	2	2	2

The use of iPads has led to an increase in student collaboration in my classroom	The use of iPads has led to an increase in student communication in my classroom	The use of iPads has led to an increase in problem solving among students in my classroom	The use of iPads has led to an increase in critical thinking among students in my classroom	The use of iPads has allowed for an increase of instructional time in my classroom.	I believe that using new types of technology in the classroom is important	I enjoy using new types of technology in the classroom
2	2	3	3	3	3	3
2	2	2	2	3	2	2
3	3	2	2	3	1	1
3	3	2	2	3	4	2
2	2	2	2	3	1	2
2	1	2	2	3	3	1
3	3	2	2	2	2	1

I received adequate training in the use of iPads prior to using them in my classroom	What subject do you teach?	When did you start the iPad pilot?	Do you own a cellular phone?	If yes, what brand is your cellular phone?	How many cellular phones have you owned in the past ten years?	How many different brands of cellular phone have you owned in the past 10 years?
2	Math	Semester 1	Yes	Apple	5	0
2	Social Studies	Semester 2	Yes	Apple	3	2
1	Math	Semester 2	Yes	Apple	3	3
1	English	Semester 2	Yes	LG	7	2
1	Math	Semester 2	Yes	Samsung	3	2
2	Special Ed	Semester 1	Yes	Samsung	3	2
1	Math	Semester 1	Yes	Other	5	3

Do you own a personal/ laptop computer?	If yes, what brand is your personal/laptop computer?	How many personal/laptop computers have you owned in the past ten years?	How many different brands of personal/laptop computer have you owned in the past ten years?	Do you own an automobile?	If yes, what brand is your automobile?	How many automobiles have you owned in the past ten years?
Yes	Apple	2	1	Yes	Honda	1
Yes	Apple	3	1	Yes	Honda	2
Yes	Apple	3	1	Yes	Honda	2
Yes	Apple	4	1	Yes	Toyota	4
Yes	Dell	2	1	Yes	Toyota	3
Yes	Dell	2	1	Yes	Chevrolet	2
Yes	Hewlett Packard (HP)	2	1	Yes	Other	1

How many different brands of automobile have you owned in the past ten years?

1
1
2
2
2
2
1

Brand Loyal - Automobiles	The use of iPads has led to increased student engagement in my classroom	The use of iPads has led to an increase in student learning in my classroom	I believe that students will be better prepared for the future due to the use of iPads in my classroom	I am better able to track student learning due to the use of iPads in my classroom	I believe that using the iPad has changed how I access information.	I believe that using the iPad has changed my instructional practices.	The use of iPads has led to an increase in student collaboration in my classroom
Timestamp							
4/11/12 14:00	1	1	1	2	1	1	2
4/12/12 12:08	3	4	3	4	4	3	2
4/11/12 9:19	2	3	1	1	1	1	2
4/11/12 9:12	3	2	3	3	3	3	3
4/13/12 9:45	1	1	1	1	1	1	2
4/11/12 8:50	3	2	2	2	2	2	2
4/11/12 9:47	1	2	1	2	3	1	2
4/11/12 9:39	1	1	1	1	2	2	1

When did you start the iPad pilot?	Do you own a cellular phone?	If yes, what brand is your cellular phone?	How many cellular phones have you owned in the past ten years?	How many different brands of cellular phone have you owned in the past 10 years?	Do you own a personal/laptop computer?	If yes, what brand is your personal/laptop computer?	How many personal/laptop computers have you owned in the past ten years?
Semester 2	Yes	Other	3	2	Yes	Don't know	1
Semester 2	Yes	Apple	3	2	Yes	Apple	3
Semester 1	Yes	Samsung	3	2	Yes	Apple	1
Semester 2	Yes	LG	2	2	Yes	Dell	2
Semester 2	Yes	LG	3	3	Yes	Sony	2
Semester 2	Yes	LG	5	2	Yes	Other	6
Semester 2	Yes	Other	2	2	Yes	Dell	0
Semester 2	Yes	Apple	7	0	Yes	Dell	1

How many different brands of personal/laptop computer have you owned in the past ten years?	Do you own an automobile?	If yes, what brand is your automobile?	How many automobiles have you owned in the past ten years?	How many different brands of automobile have you owned in the past ten years?
1	Yes	Ford	2	1
1	Yes	Honda	2	1
2	Yes	Honda	2	1
2	Yes	Ford	2	1
2	Yes	Other	2	1
4	Yes	GMC	2	1
2	Yes	Chevrolet	3	1
1	Yes	Ford	7	1

Interview Text - Teachers on Special Assignment - School One 4/11/12

Some feel that using up-to date technology is important in classrooms today, while some feel that schools sometimes get ahead of themselves. How do you feel?

Teacher #1: “There’s been a very deliberate process...thinking about the support that will go with the implementation.

If it’s going to be a successful project, there must be some mindful deliberation for what sort of support must go into the project.”

Teacher #2: “If we had just purchased the devices, handed them to the teachers, and said ‘go for it,’ I think it would have been a disaster, and it would have been however many hundreds of thousands of dollars wasted.”

Do you feel that teachers feel that they’ve received enough support?

Teacher #1: “Good technology is not going to replace good teaching. I think the teachers that are comfortable trying new things probably feel very supported, while the ones that feel a less comfortable with the technology may feel, at first glance, a little less supported. But I do think that they know that there is a safety net for them, not only with the extra staff we have to help out, but also with the colleagues they have in their departments.

Teacher #2: “Teachers aren’t fazed by our presence, because usually that’s an evaluator that comes into their classroom, but we’re there as support... to be able to go into a classroom in the role of support, as a non-evaluator, has really been positive.”

“I’d have a hard time believing there’s any teacher that doesn’t feel like they’re supported. I think they might feel frustrated at times when things don’t work...but I think.”

Do you think teachers look at you as support, not as evaluators?

Teacher #2: “Absolutely, because we’re colleagues, we both came out of the classroom.”

Do you think that’s different than how they’d feel if it wasn’t someone in a principal role, but someone from the district or IT, something like that?

Teacher #1: “I do, because it lets you relate to the frustrations that they have. They are more comfortable asking a question, because they are not going to be intimidated (because) they don’t have the answer or because they think it’s a stupid or silly question.

When you have someone that’s responsible for setting up the network or setting up the technical side in the classroom, they’re not going to have as much of an ability to incorporate maybe a teaching method to that technology, and the teachers aren’t going to feel as comfortable sharing

that they don't know how to do something, because they don't want to feel as though they're incompetent in those abilities as well.

I've had many comments where...(someone will say) 'oh, that doesn't seem as challenging' or 'that isn't such a big deal,' and I think it's been that ability to connect on a teaching level that's been really helpful.

Teacher #2: "I think when teachers know that they're talking to teachers who understand a classroom situation that that's important. Because when an iPad can do something, but not do it well, then I as a teacher can say... 'you know what, it's easier on a desktop' ...whereas I think there's sometimes a tendency for (others) to say 'if you can do it on an iPad, you need to do it on the iPad, because we need to do everything on the iPad.' I think if it weren't coming from a classroom teacher that might be the tone of some of the conversations with classroom teachers."

It sounds like there's a balance that you have because you understand what it's like to be a teacher; you know what the limitations are and are comfortable working with those limitations.

Teacher #2: I think yes; if it's someone that hasn't been in the classroom, but even if it's someone that's been in the classroom but has been out of the classroom too long...I've been out of the classroom for just over a year and you very quickly lose the day to day classroom management routine.

Teacher #1: "We don't have as much of the mandated 'you need to use this technology at this point.'"

What kinds of technology do you use outside of work?

Teacher #2: "iPad, iPhone, GPS in teh car, wii, PC."

Teacher #1: "iPad, computer, laptop."

How long have you been using technology outside of work?

Teacher #2: "I've had a computer since I was ten."

Teacher #1: "We had an old apple in my teen years."

What is your comfort level picking up new technology?

Teacher #2: "Very high, I've built many computers out of components."

Teacher #1: “I can see a lot of the big picture with technology, I can see how the pieces fit together personally and professionally.”

Do you feel that your comfort level with technology has helped you professionally?

Teacher #2: “Yes, definitely. You try something out, don’t get too hung up. When you can see an end product, it’s not a matter of can you or can’t you do it, but how do you get there. Because there are going to be obstacles...it’s how you handle those setbacks. I think that attitude’s towards technology been very fruitful. I think one of the fears teachers have when they teaching with technology is that they’re going to make a mistake that they don’t know the answer to.

One of our big things (we say to teachers) is “if you..don’t know the answer, there’s ten kids in the front row that (do.” Teachers have expressed that ‘I don’t know how to make an iMovie, and upload it to YouTube, but my (students) do.’ That’s exactly where we want to get our teachers to, that they have that comfort level that they don’t have to be experts. It’s OK not to know everything. It’s not a familiarity with the device or with the program, but just with that general mentality, because that will give you versatility.

Teacher #1: “Having that open attitude that if things go wrong, you can bounce back, it’s not going to be the end of the lesson or whatever you’re trying to do. Resiliency impacts how you teach, and impacts how students perceive how you use the technology.”

How do you feel that the school district can help those teachers with less familiarity with technology?

Teacher #2: “Success builds on success. The district can provide technology to provide a certain level of comfort without mandating that you must...people will use the technology if it Teacher #1efits them.”

Do you feel that the questions you get asked when you go into the classroom have changed as the iPads have been implemented throughout the year?

Teacher #1: “Yes...it’s getting away from the mechanical aspect of using it in the classroom and more towards the instructional aspect.”

Teacher #2: “I think that’s been a predictable change. We framed the trainings based on a three part (process), so teachers see themselves along that (process)...there is a model for professional growth...teachers see themselves as having traveled along a continuum towards better technology integration.”

What sort of technology do you own?

Teacher #1: Hewlett Packard desktop, Verizon phone, iPad, sony TV... a variety

How do you feel that owning a variety of different brands that all have their own sort of idiosyncricities has impacted your use of technology, both specifically in the classroom and in general?

Teacher #1: "I think it's made me more versatile. I'm not locked into a certain operating ...choice, it makes (me) a little more able to adapt."

Teacher #2: "I tend to do a lot of research when I purchase electronics...the brand doesn't matter as much...as dependability."

In general, how do you feel about the implementation so far, not only for yourself but for teachers and students as well?

Teacher #1: "I think it's gone quite well. Teachers have been brave enough to try some very challenging ways of teaching...not challenging in content but challenging to the way they've traditionally done things. We're starting to see a lot more transformation than we had at the beginning. Overall it's been a valuable venture for the students...to expose them to technology that they'll encounter after high school. There's a lot of value in the digital literacy that we're giving them."

**Interview Text - Director of Instructional Technology and Media Services - School One
4/11/12**

Some people pick up technology very quickly with very little assistance, while some need extra training. Do you feel like the teachers involved in the iPad implementation project were given adequate training in the use of iPads?

I think adequate, yes... I think you can always get more, that's why I'm hesitating. My job is to provide that sort of training, so I always feel like we could be giving them more. But we did give them quite a bit of training...quite a bit more I think than what teachers typically get in technologies, certainly more focused training than we've given teachers on previous products for implementation.

Like when we rolled out Smartboards...initially we were giving them a one-day beginner training followed by three days of training during the year, so they got a total of four days during the year. For these iPad teachers they've had multiple days of training.

In general, how do you think the teachers involved in the project feel about the training they've received?

I think they've felt good about it, they've said generally positive things, that they feel supported. I noticed a couple comments from the survey this morning that teachers were saying that initially they felt uncomfortable about it but now they feel better, that the support has been great. And they have been supported I think way more than they have with anything else, in a similar implementation, and they have been supported more. The fact that either (Teacher One) or (Teacher Two) or I can be right in their room if they shoot an email or call with a question, as well as we're proactively trying to get to each of their classrooms. Our goal was every week to be in each of their classrooms for about ten minutes, and there's fifty some teachers, but now we're actually closer to every couple weeks, getting in and doing those observations and the drop-ins.

In general, how do you feel that teachers feel about using technology in the classroom, not necessarily the iPads, just technology in general?

I think the majority of them are open to it. With anything I think there's an adoption curve, an L curve almost, you've got some resistors, some high flyers that just grab it and love it and go with it. These guys that were here are a couple of the high flyers that did a lot of stuff with it in the classroom and that's why we pulled them out of the classroom to help other teachers with it. Other teachers that are really struggling and hesitant in using things or don't feel very comfortable with technology, they exist too, but I'd say the majority of our teachers are in that middle of the road or the high flyer. Of that fifty I'd probably say less than twenty percent hit that resistance, maybe closer to ten percent are in that resistant stage, which is a pretty good place when it lays out, that the majority of them are open to using technology.

Of those twenty percent, how do you feel that their use of technology outside of the classroom affects their use of technology in the classroom?

I think it's a direct correlation. The types of teachers that are going to struggle with this, I mean I've helped some of them set up email on their smartphone, I mean they've got a complete iPhone, smartphone and they don't know how to connect email to it, they don't know how to save a contact in their phone so they don't have to remember a person's phone number anymore. Someone who's struggling, and I'd say it's probably closer to ten percent, the strugglers, they tend to be a little bit older, stereotypically it's the older teacher who was doing a lot of teaching prior to the days of projectors and computers, so just haven't kind of grown up feeling confident using it.

What sorts of technology do you use outside of work?

Outside of work I think my wife would say I have my cellphone and iPad sort of glued to myself, to my person. I spend an awful amount of time on those. Since I started doing a lot of stuff on the iPad I started using my desktop computer less, but that used to be where I'd spend the majority of my time. And then, a little bit of TV, my kids have a video game system that I occasionally use.

What kind of desktop computer do you have?

It's an HP, I bought it at Circuit City so it's pretty old, it's gotta be six years old or so. Two Samsung TVs, two Honda automobiles, prior to that we owned a Honda Civic. I have a iPhone and before that it was a Droid, maybe a Nokia.

Do you feel that the technology you've used outside of work has helped you implement technology and assist teachers in implementing technology?

Yeah, I might be an unusual case because a lot of my technology use outside of work is still work-related. I teach technology classes for St. Mary's University on the side and do some training on the side. Yeah, it definitely helps. Years ago we used to have teachers that had never purchased an airline ticket online, and we had teachers that were, so they understood internet commerce and how that works and were more comfortable navigating the internet. I think most recently good examples are facebook. When we do our new teacher training classes, maybe as little as four years ago, many people really were not capable of facebook and doing much with that. Now the new teacher trainings when they need a new picture for their teacher website they all just pull up facebook, and they know and understand how to upload things to facebook and how to navigate online. So now a lot of the classes are sort of condensed and less basic, like "here's how you connect your camera, and here's how you get pictures off of your camera..." All that has become so much simpler for the end-user, that I think anyone's technology use outside of work is going to benefit their technology use in school.

When you began implementing the iPad program, how do you feel the comfort level of teachers was with the iPads?

The comfort level with teachers was pretty minimal. We started with 16 teachers and I don't know if any of them had an iPad prior to this. It was about a year ago when we had teacher in and gave them an iPad and told them that we were going to use it. A few had iPhones so they were able to make that jump, but more kids have iPhones than teachers, the students here have higher tech than teachers, some of them had iPods, but I'd say their comfort level was pretty basic.

Do you think that's changed at all?

Oh yeah, I think they're much more comfortable.

We spoke about some of the teachers that have struggled with the iPads. Are there any general characteristics of the teachers that have struggled with the implementation?

Every teachers's supposed to have a classroom website, some of them do the just basic minimum requirements for that. The teachers that aren't doing that, they're struggling with the iPads; if they can't fill out a simple form and hit submit, they're probably struggling with this. If they're just displaying textual, power point slides of information on their screen to students, where that's a typical presentations, where they just display a bunch of text and read off the bullet points to the kids sitting there, then they're probably going to be a struggling user. There's not that comfort level with the technology; they maybe know how to do a few things, but can't get that next step.

Do you think that overall attitudes towards using iPads in the classroom have changed at all since the beginning?

Yeah, we kind of noticed a honeymoon period right at the beginning, where I think teachers were maybe more optimistic about what it could do before reality hit, same with our students. I noticed that with our surveys of students and parents. When we surveyed parents about wanting one to one technology time with students, it hasn't been a huge percentage change, but before the iPads it was I think around 82% wanting it, then in October it was around 77%, and now in February it's 74%. I think maybe the "coolness" of it died down, when students learned that they still had to do school with it. Once the honeymoon period was over we saw a slight dip in the sort of excitement surrounding it. I saw that with the parents and the teachers too, they were more optimistic, optimistic isn't the right word, maybe positive is the right word for what they thought the iPad would be in the classroom.

I think what a lot of that is is those teachers that are kind of at that replacement stage, I wish I could see who's saying what on the survey, because we have the high flyers that are really talking about how this is really transforming what they do in their classroom, then we've got the

teachers that are struggling, and I'm not sure that their classrooms were the most exciting places to be before the iPads, and now they're not doing a lot, they just now have this new device that the kids have, they really haven't changed their instruction or anything. A really good teacher before iPads tends to be a really good teacher after iPads, because they just know how to use the tool to collaborate more. A really good teacher is using the tool as a device for everybody to be on the same google doc at once, group collaboration things, and in other classrooms teachers haven't even touch that, they don't understand how to fit that in, whatever their reason is, the hesitancy to use new technology, but then kids aren't as interested in that class, the teacher is still the one in the front with all the information, versus in our class everyone's together, collaborating, communicating with one another.

Do you think you could have predicted who was going to do well with the iPads and who was going to struggle?

Yeah, because I already know the teachers well enough to know which of the teachers are doing great things with their websites, which of the teachers are doing great things with their smartboard lessons. In the past when we had smartboard trainings and other tech trainings we kind of knew, this person is going to be a struggle. This person either never comes to tech classes, or when they do, they struggle so much with it that you just know it's going to be a struggle. We went into this knowing that it was basically going to be, we aren't hand-picking the teachers, saying we only want high-flyers on this. We wanted high-flyers, but we knew we were going to have a whole swath of them. We don't have the ability to say "well, these teachers aren't going to teach freshman anymore." We didn't really have that ability to do that. Initially when we started we hand-picked a few but we knew when we expanded that it was going to be everyone. We kind of have the whole mix in there.

Have you seen any teachers that have been able to use the iPad to jump up a level in their teaching?

Oh yeah, I think that's one of the best things, I hope I don't sound all gloom and doom, I think the other trainers and I tend to focus on the neediest people, you know, let's get them moving. Like the google form we used for the survey, you know how easy that is, none of the teachers had ever used google apps for teaching in August, before we started this whole iPad pilot; we actually started the iPads at the same time we started using google apps for education, and at the same time transferred all of our school websites from an old system called blackboard over a product called schoology. So these teacher had three new things coming at them at once. Back in August, they didn't know how to use a google form; now very frequently, a couple times a week, sometimes every class, they ask students questions about homework, maybe even during class, quick answer it on your iPad. We've already got the google form link set up on their iPads, the kids quick click it and the teacher's like "well okay, I see you're the only one that chose answer x, explain your answer." That's great teaching, when you can start to poll everyone, and use google forms to do a quick survey of the class, and we've got most of the teachers doing that. We used to have this system of student responders, they look like a

television remote - none of those are super easy for teachers to learn on the back end of it, setting up the questions, etc. So it kind of throws all that out and suddenly we've got an easy way to survey students. So now we've got a teacher that would have totally avoided learning how to use the student response system and has totally avoided it now for six years, and now can totally leapfrog ahead and get the student response and not have to worry about getting the software installed on the computer, etc. So there's multiple examples where the iPad has really jumped them ahead, sometimes years, over something that would have taken them a long time. (Teacher One) mentioned something about teachers making iMovies, and teachers saying "I used to do it this way, but now I want to do movies in the classroom." iMovie is so much easier than windows moviemaker. To try and teach a classroom of teachers how to use moviemaker when the program is freezing up and crashing while they're using it, and it's not intuitive. Now they see kids using it and they say "I don't even know how to use this but I want you to make a movie, and I want you to teach me how to use it." That's just jumping them leap-frogging them at least a couple of years of staff development training that would have had to take place on moviemaker.

Those who are using google docs, when they see the collaborative piece, where you can have more than one person typing on the same document, a lightbulb goes off, it just opens up all these opportunities for collaboration in the classroom. Suddenly they can have four groups of students and they only need four documents that everyone can be typing on at the same time.

Interview Text - School Two - 6/4/12

Background discussion with Teacher 1:

There are eight people involved & 12 iPads shared between eight classrooms. Checked out for about an hour at a time.

There is a calendar used for checking them out. Two half-days for training during the school day with substitute teacher release, plus time allotted during professional development days during the summer.

Did you have any familiarity with the iPads before implementing them in your classroom?

Teacher 1: I have an iPhone, I had an iPad

Teacher 2: I had an iPad too.

Teacher 3: I didn't have an iPad, but I had an iPod

Teacher 4: I have a smartphone, but not an iPhone.

What sorts of technology do you use in your daily life, outside of work, outside of school?

Teacher 1: My iPhone and my iPad.

Teacher 2: iPhone, iPad, computer.

Teacher 3: Smartphone, iPod, computer.

Teacher 4: My mac, my smartphone, my iPad now that I have one.

How many different brands of technology do you own?

Teacher 1: I'm an apple person.

Teacher 4: My phone is a Samsung, because I refuse to get an iPhone, because I want to be different than everyone else. Do I think that everything I use needs to be an Apple, no, I don't think that, do they work better than everything else, yes, though my laptop isn't working very well.

Teacher 2: My laptop is a HP.

Teacher 3: I don't know, lots.

Teacher 1: (speaking to Teacher 4) Do you have the silver bullet (meaning the macbook pro)?

Teacher 4: Yeah, I've had a lot of problems with the mac.

What are some of the specific projects you've used the iPads for in the classroom?

Teacher 1: I've done iMovie with mine.

Teacher 2: We've done math rotations, Carolyn and I have looked at using other apps, show-me, the near-pod apps, that was great. We just tried the socratic one. We've used them more for the math, you (referring to another teacher) have used them more for the arts.

Teacher 3: With first grade we've done two different projects, actually I did one with story-kit and drawing pad together, it was a literature project, while my neighbor did one with iMovie. It was a literature project, kids putting on plays and recorded themselves. I mean, we haven't had them very long.

Teacher 1: When did we get them, the first of May?

Teacher 3: But we had used story-kit with the ipods and that was so hard for kids to try and use their fingers to draw, and the iPads were just awesome for that.

Teacher 4: We had a fairly large project with show-me in science, and another teacher and I did a scramble game...it was a reward thing at the end of the day, it was kind of fun.

Some people feel that using the most up to date technology is important for schools and school districts while others feel that sometimes school districts move too fast when implementing technology. How do you all feel about that?

Teacher 2: I think our school is unusual in that respect, at least from what I've heard from other people in other schools and other places in the district. We have a lot of the up to date technology. What we have is a real benefit to kids, they're real inquisitive about it, they're not afraid to use it. They go right into it and teach us how to do things. I think Laurie does a good job of researching what's a good fit for us and what's not.

Teacher 3: That's the huge piece, I mean we have (the school's technology coordinator), that other schools don't have.

Teacher 4: The support.

Teacher 3: They can help you get it going, get it up and running, they'll come you your class to help troubleshoot.

Teacher 4: I think we're meeting them where they're at. By the time the school has it they've already gotten it. It's just meeting them where they're at. When we figure out what good uses for it are in the classroom it becomes a tool, the class isn't all about the iPad. Like when we did it the class was still about the science, not the iPad. We're trying to make what we're doing more authentic and trying to find ways to share.

Teacher 1: I'm going to take it from the political angle. If we didn't have this amount of technology in our schools we wouldn't be doing what's right for kids, but since we do have this technology, we're spending too much money. So, I think in the public eye there's always going to be two sides of the story and they're never going to match, because they want these children to be able to come to their offices and work, but if we don't give them the tools they need, are we doing our jobs as a school district.

Another thing we have here is the dual platform, I know Laurie Toll likes to talk about that a lot, which is largely beneficial, because we use them on two different levels, for two different things.

Could you explain that, the dual platform?

Teacher 2: We've got Mac and HP and the kids are pretty familiar with using both.

Teacher 1: Although they're similar, they're pretty different and they have different capabilities.

Teacher 2: They're learning to discriminate. Not even just dual platform, but with different browsers...we're really teaching them to go out and make their own choices as far as technology goes. We're not doing that because of curriculum, but because we expose them to different types of technology.

Teacher 1: I think that's interesting...even fourth graders are familiar with different web browsers. They're smart enough to say "Don't use that one, use this one."

Teacher 4: We did this project with Adobe photoshop and the technology's changed since we wrote the lesson...I sat down to do it and said "I don't know...I don't know how to do it." I couldn't solve how to do some of these things with the new directions. I put it in the hands of a couple of kids and said "you know what guys, you figure it out and you be the teachers," and sure enough within a half an hour they had figured it out and solved what the problem were. They were up in the lab showing everyone "here's what you, here's what you do, here's what you do."

Teacher 1: I'm going to piggyback on that one too. I did that with my iMovies...I said to four kids "I need you to figure out what we need to change and come back and tell everybody," and they did.

Teacher 2: That problem-solving aspect too, I think that's a huge thing, even with the dual platform thing, they figure out how to get around programs and how to use them. They're not afraid to necessarily go in and say "We don't need a lot of help from us (the teachers)." I think that's a big thing for kids, to have that problem solving on their own, to think on their feet.

To make sure I understand, the iPad implementation project was lead by...

Teacher 2: (name of Technology Integration Coordinator)

And her job title is...

Teacher 2,3: Technology Integration Coordinator

Does she have a direct supervisory role over any of the teachers in the school?

Teacher 1: Nope

Teacher 2: She's there to help us do our jobs.

Teacher 1: She's not there to boss any of us around.

How do you think that affects using new pieces of technology in the classroom?

Teacher 4: I don't think I'd do 90% of the things I do without that resource.

Teacher 2: Yep

Teacher 4: I don't even need her there, but the idea that there's somebody I can go to when there's a problem or a suggestion or when kids need to go beyond, it's critical. It's critical.

Teacher 2: And I think it just gives you that ability to take those risks...yeah, she's invaluable to have.

Do you think that would be different if the role of the person helping you implement the technology was in a supervisory role...

Teacher 2: I think it would be scarier.

Teacher 1: Yes, because then it's not enabling. At that point she goes from being an enabler to a director or...

Teacher 4: An evaluator

Teacher 1: Yes. Where as right now we think of her as being on our side of the table. If she was principal and did our evaluation she would then be on the other side of the table.

Teacher 4: I think too when we first started out as a magnet program, the people who were more intimidated by technology, it was super super scary to be in that position, where you're feeling like "I have to do this, I don't know how to do this and I don't know who to ask for help,"...

It really depends on what you do in your personal life in how comfortable you are implementing technology, but I think for those teachers who aren't secure implementing technology that would be so intimidating, because now I know someone's looking at me and I'm not doing the same things as the teacher next door is doing, and you know, and what are they going to be saying about me.

Some people pick up and can use new types of technology with very little training, while others need more training to use technology. Do you think the school provides adequate training?

Teacher 4: Yes.

Teacher 1: Absolutely

Teacher 4: And in a lot of different ways. It's not a one size fits all kind of thing. It's very differentiated. In staff development, we self-select which group we're in...

Do you ever feel that there's too much training involved?

Teacher 1: No.

In general, how do teachers at your school feel about using new technology?

Teacher 2: I think there's a whole range.

Teacher 3: Some people aren't very comfortable and others pick it up and run with it right away, and everything in between.

Teacher 4: I think what another teacher said in one of the staff developments was good, about being comfortable with failure and being able to sit back and see what happens. People who feel more comfortable are at that place, where it doesn't have to be perfect the first time, but that's hard sometimes, for people to feel okay with that.

Teacher 2: I think the comfort level is there, because there's so many of us that are in the same boat, we can ask questions. Even this initiative, the way they set it up, where we had to have

partners in order to be part of the initiative. We do that naturally I think, but that adds an extra incentive to make sure you're always collaborating...

Could you explain that a little more, how that was set up?

Teacher 2: You had to apply with a partner to be able to use the iPads.

Teacher 3: You had to submit a plan to use them.

Teacher 4: I think the other ones were all at the same grade level, but no one at my grade level wanted to do it so the ELL (English Language Learner) teacher and I signed up, since we'd done some co-teaching and came up with a plan.

Do you feel that for those implementing technology in a classroom, using technology outside of the classroom is related to using technology inside of the classroom?

Teacher 4: I think the more comfortable you are outside, the more comfortable you are inside. Also, knowing what kids are doing with technology helps.

Teacher 2: I think having the time to do it too, because sometimes you just don't have time during the day to just play around with it...

Teacher 3: And that's what you have to do

Teacher 2: (nodding in agreement) Yeah, so for me at least having time outside of class has been really important, because I can futz around with it and do what I need to do and try different things.

Teacher 3: That's what's been so awesome about the iPad, it's portable, so if I'm going to the doctor I can just bring it and play around with something, it's just so much easier than bringing a laptop.

Teacher 4: Yeah, I think that's something that kids now have these in their houses, so now we've gone from where 50% of them had internet access and now 100% of them have internet access in my classroom, you just see that changing too.

I'm interested in what you said about having access to the iPad outside of the classroom and having non-directed time helps you. Can you explain how that has an effect on how that helps in the classroom?

Teacher 2: Everyone that was in the initiative has an iPad too and it's basically ours to put apps on it.

Teacher 1: We use it as if it were our own.

Teacher 2: Not even necessarily school apps. We were told “Use it.” I think it’s something we absolutely have to do...you can even get in the mindsets of the students, trying to find what’s out there for art...I need time to find apps at home, try some of the free apps, how easy is it...I needed to have that time outside.

Teacher 4: Like for our show-me app, our ELL teacher did a “show-me” and we found out what we can do and can’t do...it’s just like planning a lesson at home, the iPad is just another piece of that.

You mentioned you are an apple person. How do you feel that affects you in the classroom?

Teacher 1: That’s my preferred tool then. Because we have apple labs and HP labs, and I’ll check out the apple cart.

Do the rest of you have a brand that you prefer to use over another brand?

Teacher 4: Whatever works.

Teacher 3: That’s true.

Teacher 4: The apple carts seem to be easier to get to.

Teacher 1: It’s really what’s available. I just take my macbook home and my iPad home.

How do you feel using different types of technology affects you in the classroom?

Teacher 4: When we started doing a project where students use their own devices in the classroom, it made me very nervous and I always wanted to know what they were checking out. But when I got my smartphone, and kind of would see what I was doing...they constantly, and I don’t even think twice now, they constantly whip their phones out...today there was a kid who had his phone out and was checking on some science thing we’ve done and wanted some more data.

I think feeling more comfortable in knowing that once you get over the novelty of it it becomes this tool. I feel way more relaxed about what they’re doing in class with their technology, and that’s a big deal for them, to know they’ve got that freedom.

Getting back to (the technology integration coordinator). I want to be sure I understand her role. She's the lead IT person?

All: No, no, not really.

Teacher 4: Think of her as the technology lead teacher, but without classroom responsibilities.

Teacher 2: She will help you there though.

Teacher 4: We also have beyond her an ESP that is dedicated to labs, an ESP that is dedicated to other types of technology...

So when you look at (the technology integration coordinator) you see...?

Teacher 4: Curriculum

Teacher 1: A leader and an innovator.

Teacher 4: We meet with our teams for at least a half a day twice a year and she is there to specifically say "What are we going to do with science and technology?" She then figures out how she can support us to do some things, and pushes us to. She says "We can't just stay here, we have to keep pushing pushing pushing, here's something new we need to try."

Do you see her as a fellow teacher?

Teacher 1: Oh yeah.

Everyone: Yes.

Teacher 1: We drink beer with her.

Teacher 3: Team teaching is what it is, when she's there. She might have a little more of the technology and I might have a little more of the curriculum piece.

Teacher 1: She's also big with digital citizenship.

Any additional comments on technology integration in the classroom?

Teacher 1: We use what works and we use what's available...we all have our definite favorites...one might like the HP program, one might like the mac program.

Teacher 2: I think it's the programs more than the brand or product.

Teacher 1: I want to go back to the beginning, when (the technology integration coordinator) said the kids need to have exposure to both. If we have full labs of HPs then we need full carts of macbooks. There was a lot of push-back to that, the district thought she was nuts, because they didn't want to support it. But now we have a mac guy up there and he's like "Yeah, get the iPads in there, come on, come on."

Teacher 3: I tell ya, every school should have someone like (the technology integration coordinator). They're just going to have to. You just can't have someone like (the librarian) doing that role and everything else, you just can't.

Description of District's Innovative Technology Program

1:1 iPads at ██████████ High School: Using Technology to Accelerate Learning

- **Video Overview:** <http://vimeo.com/34686596>
- ██████████ iPad 1:1 Pilot Website: [h](#) ██████████

The changing landscape of the world's information to digital form will require today's student to have a different set of skills than what was required just a decade ago. Students must be equipped with not just the three R's, but also with 21st century skills of problem solving, critical thinking, communication and technological literacy. Future graduates will need to be able to quickly find, synthesize and communicate information and collaborate with colleagues—not just in their own office, but within a global community of colleagues and customers.

To that end, in September 2011, ██████████ Public Schools launched a **1:1 pilot using the Apple iPad** to create a seamless and dynamic educational experience for students. The pilot uses digital curriculum materials, student collaboration tools and individualized instruction in math, language arts and science, all with the goal of enhancing student learning. Because most ninth grade classes have only ninth grade students, this grade level was selected for the initial roll-out of iPads. Half the 9th grade was provided iPads in September. Initial data from the pilot supported expansion to all 9th grade students in January 2012.

- Semester 1: ██████████ deployed iPads to half of the ninth grade class (about 360 students). Students involved in the pilot were selected based solely on their class schedules and represent a broad range of academic ability. Because most ninth grade classes have only ninth graders, ██████████ has focused on curricular tools that fully integrate into the ninth grade core curriculum in language arts, math and science. Students use their iPads in three of their six classes and take the iPads home with them each day.
- Semester 2: iPads used by all ninth grade students (720). Social studies and health classes were added, making the iPad a tool that all ninth grade students use for two-thirds of their day.

Four implementation practices set ██████████ iPad pilot apart from many school pilots:

1. Available digitized curriculum resources (developed over last ten years of using SMART Boards); the iPad is a primary learning tool in math, science and English for the pilot.
2. Each student is assigned an iPad as a primary learning, organization and productivity tool. Students take the iPad home, just as they would take textbooks home. (Many pilots use only classroom sets)
3. Teacher training and professional development (integrated with curriculum review)

4. Age of the student—high school freshmen (focused on future; know grades count; old enough to be careful and responsible with the tool)

The goals of the iPad pilot are to:

- Enhance and accelerate learning
- Leverage existing and emerging technology for individualizing instruction
- Promote collaboration, increasing student engagement
- Strengthen the 21st century skills necessary for future student success

Shared Vision for Technology

Since 2004, the [REDACTED] School Board has articulated a vision for world-class, child-centered excellence in education that has propelled many areas of our school district to new levels. In the area of technology, the vision states:

Technology is essential in a world-class education because it brings immediacy to knowledge acquisition and relevance to content. It fosters creativity, refines critical thinking skills, allows for interactivity and ultimately is an accelerator of learning. Technological fluency is critical to the success of every student, teacher and staff member in the [REDACTED] School District. The District will ensure that all students have access to technology. We will insist that our students are prepared to be responsible citizens in their use of technology. All technology will enhance student achievement and prepare students to thrive in the global community of the 21st century.

The Board's vision and financial support for educational technology provides a solid foundation to empower staff to embrace technology, to inspire our community to support technology funding and to allow students access to technology.

Proactive leadership for the power of technology as an accelerator of learning is also a critical attribute of the District's superintendent, chief technology officer and director of technology integration and media services—three individuals with proven visionary leadership. Superintendent [REDACTED] received AASA's 2005 "President's Technology Award" and the 2006 eSchool News' "Tech Savvy Superintendent Award." Dr. Peterson has also served on ERDI since 1996, allowing him to review leading edge innovations and expanding his vision for the potential impacts of technology on learning.

[REDACTED] (CTO) was named to NSBA's "20-to-Watch" list in 2010 and [Technology Leader of the Year](#) in 2010 by Tech&Learning. [REDACTED] and [REDACTED] (Director of Instructional Technology & Media Services) have been active members of ISTE and the NSBA Technology Leadership Network for almost a decade. [REDACTED] School District staff regularly participates in national and international conferences such as ISTE, BETT and served as delegates on the

ISTE People to People China Exchange as well as numerous NSBA Technology Site Visits. Each of these experiences expands our leadership vision at all levels of our technology integration.

Sharing our vision for technology as an accelerator of learning is also a key message and primary goal within our District's Five-Year Communication Plan. Technology is a featured topic throughout District publications, electronic communications, marketing communications, School Board Meetings, parent or public presentations and media relations activities. Orientation activities and new staff training, Weekly Tech Tips, video stories demonstrating technology in the classroom and special events (including our annual Tech Site Visit for Educators) are all tools used to communicate our shared vision for educational technology.

Empowered Leaders

In ██████████, we know that our greatest assets are our human assets. Everyone is our district is asked to focus on world-class, child-centered excellence. In that pursuit of excellence, we expect the best from everyone—their best performance and their best thinking. It is a singular focus on what is best for our students.

Through professional development, teacher-led curriculum committees, professional learning communities, innovation training, strategic thinking workshops, instructional leadership teams and our daily duties, all stakeholders are empowered to be leaders in affecting change.

██████████ is known as an innovative district focused on teacher leadership. Staff have frequent opportunities to visit exemplary districts, attend conferences and bring their learning home to share with others. We also host technology site visits and a [Summer Institute](#).

Through the iPad pilot, teachers used both face-to-face learning sessions and online collaboration tools to research and share curricular applications. The online discussion through [Schoolology](#) allowed teachers and students to suggest apps, identify issues, and trouble shoot for each other. We also are administering a longitudinal survey of parents, students and teachers, quarterly throughout the first year of the pilot implementation.

Finally, using Spigit (crowd sourcing tool), all district employees are encouraged to share ideas and comment on ideas for innovation. Currently, we have 634 members in our Spigit innovation community. We focus on **three types of innovation ideas** that move into research and implementation phases.

- **Incremental:** Innovation projects that are relatively close to existing services and/or resources. These innovations often represent continuous improvement projects.
- **Adjacent:** Innovation projects that represent a larger departure from the current norm. Typically, they either deliver an existing service through an entirely new approach (such as the iPad project at the high school), or use an existing approach to deliver an entirely new service (MHS offering hybrid courses).
- **Transformational:** Innovation projects that represent a fundamental departure from anything currently in use (such as implementing a Language Immersion option at all elementary schools without enrollment caps).

Technology Implementation Planning

Over the past five years the District has been increasing the student-to-computer ratio with the intention of moving towards a 1:1 access model for students. This effort can be seen in the goals of the 2007-2011 Technology Plan and is reflected in classrooms and media centers with the increased number of computers, laptops and student responders. During this time the District has taken opportunities to research other 1:1 programs across the country, has attended numerous NSBA Technology Site Visits and most recently has delved into understanding the research from Project Red—looking for insights into the components of successful 1:1 programs.

This background of research and understanding laid the foundation for the initial planning of [REDACTED]'s iPad pilot. The pilot was carefully aligned with the curriculum review cycle, creating a systematic plan for bridging the instructional and technology goals of the District. This paved the way for the instructional leaders of math, science and English to join the preparatory work of defining the components of the pilot surrounding content, device choice, staff development implementation and communication. Additionally, a strong existing foundation of digitized curriculum and learning materials served as the instructional framework behind the pilot.

The concept of running the pilot as a controlled experiment allowed for buy-in from all stakeholders, assuring the pilot was measured for its effectiveness in impacting students. This systematic approach to assessing the pilot created benchmarks for success and provided honest feedback at all points during the pilot implementation. The success of the pilot thus far speaks to the careful implementation planning, both in designing and executing the roll-out of iPads to all freshmen students.

Consistent and Adequate Funding

The [REDACTED] School District has a dedicated Instructional Technology Levy, approved by voters in 2002 and renewed in 2007 through 2017.

This fund has provided:

- Smart Boards and sound distribution systems for every classroom in [REDACTED]
- A consistent technology replacement cycle
- Stable network infrastructure, storage and filtering
- Increased access to digital resources
- IT and Instructional Technology staffing
- Staff development for effective technology integration throughout our curriculum

Technology dollars do not compete with other school funding for ongoing operations, classroom teachers or classroom supplies. By law, the Technology Referendum dollars can only fund technology and instructional equipment. Due to this, we are confident that we will have

funding to continue not only supporting this pilot, but expanding it to the remaining high school students if the pilot continues to demonstrate value to student learning. Our preliminary budget projections cover equipping the remaining high school students with iPads while building in a rotation cycle to replace the devices every three years.

Equitable Access

The iPad allows all students and staff in the pilot program easy access to digital resources and content. This content is found both locally on the device and in the cloud. Access to local content assures that students and staff can continue to work when not connected to the Internet. This content is found in apps and also in iBooks and textbooks that are available on the iPad. When the iPad is connected to the Internet, local content is backed up to the cloud to assure this work is saved and accessible from any Internet connection.

For students who do not have access to the Internet from home, the District provides filtered broadband access through Verizon so students and parents have a way to connect from home. Although local content is available on the iPad, access to the Internet ensures the District's online eLearning tool and student information system can be accessed to view grades, attendance, homework and other school and District information. Internet access also allows students to utilize Google Apps for education, an online set of tools for collaboration and communication. Students frequently utilize these tools for projects and group work outside of the school day.

Skilled Personnel

Starting in the spring of 2011, the English, math and science high school department chairs worked with the Executive Director of Technology, the Director of Instructional Technology and Media Services, the Teacher on Special Assignment for Instructional Technology Support and the High School Media Specialist to identify and evaluate what features, functionality and resources would be necessary in a 1:1 learning environment. Many devices were considered and evaluated (laptops, Android tablets and the iPad to name a few) before the group decided on the iPad. This group then expanded to include 16 classroom teachers who each received an iPad in May 2011 and began investigating educational applications that would complement the ██████████ curriculum. This process lasted a few months during which the group collaborated over the summer together in an online Schoology course.

An iPad Administrative team meets weekly to assess the work of the pilot. The Administrative team is lead by the Assistant Superintendent for Instruction and is comprised of the High School principals, the Executive Director of Technology, the Director of Instructional Technology, the Executive Director of Communications and the on-site Media Specialist and Instructional Technology Support Teacher at the high school. These weekly meetings address questions that arise regarding the iPad pilot and give guidance to the next steps.

Ongoing Professional Learning

Research clearly states that “lack of targeted, sustained support for teachers on integrating technology with the curriculum has been identified as a major barrier to a successful one-to-one computing environment.” (Barrios, Ph. D., Tina. "[Laptops for Learning Final Report and Recommendations of the Laptops for Learning Task Force.](#)" *Laptops for Learning*. Web. 28 Jan. 2012. In addition, Pamela Livingston states that “teachers new to 1:1 must be provided with meaningful examples of ... integration that relate specifically to their content areas. These models will help them recraft their lessons and projects to take advantage of ubiquitous access. They also need help with classroom management and technology management issues.” (Livingston, Pamela. *1:1 Learning: Laptop Programs That Work*. Eugene, Or.: International Society for Technology in Education, 2006. Print.) With this in mind, s instructional technology staff created a plan to extensively support teachers prior to the beginning of the pilot as well as on a daily basis when school began.

During the summer of 2011, face to face teacher training began in July and then again in August prior to the start of the school year. The group has continued to meet once a month for a full day since this time. Teachers have a sub in their classroom in order to be able to work together to learn how to integrate technology into their curriculum. Time is spent on advanced iPad functionality, learning to create formative assessments, using the best features of their Schoology websites, creating collaborative activities with Google Docs, further investigation of educational applications and brainstorming best practices in classroom management. Teachers are reminded that they are part of a pilot, which is to say they are taking part in a defined experiment in which they do not have to be an expert. Teachers are not expected to implement everything the first day, first week, or even in the first months.

Our overall instructional goal is to model best practices and integrate this one-to-one technology into teaching instead of just focusing on the device itself. We set month by month goals, starting in September with a goal of every teacher using the iPad to administer formative assessments such as exit slips. In October we focused on making every teacher comfortable creating collaborative digital activities using Google Docs. In November the monthly goal was to have teachers use iMovie for projects that students create. Each month thereafter we have continued to focus on a new educational instructional goal.

About one-third of our instructional time with iPad pilot teachers has focused on classroom management, just as the research cited earlier suggests. Teachers have discussed the need to set up class expectations and routines to help students make the best use of the iPad. This includes instruction and discussion with students about listening, focusing and staying on task. Teachers have also brainstormed ways to use proximity as they work with students, taking advantage of technology tools like Apple TV and apps like Splashtop HD.

An important component of the instructional technology training has been to help teachers understand the different stages of technology integration that occur when using technology with scales like R.A.T (replace, amplify, or transform learning) and S.A.M.R. (substitution, augmentation, modification and redefinition). Teachers spend time sharing what they have

done in the past and are encouraged to take these lessons to the next level, amplifying the use of technology and transforming their instruction.

Time has also been provided to allow teachers the opportunity to observe colleagues during their work day, so they are able to see others teaching the same curriculum as well as observe other subject areas and how technology is utilized. The instructional technology department also has made a concentrated effort to be in each iPad teacher’s classroom at least once a week, directly observing what is going well, gathering ideas for future instructional needs and being there to help the teachers as soon as they need it. Sometimes the instructional technology team teaches the class so that the teacher is able to see how things can be done and then model these best practices themselves.

Technical Support

The iPad project is supported by a strong team of technical and instructional experts. There is on-site support at the high school campus with our media staff who is a consistent and present team that has an established relationship with students. The on-site support is equipped to handle all technical hardware and software needs, including the need for repairing, re-syncing and replacing student devices. The on-site support model allows for immediate response, offering a high level of service to students and staff. Spare hardware inventory is also available on-site for any hardware repair issues so a student is never without an iPad if one needs maintenance. Document storage to the cloud makes swapping devices for repair quick and simple, as all content is available via the Internet.

Students also serve as a great resource in assisting others with questions through an online course in our eLearning environment. All students and teachers in the iPad pilot are enrolled in this course which serves as a central online location where users can post questions that are answered by others. These questions are often asked and answered by students, with little need for assistance from staff. The online course also allows for assistance outside of the school day, when a student at home may have questions at night about something they are experiencing on their iPad.

Curriculum Framework

██████████ has earned [national awards](#) for its use of educational technology and has a real advantage in having a successful iPad pilot. In 2002, ██████████ installed its first SMART Boards—used in every classroom today—and began digitizing our curriculum. Unlike many other schools piloting iPads, ██████████ is not relying solely on third-party apps to teach content; ██████████ teachers are relying on ██████████’s digitized curriculum to teach. Having digital content in place made the use of iPads a natural next step. Teachers continue to post course notes and assignments, which students can download to their iPad, add their own notes, complete assignments and return homework to teachers via the iPad through Schoology, ██████████ online eLearning management system.

██████████’s curriculum challenges and supports all students to pursue their highest academic and personal achievements. The curriculum provides a framework for reaching world-class excellence by aligning rigorous standards, grade-level benchmarks, instructional strategies and resources. In order to ensure that the highest quality and most rigorous curriculum is in place, ██████████ has established a thorough curriculum review process. In this cycle, teachers and district leaders from each subject area spend an intensive two to three years carefully analyzing current best practices and establishing recommendations that will challenge and effectively serve students. The staff review current practices, analyze internal academic data, survey students and parents, research best practices, visit other exemplary programs and incorporate the latest Minnesota State and National Standards. Rather than creating a separate class and curriculum for ICT, the ISTE NETS-S are embedded directly into the core content areas.

██████████ teachers use state standards as their starting point, then “unpack” those standards to determine the most essential learnings for our students. Staff use the Understanding By Design model for mapping curriculum to ensure that all learning is focused on the actual application of knowledge. The UbD model emphasizes higher-order thinking skills, allowing classroom instruction to be inspired by essential questions and “Big Ideas.” Once the essential learnings are established, teachers design assessments, and select appropriate materials to support the classroom instruction. The curriculum review process includes an evaluation of 21st century skills necessary for digital-age learning. This evaluation is influenced by the work of Ian Jukes (Literacy Is Not Enough, Teaching the Digital Generation), resulting in an emphasis on our students’ ability to demonstrate fluency in inquiry-based learning and problem-solving. Finally, ██████████ uses the curriculum mapping tool in Skyward to allow for teacher collaboration, administration of common assessments, and consistency in our overall approach to teaching and learning.

The iPad pilot was initially focused on math, science and English, because these departments were in the curriculum review process and were looking to adopt digital materials and supplement traditional print textbooks and classroom equipment. Social studies and health were added second semester. The opportunity to use the iPad gives students access to anywhere, anytime learning—in classrooms, around campus, at a cyber cafe and at home. A good example of using iBooks in 9th Grade English can be viewed here: <http://vimeo.com/29115580>.

Student-Centered Learning

Video overview of student engagement, collaboration and classroom community within the ██████████ 1:1 iPad Pilot can be seen here: <http://vimeo.com/32874069>

Naturally, an essential component for a successful 1:1 iPad pilot was to ensure that students received the proper instruction and essential information they would need to create a seamless and dynamic educational experience. To do this, ██████████ created a series of nine instructional student videos, which combined humor with the details found in our Acceptable

Use Policy as well as all the rules and guidelines for the iPad project (██████████.us/iPads). These videos taught students how to use and care for their iPad properly (<http://vimeo.com/28090375>), identified the difference between educational and personal use of the tool (<http://vimeo.com/28725971>) and instructed them on what to do if their iPad was damaged or lost (<http://vimeo.com/28386367>). We also created instructional videos to help students understand how to use their video and audio recording capabilities appropriately and safely. Prior to receiving their iPad, teachers also discussed with students the importance of being a good digital citizen who uses technology safely and responsibly (<http://vimeo.com/35886574>).

In addition to instruction about the rules and guidelines of this project, students also were instructed how to use the tools and applications. For this training, students spent two class periods learning how to set up their iPad and in their Google account, subscribe to their Schoology course calendar and practiced going through the steps of the digital cycle. This cycle is used by students daily to access files and assignments from instructors, edit and alter the files and return the files through cloud storage back to teachers in a Schoology dropbox. Video tutorials for each of these steps were also created and are available to students for review ([Video tutorials](#)).

All 720 students, 53 iPad teachers and the iPad Administrative Team are enrolled in an iPad pilot Group in Schoology which allows for communication and collaboration between everyone in the iPad pilot. Students and staff regularly post questions, tips and tricks and app suggestions. The entire group works together to help one another. Students often offer the solutions to technical issues that are posted and post ideas for improvements in the program. The students have also formed an iPad Advisory Group that meets with the High School Principal and Director of Instructional Technology & Media Services monthly.

Students (as well as parents and staff) have been surveyed quarterly to rate all aspects of the program. Classroom teachers regularly administer formative assessments using Google Forms, or Schoology and Skyward online assessments to gauge individual student's understanding and progress and differentiate instruction. Teachers have increased the frequencies of formative assessment and often administer open-ended response questions to evaluate the effectiveness of instructional methods and seek students' opinions and ideas as well as suggestions for improvement.

Assessment and Evaluation

Video overview of real-time formative assessment and student achievement within the ██████████ 1:1 iPad Pilot can be seen here: <http://vimeo.com/32874739>

Assessment and evaluation have been two critical components of the iPad project. Equipping only half of the freshmen students with iPads to begin the school year allowed for ██████████ to conduct a controlled experiment where the effectiveness of the iPad could be measured when looking at student performance. Additionally, regular surveys go out to all students and parents in the iPad pilot to gather feedback on how the iPads are engaging students, aiding collaboration and communication efforts, impacting student organization and affecting the

learning experience as a whole—from both the student and parent perspective. The student achievement and survey data are shared with the ██████████ School Board for a formal review and recommendation at each stage in the pilot (actual pilot data and impact on student achievement shared below in number 2).

Additionally, the pilot is assessed by teachers on a regular basis during their monthly staff development day where the iPad teacher team meets to discuss how the iPads are being used in their classrooms, what struggles they need help with, what positive lessons and experiences they share with the group and what new components can be added into the pilot. Feedback and group discussion is an essential component of each day in addition to formal staff development training on new technologies.

Beyond the feedback from teachers, parents and students, an iPad Administrative team meets weekly to assess the work of the pilot. The Administrative team is lead by the Assistant Superintendent for Instruction and is comprised of the High School principals, the Executive Director of Technology, the Director of Instructional Technology, the Executive Director of Communications and the on-site media specialist help at the high school. These weekly meetings address questions that arise regarding the iPad pilot and give guidance to questions and next steps.

Engaged Communities

In addition to the School Board Vision for world-class, child-centered excellence, the ██████████ School District has the following policies and plans in place to support information technology integration:

- Dedicated technology levy fund approved by voters through 2017
- Technology audit conducted by an independent third-party (the BLE Group) every three years to update the District’s technology plan (audit includes end-user focus groups and interviews as well as systems audit)
- District’s curriculum review and materials selection processes (Policies # 603 and #606) require consideration of digital resources to support student learning
- District curriculum maps and assessment data are interrelational databases within the District’s student information system. All teachers access digital resources on a daily basis.
- District systems provide for password-protected learning systems by classroom, by level and by school to teach students digital literacy while maintaining a safe online environment for all students. Systems include a Google Apps for Education, Schoology and Skyward.
- District policies articulate the requirement for all teachers to use web-based tools and provide guidance regarding the acceptable use of technologies and social networking tools (Policies 524, 525, 526).

Prior to students receiving iPads, [parent informational meetings](#) as well as online webinars informed parents about the project and answered questions.

has developed a K-12 plan identifying an Internet & Technology Safety curriculum, selected the best resources to teach it and determined the subject areas and teachers responsible for this material throughout the year. This curriculum is designed to proactively prevent incidents by teaching students about the importance of appropriate online behavior, the permanency of their digital record, the need to keep personal information private and the importance of being a good digital citizen. Classes, email newsletters and a [website](#) of tips are provided for staff and parents educating adults about how kids are using technology and how adults can best talk to students about safety. A [Parents' Guide to Student Use of Technology](#) section is included in the parent/student informational materials and on the iPad website to assure parents have information and tools for cyber safety awareness at home. This information includes resources for setting up a filter at home, setting expectations, limiting screen time and more.

Supportive External Context

Starting in 2005, the School District began hosting annual technology site visits for educators from around the area to visit and experience how technology serves as an accelerator of learning and to see how effectively integrates technology into everyday activities E-12. Each year between 100-170 teachers, instructional leaders and technology staff from the Midwest come for an in-depth, behind-the-scenes tour to see the power of technology and discuss innovation in instruction. In 2007, Public Schools was a host site for the National School Board Association's Annual Technology Site Visit, which lasted three days and was attended by over 150 people from across the nation and Canada.

This year's [visit](#) lasted two days, February 23-24, 2012 ([program](#)). During the first day of the visit, attendees toured classrooms in six buildings grades E-12 and attended breakout sessions held by teachers and district staff. The second day focused entirely on the freshmen 1:1 iPad pilot at High School. Attendees received in-depth background information on everything from the planning, budget and communication of the pilot program to the training, implementation and findings. They were able to meet with staff, teachers and students to learn how iPads are being used daily in teaching and learning.

In 2004, staff began presenting at local and national conferences about our use of technology in education. Conference presentations include the annual Minnesota TIES Educational Technology Conferences, the National School Board Association's T + L Conferences, the Florida Educational Technology Conference and many more. Most recently staff presented our iPad pilot at the Minnesota TIES Conference in December 2011, FETC in Orlando in January 2012, the annual BLE Group Conference in Austin in February 2012, as well as numerous regional Apple iOS in the Classroom Events in November 2011 and February 2012. Our iPad presentation outline can be viewed here: tinyurl.com/iPadTonka

In addition to hosting technology visits and presenting at conferences, instructional and technology staff, administrators and teachers regularly attend regional, national and

international conferences (as mentioned earlier) to learn about best practices for technology integration.

Impacting change at the state-level, School Board’s legislative platform includes a request for dedicated capital/technology funding increases to the state funding formula for all schools. Discussions with local legislators resulted in bills carried and passed to for \$45 per pupil in FY 08 and \$50 per pupil in FY 09. In 2007, teachers demonstrated lessons using technology at a MN Senate Education Committee Hearing and in 2009 hosted a Senate Education Hearing in our district. Both were instrumental in the legislation moving forward. In 2007 for the NSBA Technology Site Visit in , then Minnesota Governor Tim Pawlenty spoke, calling a lighthouse for technology innovation in Minnesota.

One-paragraph description of the technology planning process, including a list of people involved:

’s vision for a 1:1 initiative has been in the research and development phase over the past five years. This has allowed us to study other 1:1 programs across the country and investigate studies such as Project Red to develop an understanding of important data collection measures. Starting in the spring of 2011, the English, math and science high school department chairs worked with the Executive Director of Technology, the Director of Instructional Technology and Media Services, the Teacher on Special Assignment for Instructional Technology Support and the High School Media Specialist to identify and evaluate what features, functionality and resources would be necessary in a 1:1 learning environment. Many devices were considered and evaluated (laptops, Android tablets and the iPad to name a few) before the group decided on the iPad. This group then expanded to include 16 classroom teachers who each received an iPad in May 2011 and began investigating educational applications that would complement the curriculum. This process lasted a few months which during that time the group collaborated over the summer together in an online Schoology course. Additional planning was completed by this core group including the following:

- Defining the project (Why are we doing this?)
- Coordination of team members (math, science, English department chairs along with Director of Instructional Technology and Executive Director of Technology)
- Identification of pilot group (freshmen students)
- Identification of device (iPad)
- Teacher trainings and staff development
- Infrastructure improvements
- Mobile device management implementation
- Syncing and deployment process
- Communication to families
- Training for students

Description of Effectiveness and Impact of the Innovative Technology Program

- Communication impacts within the 1:1 iPad Pilot: <http://vimeo.com/32875508>
- Organizational skills and efficiency with the 1:1 iPad Pilot: <http://vimeo.com/32863254>

Measurable Results in Student Achievement

Early indications for [REDACTED] iPad pilot have shown [measurable results with student achievement](#). In the aggregate data for quarter 1 for all freshmen students, there are fewer D's in most classes and fewer F's in all core courses (English, math and science) for students in the iPad pilot. Additionally, many of our iPad pilot teachers teach some courses with the iPad and some without. In most courses where the teacher is the same, students are performing better with the iPad than those students with the same teacher who do not have an iPad. Students are performing better in these classes indicated by either more A's and B's or fewer D's and F's.

Many of our teachers attribute the increase in student achievement to the increase in formative assessments in their iPad classes. [REDACTED] teachers focus on formative assessments (practice homework and quizzes) to assess student learning throughout a lesson. Research is clear that when teachers use frequent formative assessments, they are better able to gauge student learning, reteach material if needed, or move on if everyone understands. The iPad tools combined with Schoology or Skyward formative assessments allow teachers to more efficiently administer and grade formative assessments, allowing more timely intervention if a student doesn't understand a concept.

In addition to student achievement data, [REDACTED] is collecting data on how the iPad impacts [student organization](#). Tracking late and missing assignment data shows that in most iPad courses, students have fewer missing assignments. Students attribute this to their ability to stay better organized with all of their files in one place. Students complete and submit homework and do research on one device. When students take the iPad home, they can readily access their texts, homework, teachers' notes and all papers they have previously kept in a multiple binders and folders. Students report that using iPads have increased their organizational skills, making learning more efficient. When students are reading a novel, they can read and take notes directly on the iPad. When students are ready to study, they simply review the notes on the iPad. In addition, their assignments and due dates are pushed directly to their calendar on the iPad, ensuring all students know when tests, quizzes and assignments are scheduled.

Using iPads also keeps students more engaged and inspires collaboration among other students and their teachers. The result is a strong sense of community in the classroom driving further knowledge and understanding. Seventy-seven percent of students in the pilot reported that they collaborate daily with others in school using technology.

Correlation to Student NETS•S:

1. Creativity and Innovation

Each student iPad has art and drawing apps installed as well as iMovie, allowing students to use these tools to express and model their individual learning like never before possible in our instructional environment. Students also use recording apps like ShowMe to record audio and video on their iPad screen to demonstrate their knowledge as well as reteach critical concepts to one another. Students have created movies on everything from Newton's Laws to literature topics and book reviews. They use tools on their iPad to explain everything from the processes within government to the steps that they used to solve a math problem. Students also use the iPad camera features to record steps for scientific experiments and illustrate processes.

2. Communication and Collaboration

All 720 students, 53 iPad teachers and the iPad Administrative Team are enrolled in an iPad Pilot Group in Schoology which allows for communication and collaboration between everyone in the iPad pilot.

Teachers report an increase in student engagement during the first two months of the pilot, as well as a stronger sense of community in the classroom. With the introduction of the new instructional technology, teachers have also noted that students are collaborating virtually with a more diverse group of peers and that the collaboration is happening more regularly. And, even the challenging moments when teachers have needed to enlist students in technical problem-solving, these teachers also report that the classroom community actually benefits from this collaborative spirit. In parent surveys and interviews, parents report a high level of engagement spilling over into the area of homework—students who previously kept homework hidden or out of parental oversight are showing new levels of interest and engagement that are observable at home.

Teachers and parents both report a higher level of overall communication within the pilot, often supported by the fact that much of the instructional content is now available online for parents and therefore accessible to students outside of school, in an “anywhere, anytime” environment. In some cases, teachers report that the communication with students has improved to such a high level that the need for parent communication (often related to locating missing assignments, etc.) has actually decreased.

In the classroom, communication and collaboration using technology are in daily practice. Each student has a Google e-mail account and uses Google's Apps for Education such as collaborative documents, spreadsheets and Google sites on a daily basis. Many classroom activities have moved from individual tasks to collaborative work, now that each student has a device with access to the same file simultaneously and make edits. Often groups will collaboratively solve problems together, contribute to a master document that compiles all of their collective knowledge and learning about a topic, such as a collaborative review master document of

Romeo & Juliet. Classes have also started creating a “back channel” discussion which reflects students’ thoughts, ideas and questions about a topic during instruction.

3. Research and Information Fluency

With all of the resources of the Internet now at their fingertips, students are researching information for classes on a daily basis. Teachers are reporting that students look up terminology and definitions as well as further investigate content more so than they have ever seen prior to the 1:1 iPad pilot. Teachers have discovered that students are now routinely adding to class discussions and contributing knowledge they have just acquired by accessing and researching information online with their iPad during class. Students are reporting that they investigate topics they don’t understand since the resources are so easily accessible. Students are also researching more about topics, going beyond the basic requirements for assignments and learning. Social studies teachers have found the iPad to be a wonderful tool to bring current events and information about topics directly into classroom discussions.

4. Critical Thinking, Problem Solving and Decision Making

Science teachers are using tools and apps on the iPad for students to collect data during experiments as well as move the experiment outside of the laboratory and into their homes to collect additional data. Math teachers are reporting that students are investigating functions and formulas more thoroughly now that they can manipulate graphs with their fingers to resize graphs and analyze slopes of lines, change the angles within shapes and more. Teachers are noticing increased student understanding reflective in assessment scores which they attribute to better understanding of problems due to the ability to critically think and analyze like never before possible.

Examples of students identifying these skills are evident in our survey results. Seventy-nine percent of students in our iPad pilot indicate that in classes where technology is used they apply critical thinking and problem solving skills daily or weekly. In addition, 95 percent of students in the iPad pilot indicate that they can apply learning in new ways when using technology in school.

5. Digital Citizenship

One of the benefits of using Schoology as our online e-learning platform is that it creates a model for appropriate use and interactions within a 21st-century social networking environment. Every student and staff member has a Schoology profile, similar to that found on sites like Facebook. Conversations routinely take place about what appropriate interactions are, as well as what responsible, safe and ethical practices should take place in this environment.

Due to the increased levels of responsibility required of students working in the open spaces of the Internet, teachers intentionally emphasize online responsibility. Parents report that the impact on student behavior has been positive. Parents also report that the firewalls and protections set up by the District have provided clear parameters for students as they work on

their iPad outside of school. Before distributing iPads, teachers also discussed with students the importance of being a good digital citizen who uses technology safely and responsibly ([video](#)).

6. Technology Operations and Concepts

All 720 students, 53 iPad teachers and the iPad Administrative Team are enrolled in an iPad pilot group in Schoology which allows for communication and collaboration between everyone in the iPad pilot. Students and staff regularly post questions, tips and tricks and app suggestions. The entire group works together to help one another. Students often offer the solutions to technical issues that are posted and post ideas for improvements in the program.

Since the navigation functionality and features of the iPad are different than a standard computer operating system, students have become very adept at using the cloud for file organization, storage and management of their files and materials. [REDACTED] students use a completely digital cycle to access, open, save, edit and return files with classmates and teachers in a fully digital classroom environment using apps, Google Docs, YouTube and Schoology rather than email to transfer files.



Students, teachers and parents report that there is a noticeable difference in students' ability to organize their materials, leading to a reduction in the number of late and missing assignments as well as an increase in time dedicated to instruction in the classroom. The most impressive element for teachers in this area, however, has been the reduction of missing or late assignments, making the flow of instruction more seamless for all students. Parents report a significant increase in the area of organizational skills observed at home or outside of school. Although students naturally grow in their ability to self-organize as they move through high school, this early spike in organizational skills will allow students to benefit sooner (and perform better) in their ninth grade academic program.

iPad Communication Plan

Background:

In September 2011, ██████████ High School will launch a 1:1 iPad pilot. The District outlay will exceed \$500 per pupil for this initiative. During the pilot, the District will study the impact of this 1:1 technology tool on student learning. The results of this pilot will inform future investment for technology. The success or failure of this initiative will lie in part with how the program is communicated to primary audiences—students, teachers and parents involved in the pilot—and secondary audiences.

Over the past five years the District has been increasing the student-to-computer ratio with the intention of moving towards a 1:1 access model for students. This effort can be seen in the goals of the 2007-2011 Technology Plan and is reflected in classrooms and media centers with the increased number of computers, laptops and student responders. With the growth of digital content and hardware devices on the market and the desire to make a more substantial move towards a 1:1 access model, a pilot for the high school campus is recommended for the 2011-2012 school year.

The goals of the 1:1 pilot will be leveraging technology as **an accelerator of learning**:

- individualizing instruction
- promoting collaboration
- increasing student engagement and student achievement
- strengthening the 21st century skills necessary for future student success
- increasing student access to digital resources in place of traditional print textbooks and classroom equipment such as graphing calculators.

Situation Analysis

- Fifteen teachers initially selected to participate in the iPad pilot. The pilot group includes 9th grade students from math, science and English, as these are the departments that are in the curriculum review process and are looking to adopt digital materials. Four of the teachers will teach both the pilot cohort course and the non-pilot cohort, which will provide unique insight into potential course modifications.
- There are approximately 360 students in two cohorts participating in the pilot. These students represent a broad range of academic ability. Each of these students will be enrolled in pilot courses for math, science and English (half their day).
- Many students own an iPod, iPod touch or iPhone and will be familiar with the iPad interface. Communication must include “unlearning” personal habits that are not supported by the school environment.
- While students may be familiar with the device for recreational use, this pilot will teach them how the device can enhance learning and be used as a productivity tool. (Ian Jukes)
- The expenditure for the iPad pilot is occurring at the same time as a government shutdown at the State level and uncertain funding for K-12 education for this biennium. However, because of its voter-approved technology levy, ██████████ School District has dedicated funding for technology, which cannot be used for day-to-day operating expenses. The funding for this pilot does not compete with teachers, class size or classroom dollars.
- ██████████ High School is fully wireless; the wireless network was updated in the summer of 2011. Building confidence in the wireless network’s NEW speed and efficacy will be important to change prior perceptions.

- Filtering: When in use on campus, the iPads will have the same District filtering systems that all student computers have. However, when accessing wireless networks outside of the District, the iPad will not be filtered. Still the District's Acceptable Use policy applies for all District-owned equipment. Students will sign an agreement that the device is to be used for educational, school-related purposes during instructional time. (FAQ: Can they access Facebook when outside of school? Yes, if that is acceptable with their parents. We believe increasing personal use of the device will increase their skills with the device for learning and productivity. Personal use outside of school hours is acceptable within the parameters of the District's Acceptable Use policy.)
- Students are digital natives and often more tech savvy than parents. Parent need to be educated in cyber safety, network filtering, and appropriate use expectations.
- Cost to families: The iPad will remain the property of ██████████ Public Schools and will be checked out to students, just as a textbook would. There is no cost to the student, unless the device must be replaced due to loss or damage.
- Student email accounts: Beginning in 2010, all students in grades 5 – 8 were issued district email accounts which allowed access to many educationally based web resources. New email accounts will be issued this year; these email addresses will follow the students throughout high school. All students email address will be @student.mtka.org
- Access to documents and homework. ██████████ will begin using Google Apps this year, which provide web-based document storage (aka cloud computing). Students can create, save, access and share documents using Google docs within a password protected environment. (link through Schoology or For Students? Single-Sign On)
- The iPad will rely on local wireless (wii-fii) connections, not a cell phone company or 3G connections. Students may use the iPad outside of school via free Wi-Fi spots (e.g. caribou) or home wireless networks. If students don't have a home wireless network they will can use a regular desktop to access Schoology and other web-based resources, but not specific iPad apps. If students have no internet access at home, they should check with the school media center for assistance. Internet access is a regular learning tool, just as calculators have been for years in school.
- The District will pre-populate the iPads with recommended apps. The App store and iTunes will be disabled on district-owned student iPads to ensure compliance with software licensing. Facetime is also disabled.
- Parents and students must be provided with both policy information and effective instruction for the pilot to be successful.
- Responses to the innovation questions on the 2011 parent survey supported the concept of this pilot; technology and specifically iPads/ tablets were among the top three suggestions for innovation in education.
- The ██████████ School Board approved this pilot and expects a report and recommendation following the conclusion of first quarter. At that time, a decision may be made to extend or not extend the pilot. Measurable data needs to be collected for this report.
- Schedule changes may impact a student's ability to continue in the cohort. Procedures are needed for course add/drop specifically as it relates to this pilot.
- The iPad project team will meet with the high school administration weekly through Q1 and collaborate through Google Docs to plan for, document, and adjust to the needs of the pilot.

Communication Goals

1. Support the roll-out of the iPad pilot with effective communication so the pilot can be appropriately evaluated for its impact on student learning.
2. Ensure two-way communication with primary audiences (students, teachers and parents involved in the pilot) to inform future decision-making.
3. Develop and evaluate communication tools for use with the general population if the pilot is expanded.
4. Gain support and understanding for District's goal of using Technology as an Accelerator of Learning as exemplified by this project.

Key Messages (Phase I)

- In ██████████, we believe technology is an accelerator of learning. The iPad and its many apps show promise for enhancing learning.
- iPad pilot is a study: How can the device enhance learning and be used as a productivity tool. (Ian Jukes)
- Who is in the pilot: About 350 grade 9 students (about half the class) who, by their class schedule, share teachers in English, math and science. The pilot includes both X and G classes in the three subjects (majority are in G classes). Teachers are teaching both pilot and non-pilot classes.
- Pilot will serve as a test during first semester with opportunity to expand second semester if successful.
- iPads are property of the school, checked out to students like textbooks; all school policies apply. There is no cost to students, unless the device must be replaced due to loss or damage, which would be the responsibility of the student's family.

Key Messages (Phase II)

- Recommendation to expand pilot to all 9th grade students at start of second semester approved by the School Board at December meeting. Funding for potential expansion was included in 2011-2012 Technology Budget.
- Early indications for ██████████'s pilot have [shown measurable results](#) with student organization, student achievement, student collaboration and an increase in the number of formative assessments teachers use to ensure student learning.
 - Fewer D's and F's in all content areas for students in the iPad pilot
 - Overall higher grades in several iPad cohorts versus non-iPad cohorts with the same teacher
 - Improved overall average scores on Science 9X tests compared to past three years
 - Overall higher final grade comparisons in Geometry over past two years
 - Improved Higher Algebra test score comparisons versus last year
 - Higher scores on English summative tests and significantly higher scores on essays versus last year
 - Improved class average scores on English Quarter 1 Essay compared to last year
 - Overall fewer missing assignments in iPad courses

Audience: Pilot Students Cohort (Phase I, repeated for Phase II)

Objectives	Communication Strategy	Messages	Tactics/Tools	Staff/ Responsibility	Timeline	Evaluation
1. 100% of students in pilot will report understanding expectations of the pilot.	Information Distribution	Rules and guidelines, care and maintenance	Common syllabus language and messages from teachers	Communications & Teachers	Aug 20	Student Survey three times through pilot
2. 90% rate evaluate initial set-up course positively (large-group instruction on “how-to”).	Class instruction	Goals of pilot	Video series shown in class prior to distribution (posted to Schoology class)	Alex and Dave E.	Sept 1	Student Quiz
			Common webpage with p & p links	Janet and Jake	Aug 20	End of pilot student survey
			Large group instruction, Set-up course (Forum Rm)	Dave, Jeff, Peter, Julie	Sept 13-16	Session evaluation poll
			Schoology online Quiz	Dave E.		
1. 100% will maintain their network and iPad use privileges throughout the school year.	Educate/inform	Acceptable Use Policy (524, 525, 526)	iPad Agreement (includes rules, care and feedback)	Julie/Dave/Peter	Aug 20	Media Center/Tech Office records
2. Fewer than 10% of students will have discipline referral related to iPad use.		Care of the iPad	Copy of agreement on iPad (icon)		August	
			Online Quiz through Schoology course (like taking your drivers test)	Dave/Peter	Sept 1 (students complete Sept 6)	Count of student referrals

Objectives	Communication Strategy	Messages	Tactics/Tools	Staff/ Responsibility	Timeline	Evaluation
1. 50% of students will contribute to the knowledge-bank for the iPad pilot during Q1.	Engagement in evaluation of pilot	Help us learn. Feedback on apps. Testimonials impact on learning.	Schoology iPad course Discussion Board and Wall posts Knowledge bank to collect feedback (Google Doc Pg)	Dave E Dave, Julie, Adam	Sept 6 Sept	

Audience: Pilot Teachers Cohort (Phase I, repeated for Phase II)

Objectives	Communication Strategy	Messages	Tactics/Tools	Staff/ Responsibility	Timeline	Evaluation
1. 100% of teachers in pilot will report confidence in knowing what to communicate to students.	Common messaging	Shared communication plan	Communication plan and procedure for distribution handout for teachers	Julie / Dave / Janet	July 7	Informal feedback during meeting
		Feedback important part of pilot	Planning Meeting Common syllabus language	Julie / Dave / Julie / Dave / Janet Julie / Dave / Janet	July 7 DRAFT for feedback July 7	
		Learning together critical to future success	Joint email for parents (sender - Adney/district)	Adam/teachers/ Alex		
		Humility and downplay involvement (caution with non-pilot group kids/parents)	Discussion of video segment list (scope and sequence)	Jake / Alex	Topics by July 7	
			Key Lessons by Class	Adam / Teachers		
			Common email updates to parents		Sept 6 Sept 7 (forms due)	
					Distributio n Day	

<p>1. 100% of teachers will contribute to knowledge base for future roll-out.</p> <p>2. 25% of contributions will be about “what didn’t work”</p>	Engagement	<p>Defined Experiment for future success.</p> <p>Measuring the process of the experiment, not the results.</p> <p>Fail fast. Learn more.</p> <p>Engage students to help us learn.</p> <p>Expect dip in effectiveness/ efficiency during learning phase, but payoff will be improved student achievement</p>	<p>Planning Meeting. Review of Stella – defined experiment</p> <p>Interactive discussion - Generating the hypotheses. (form or activity)</p> <p>Schoology collaboration course for teachers (knowledge bank)</p> <p>Collect video testimonials.</p> <p>Weekly questions to teachers related to program goals.</p>	Dave E Eric/Adam	<p>July 7</p> <p>July 7</p> <p>Weekly Sept – Nov</p> <p>Weekly Oct – Nov</p>	<p>Informal feedback from meetings.</p> <p>Count of contributions to knowledge-bank</p> <p>Post-survey on hypothesis</p> <p>Count of student posts</p> <p>Acceptance of phase II pilot teachers</p>
<p>1. If pilot expanded, 5 teachers will be willing to serve as spokesperson for pilot.</p>	Opinion Leader influence	<p>iPad deepens learning.</p> <p>Successful pilot.</p> <p>Uses/lessons</p>	<p>Video segments</p> <p>Media interviews</p> <p>Webinars for colleagues (moved to phase III)</p>	<p>Alex, Dave, Janet</p> <p>Jake, Dave, Janet</p>	Q 2	<p>Number of teachers as spokespersons</p> <p>Receptiveness to media in classroom</p>

Audience: Parents of Students in Pilot Cohort (Phase I, repeated for Phase II)

Objectives	Communication Strategy	Messages	Tactics/Tools	Staff/ Responsibility	Timeline	Evaluation
1. 100% of parents will sign agreement or consent form within first week of school.	Educate/Inform Electronic and face-to-face opportunities	About the iPad pilot/innovation Goals Student / Family responsibilities	Joint email for parents (Adney/district) w/ podcast link Curriculum Night Info Mtg (separate session before for iPad pilot parents) Schedule and invite for parents.	Janet Adam, Dave, Julie, Janet	Aug20 Sept 8	Count of agreement forms signed Track complaints and concerns
2. School receives fewer than 15 complaints about iPad program from cohort parents	Face to Face personal meetings with parents who object or complain	Filtering / wireless Cyber Safety Demo website, FAQ Tech req. Help/ home tech support	iPad Website (FAQs) Apps, videos, help, tech requirements. Family helpdesk email for feedback.	Janet, Jake Tech Office	Aug 20	
1. If pilot is successful and expanded, 85% of pilot parents will rate the pilot favorably.	Inform and Promote	How the iPad is accelerator or deepens learning Academic, Organization, collaboration impact	E-blast about how iPad is being used (5) (one per class plus intro and end of quarter survey) Assignment for students – demo iPad use for parents Upload parent testimonials (video or email)	Teachers	Schedule TBD Mid-Oct	Q1 post-survey Collect feedback from parents

Audience: General Public, other MHS students, Other parents (Phase I)

Objectives	Comm. Strategy	Messages	Tactics/Tools	Staff/ Responsibility	Timeline	Evaluation
<p>1. Minimize questions and rumors</p> <p>2. Maintain internal audience priority, minimize external until pilot is evaluated</p>	Website	Pilot (defined)	Principals back to school message during New student orientation	Janet, Dave A.	Sept	Number of inquiries during pilot phase
		██████████ has a long history of pilots – ex: iPads were piloted at elementary level last year; Schoology past 2 yers	Website	Janet	Sept	iPads a non- issue during contentious school board election
		FAQ	District News post	Janet	Sept	
		Cost/Funding Does not compete with classroom \$\$, dedicated tech levy.	Video story	Alex, Jake	Nov Issue	
		Pilot cohort selected based on class schedule, subjects under curricular review	Employee News	Janet	Sept	
		9 th grade for longest impact over time at high school level	Breezes Story	Students (mosimann)	Nov	
		Any student can bring personal iPad to school.	What's Up (video): Wi-Fi enhanced; benefits all. OK to bring iPad or laptop to school		Nov	
		If successful plan to expand to all grade 9 during S2.	What's Up (video): iPad pilot	Adney, Alex	Nov	
			Facebook posts (May need to accelerate timeline if attention mounts)	Janet, Jake		

Audience: School Board (Phase I)

Objectives	Comm. Strategy	Messages	Tactics/Tools	Staff/ Responsibility	Timeline	Evaluation
1. Gain support and approval for administrative recommendation at conclusion of phase I	Educate and Inform	Status updates	Periodic updates through superintendent's memo	Eric, Dennis	Aug – ongoing	Board vote
		FAQs	Copied on all public and parent communication	Janet	Ongoing	Concerns/ compliments expressed by Board
		Rapid response to constituent or Board questions	Survey and achievement data to support recommendation	Janet, Dave, Eric Jenn	End of Q1	
		Experiment innovation language	Study Session Presentation (include iPad teachers)	Eric, Dave, Julie, Adam, Adney, teachers	End of Q1	Number of complaints superintendent receives from Board members
			Video overview of project (include parent, teacher, student testimonials)	Alex, Julie, Dave, Eric, Janet	End of Q1	
			Regular Meeting (on camera) presentation	Eric, Julie, Adney, Dave	Dec mtg	

Audience: General Public, other MHS students, Other parents (Phase II)

Objectives	Comm. Strategy	Messages	Tactics/Tools	Staff/ Responsibility	Timeline	Evaluation
1. Key messages appear in top half of all media stories	Media relations (timing critical – post Holidays)	Goals of pilot Initial findings Not a social tool, but a learning tool Educational use	Media Backgrounder Media pitches Media training for teachers Video and b-roll Leverage Apple News	Janet, Christine, Jake, Dave, Julie teachers, student interviewees	Dec- Jan	Coverage begins after winter break Key messages appear in top half of all media stories
2. Maintain ongoing support for technology as an accelerator of learning and future technology funding	Community relations	Future replacement of textbooks (cost savings) School owns iPads, just like textbooks, and issues them to students; will be collected at end of year, just like textbooks.	School News postcard Facebook posts Edit and share video series District Parent Webinar about pilot	Christine, Janet Janet, Jake Alex, Jake Janet, Dave, Adam	Jan, June Jan Jan Jan	Measure engagement on Facebook posts Measure media comments/posts
3. Zero letters to the editor or public meeting objections to spending on iPad pilot	Rapid response to questions/concerns		Respond to all inquires in timely manner Surveying parents, students, teachers, continues.	Janet Dave, Janet		
4. Positive comments associated media stories	Media monitoring		Media monitoring	Janet, Jake		
5. Maintain Excellence/ good rating on annual parent survey	Inform/Educate					Analyze annual parent survey
6. Gain third-party endorsements of project	Endorsements	██████████ leader in educational technology	Professional presentations Ed Tech Award submissions Ed Tech journals/bloggers LinkedIn Prof Groups	Dave, Julie, Peter, Jeff, Janet		Sell-out iPad Tech site tour Hits on presentation notes

Materials List:

- “What works in technology adoptions” – Handout for teachers
- Communication plan and procedure for distribution handout for teachers
- Generating the hypotheses. What will we measure? (Steering team minutes)
- Common syllabus language (Schoology iPad –teacher course)
- Speaking points for teachers
- PPT Presentation for Parent Meeting
- Website (microsite) /ipad
 - FAQ
 - iPad Backgrounder
 - Parent notice
 - iPad Agreement
 - Replacement cost pricelist
 - App links
 - Videos
- Video segments (student video only available internally)
 - Care of the iPad
 - Personalizing your iPad
 - Passwords and security
 - Synching with iTunes - Problem
 - Personal use vs. Educational use
 - Taking notes on a novel
 - Taking images of others (videotaping classes?)
 - Lost and Found
 - Tips and Tricks (notarize)
 - Setting up email
 - Accessing Google Docs
 - How to get new apps
 - Wi-Fi Hot Spots
 - Tour of apps
 - Cyber Safety



★ iPads at [REDACTED] High School – media backgrounder

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Using Technology to Accelerate Learning

The changing landscape of the world's information to digital form will require today's student to have a different set of skills than what was required just a decade ago. Students must be equipped with not just the three R's, but also with 21st century skills of problem solving, critical thinking, communication and technological literacy. Future graduates will need to be able to quickly find, synthesize and communicate information and collaborate with colleagues—not just in their own office, but within a global community of colleagues and customers.

To that end, in September 2011, [REDACTED] Public Schools launched a [1:1 pilot using the Apple iPad](#) to create a seamless and dynamic educational experience for students. The pilot uses digital curriculum materials, student collaboration tools and individualized instruction in math, language arts and science, all with the goal of enhancing student learning. Because most ninth grade classes have only ninth grade students, this grade level was selected for the initial roll-out of iPads. Half the 9th grade was provided iPads in September. Initial data from the pilot supported expansion to all 9th grade students in January 2012.

Four implementation practices set [REDACTED] iPad pilot apart from many school pilots:

1. Available digitized curriculum resources (developed over last ten years of using SMART Boards); the iPad is a primary learning tool in math, science and English.
2. Each student is assigned an iPad as a primary learning, organization and productivity tool. (Many pilots use only classroom sets)
3. Teacher training and professional development (integrated with curriculum review)
4. Age of the student—high school freshmen (focused on future; know grades count; old enough to be careful and responsible with the tool)

The goals of the iPad pilot are to:

- Enhance and accelerate learning
- Leverage existing and emerging technology for individualizing instruction
- Promote collaboration, increasing student engagement

- Strengthen the 21st century skills necessary for future student success

The technology also increases access to digital curriculum, supplementing traditional print textbooks and classroom equipment such as graphing calculators. The opportunity to use the iPad gives students access to anywhere, anytime learning—in classrooms, around campus, at a cyber cafe and at home.

The Real Advantage: Teachers Using Digitized Curriculum

██████████ has earned [national awards](#) for its use of educational technology and has a real advantage in having a successful iPad pilot. In 2002, ██████████ installed its first [SMART Boards](#)—used in every classroom today—and began digitizing our curriculum. Unlike many other schools piloting iPads, ██████████ is not relying solely on third-party apps to teach content; ██████████ teachers are relying on ██████████ digitized curriculum to teach. Having digital content in place made the use of iPads a natural next step. Teachers continue to post course notes and assignments, which students can download to their iPad, add their own notes, complete assignments and return homework to teachers via the iPad. The iPad naturally interfaces with existing tools: [Schoology](#), [Google Docs](#), [Skyward](#). Today, [cloud computing](#) allows student access to student work and learning resources anywhere and anytime. If students forget their iPads, they can check out a temporary replacement from the Media Center and access their materials as if it was their own iPad.

The curriculum for the pilot group initially included 9th grade math, science and English because these departments were in the curriculum review process and were looking to adopt digital materials. Social studies and health are being added second semester. Four teachers taught both the pilot cohort course and the non-pilot cohort course, providing a unique insight into potential course modifications and providing a control group for measuring the impact on learning.

██████████ teachers focus on formative assessments (practice homework and quizzes) to assess student learning throughout a lesson. Much like a doctor uses testing to inform a diagnosis, formative assessments inform teachers about student instructional needs. Research is clear that [when teachers use frequent formative assessments, they are better able to gauge student learning](#), re-teach material if needed, or move on if everyone understands. The iPad tools, combined with [Schoology or Skyward formative assessments](#), allow teachers to more efficiently administer and grade formative assessments, allowing more timely intervention if a student doesn't understand a concept. In English classes, teachers noted improved scores on Quarter 1 Essays were due to increased ability to offer student feedback electronically and to diagnose problems more quickly by collecting drafts online before submitting final copies.

Student Performance: More Organized and Engaged

██████████ students are using the iPads during class time to [read textbooks and novels, take notes](#), complete and submit homework and do research on one device. When students take the iPad home, they can readily access their texts, homework, teachers' notes and all papers they have previously kept in multiple binders and folders.

Students report that using iPads have [increased their organizational skills](#), making learning more efficient. When students are reading a novel, they can read and take notes directly on the iPad, which also has a built in dictionary and notes summary. When students are ready to study, they simply review the notes on the iPad.

Using iPads also keeps students more engaged and [inspires collaboration](#) among other students and their teachers. The result is a strong sense of community in the classroom driving further knowledge and understanding.

Initial Academic Results

Early indications for [REDACTED]'s pilot have [shown measurable results](#) with student organization, student achievement, more student collaboration and an increase in the number of formative assessments teachers use to ensure student learning.

- Fewer D's and F's in all content areas for students in the iPad pilot
- Overall higher grades in several iPad cohorts versus non-iPad cohorts with the same teacher
- Improved overall average scores on Science 9X tests compared to past three years
- Overall higher final grade comparisons in Geometry over past two years
- Improved Higher Algebra test score comparisons versus last year
- Higher scores on English summative tests and significantly higher scores on essays versus last year
- Improved class average scores on English Quarter 1 Essay compared to last year
- Overall fewer missing assignments in iPad courses

Student Achievement Data

Quarter 1 Final Grades: iPad and non-iPad cohort comparisons

Teacher	A	B	C	D	F
Teacher A iPad Course	72.4%	27.6%	-	-	-
Teacher A Non-iPad Course	75.4%	20.0%	4.6%	-	-
Teacher B iPad Course	54.2%	39.0%	6.8%	-	-
Teacher B Non-iPad Course	32.1%	42.9%	19.0%	3.6%	2.4%
Teacher C iPad Course	64.3%	35.7%	-	-	-
Teacher C Non-iPad Course	41.4%	47.4%	7.4%	4.2%	-
Teacher D iPad Course	25.8%	54.8%	19.4%	-	-
Teacher D Non-iPad Course	25.0%	37.5%	12.5%	12.5%	12.5%



Overall higher grades in several iPad cohorts versus non-iPad cohorts with the same teacher



Grading the iPad Pilot: Student/Parent Survey Data

- 83% of students say they understand more of what is taught when using technology in school.
- Students (92%) and parents (94%) believe technology is very important to learning.

- Students (91%) and parents (88%) feel classes are more interesting when technology is used.
- 77% of students respond they collaborate daily with others in school using technology.
- 95% of students say they can apply learning in new ways when using technology in school.
- In classes where technology is used, students say they apply critical thinking and problem-solving skills daily (40%), weekly (39%) or quarterly (16%).

Additional Background about the Pilot

By the Numbers:

Teachers in pilot = 53

Students in pilot = 720

Cost per unit (includes case and apps): \$550

Semester 1: ██████████ deployed iPads to half of the ninth grade class (about 360 students). Students involved in the pilot were selected based solely on their class schedules and represent a broad range of academic ability. Because most ninth grade classes have only ninth graders, ██████████ has focused on curricular tools that fully integrate into the ninth grade core curriculum in language arts, math and science. Students use their iPads in three of their six classes.

Semester 2: iPads will be used by all ninth grade students (720). Social studies and Health classes will be added, making the iPad a tool that all ninth grade students will use for two-thirds of their day.

About ██████████ High School

██████████ is a high-performing, high school serving students in grades 9 through 12. Located in a suburban, one-high-school community, ██████████ High School serves as the flagship of the ██████████, which has been recognized as a Technology Salute school district by the National School Boards Association.

██████████ High School's 2,850 students take six 57-minute classes per day, allowing for a full college-preparatory course load. ██████████ High School has a 99 percent graduation rate, 93 percent college-bound rate and average ACT score of 25.5.

Helpful Links and videos

██████████s (includes links to [selected apps](#))

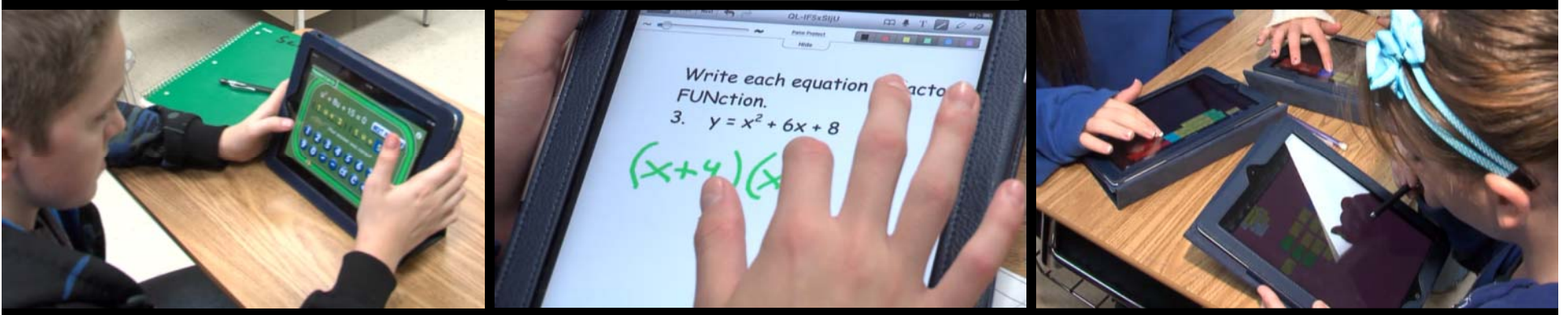
- Using iBooks in 9th Grade English
<http://vimeo.com/29115580>
- Student Collaboration and Learning (3 minutes)
<http://vimeo.com/32874069>
- Assessments for Learning and the iPad (2 minutes)
<http://vimeo.com/32874739>
- Student/Teacher and Parent/Teacher Communication (1 minute, 30 sec)
<http://vimeo.com/32875508>
- Organizational Skills and Efficiency (3 minutes)
<http://vimeo.com/32863254>

Additional b-roll available upon request.

██████████ will host an [iPad Workshop and school visit](#) for educators on February 24, 2012.

###

Approval of Expansion of iPad Pilot



Report to the Board
May 3, 2012



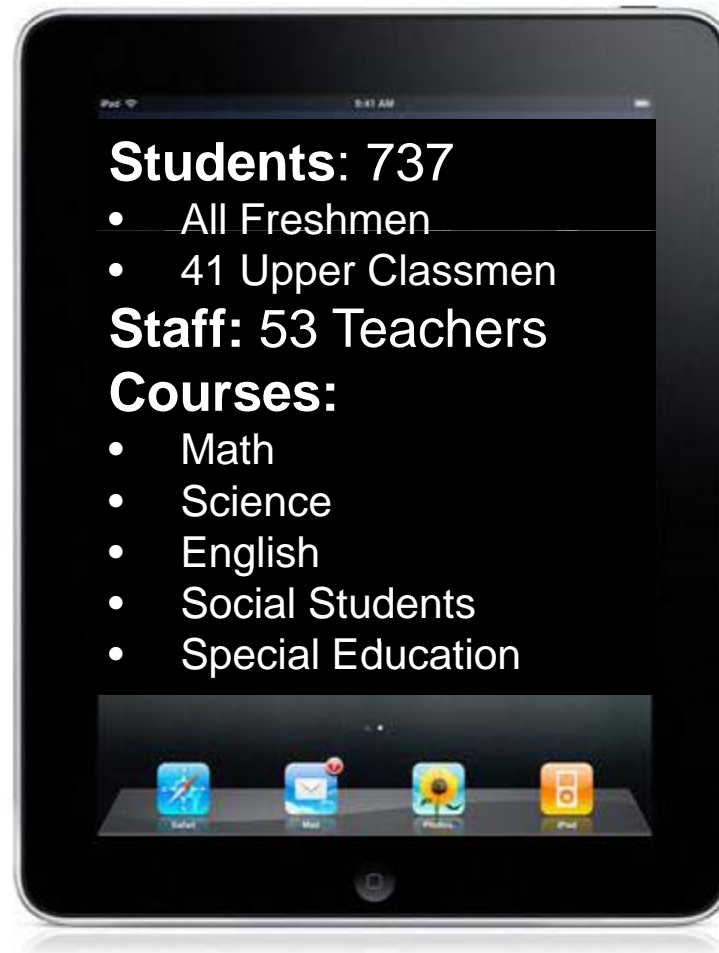
Summary of 1:1 Instructional Platform (iPad) Pilot Results

- Data shows positive academic achievement results
- Teachers are using new platform effectively to individualize instruction
- Students (and staff) are collaborating in new ways to support learning
- 1:1 instructional platform is increasing the level of engagement
- 21st century skills are accelerated (technology, critical thinking, etc.)
- Costs are manageable and offer potential for savings in some areas
- <http://vimeo.com/34686596>



Introduction

Current State of iPad Pilot



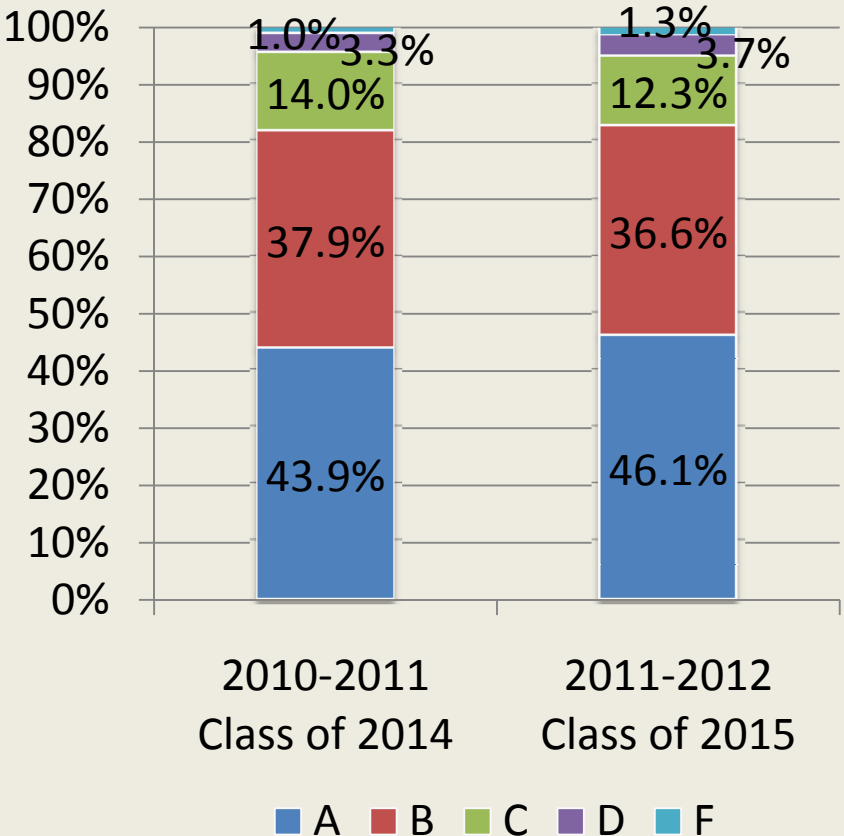
Enhance and Accelerate Learning

iPad Pilot Goal #1

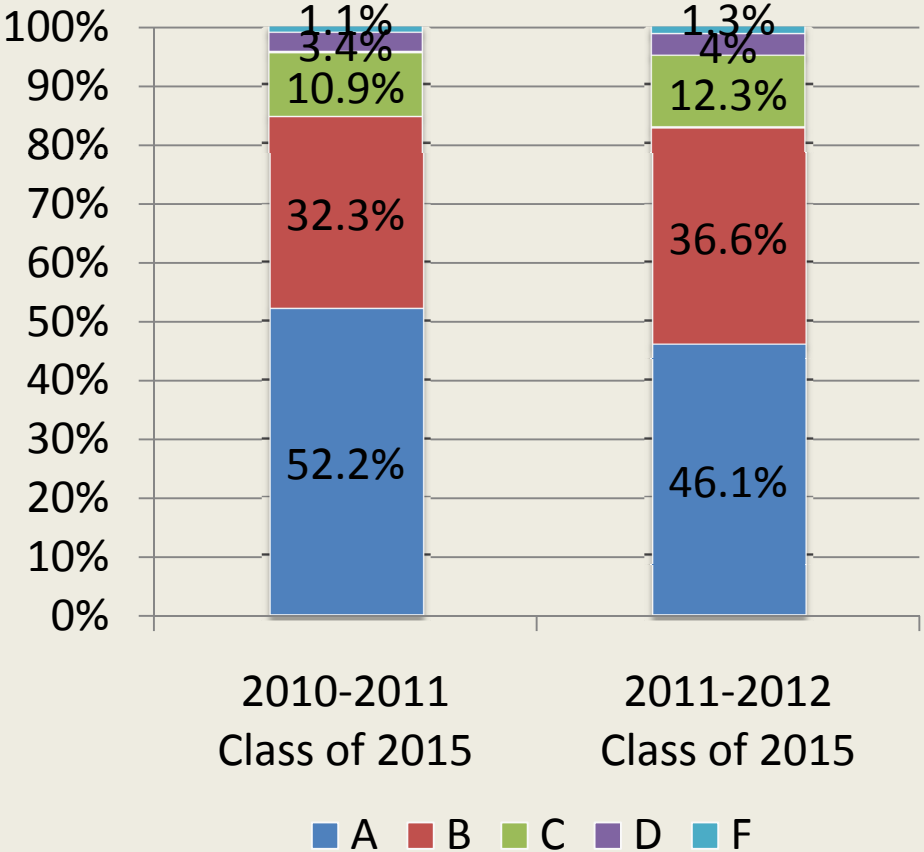


3rd Quarter Overall Grade Comparisons Past 2 years

Different Students

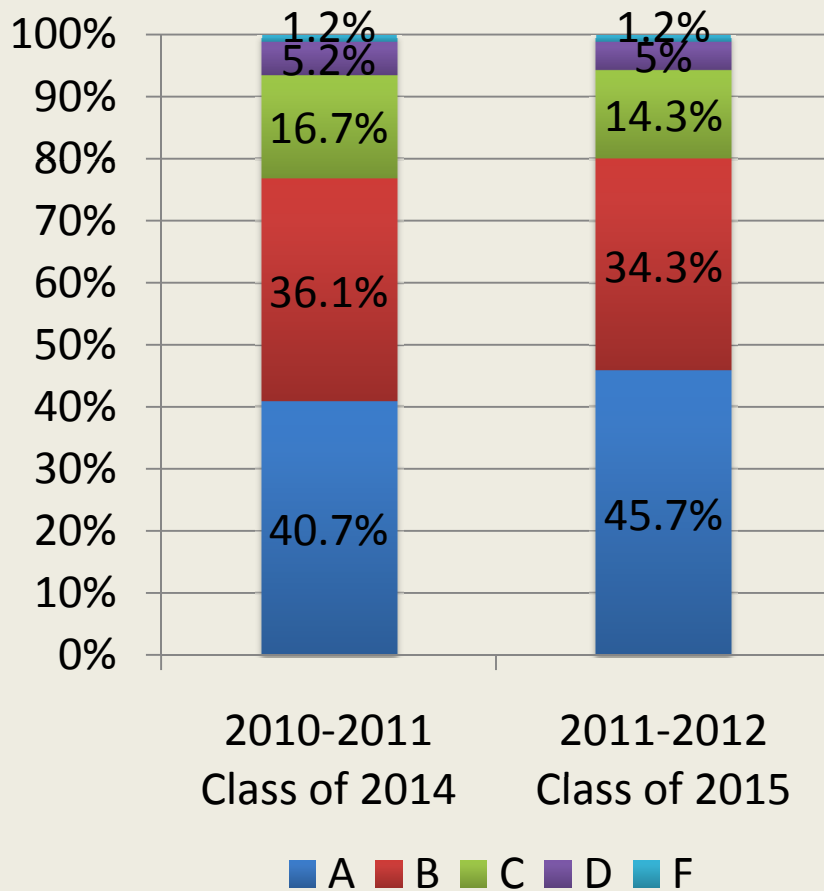


Same Students

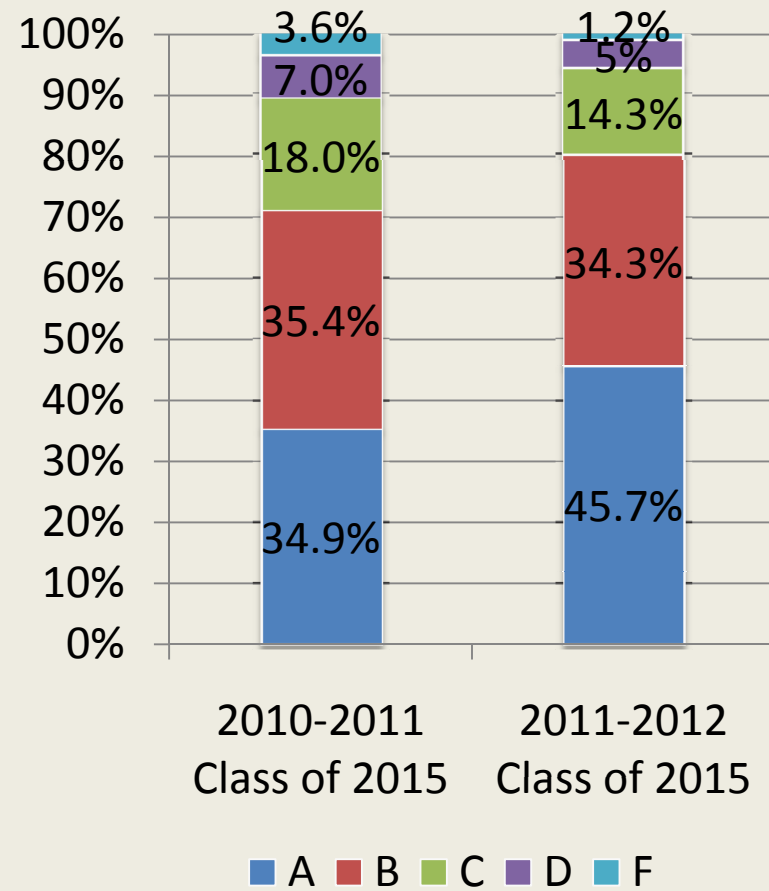


3rd Quarter Math Grade Comparisons

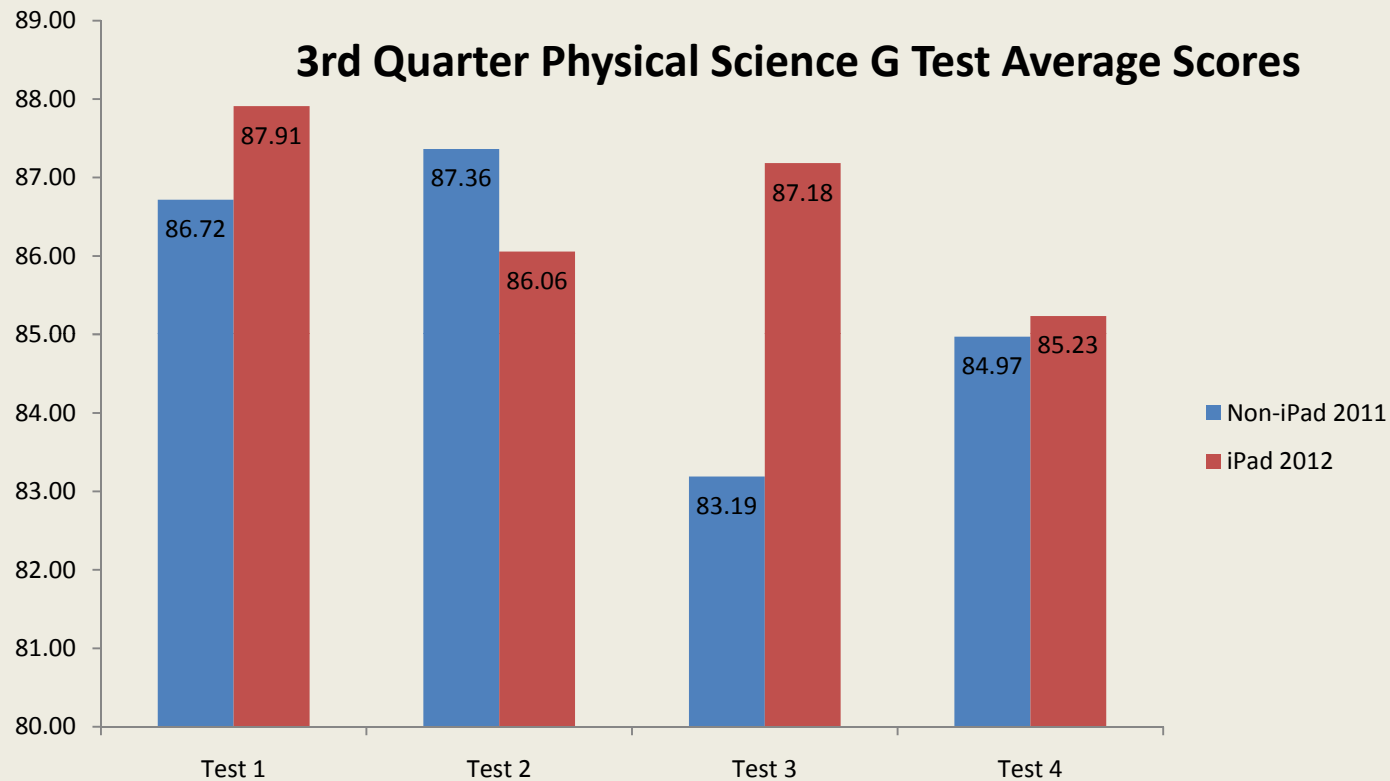
Different Students



Same Students



3rd Quarter Science Unit Comparisons 2010-2011 versus 2011-2012 Scores



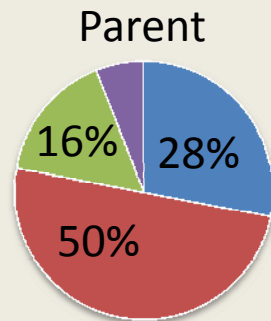
4 Common Assessments across 10 classes and 3 teachers



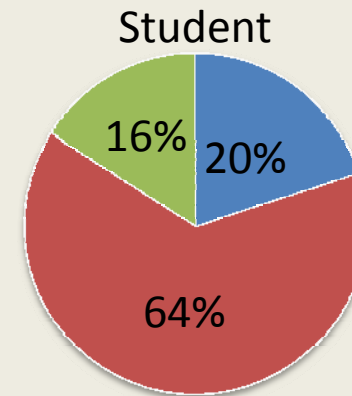
Enhance and Accelerate Learning

Student & Parent Survey Results

Thinking about your academic achievement first semester, are you/your child performing at a level that is (about what you expected, better than expected, worse than expected)?



- Better than Expected
- About the Same as Expected
- Worse than Expected
- No Response



- Better than Expected
- About the Same as Expected
- Worse than Expected

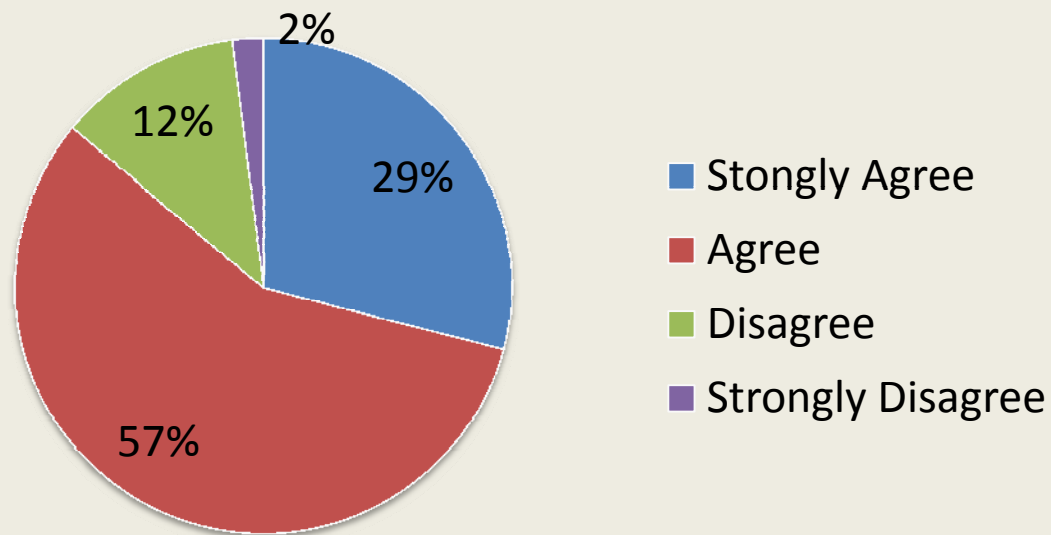
78% of parents and 83% of students responding to this question on the survey feel they are performing as expected or better than expected in their academic achievement. Not all respondents answered this question.



Enhance and Accelerate Learning

Teacher Survey Results

“I believe that using the iPad has changed my instructional practices.”



86% of teachers responding to a survey agree that the 1:1 platform has changed their instruction.



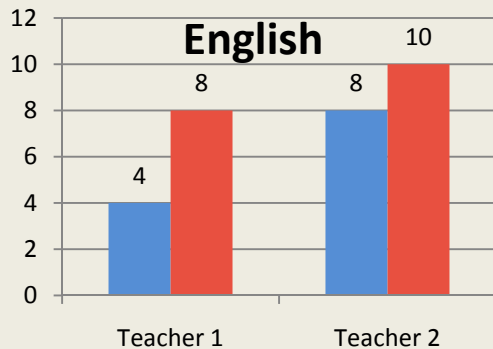
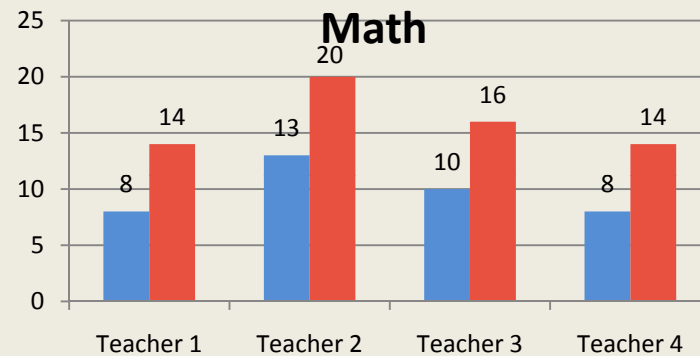
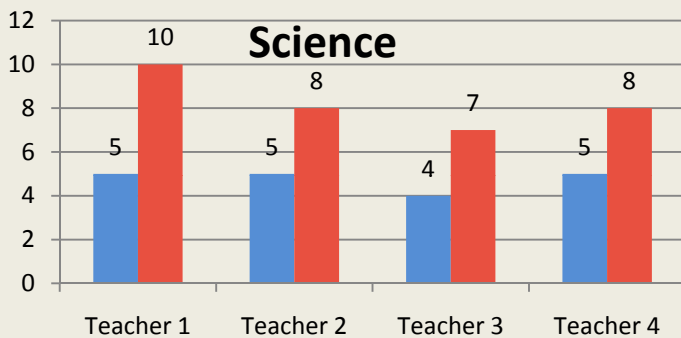
Leveraging Technology for Individualizing Instruction

iPad Pilot Goal #2



Leveraging Technology for Individualizing Instruction

iPad Pilot Goal #2



65% increase in formative assessments per unit during Quarter 3 in these examples

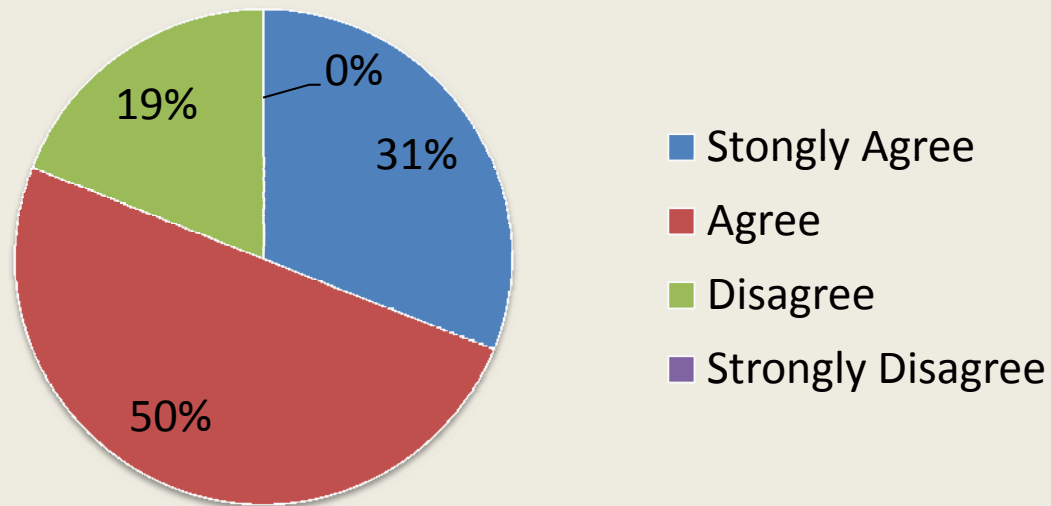


[Video Clip: Formative Assessments](#)



Leveraging Technology for Individualizing Instruction Teacher Survey Results

“I am better able to track student learning due to the use of iPads in my classroom.”



81% of teachers responding to a survey agree that the 1:1 platform has allowed better tracking of student learning in their classroom.



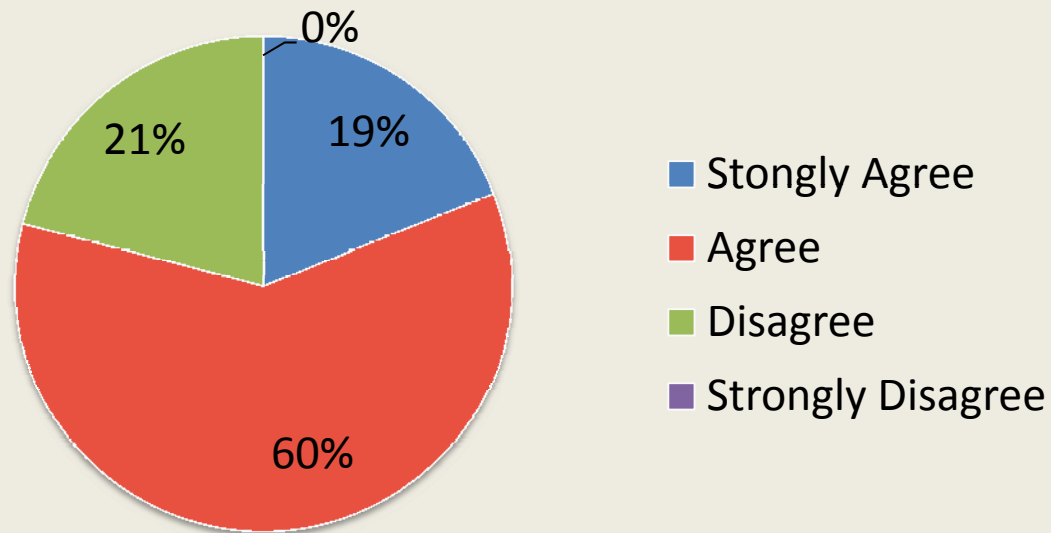
Promote Collaboration, Increasing Student Engagement

iPad Pilot Goal #3



Promote Collaboration, Increasing Student Engagement Teacher Survey Results

“The use of iPads has led to an increase in student collaboration in my classroom.”



79% of teachers responding to a survey agree that the 1:1 platform has increased student collaboration in their classroom.



Promote Collaboration, Increasing Student Engagement

Quotes from the Parent Survey

Homework

75% of Pilot teachers reported either better homework completion rates or no change

“He's more engaged with his homework because he's able to customize/organize his notes in a more meaning way that works for him.”

“He’s more interest in doing homework and getting things done on a more timely basis.”

“More timely turn-in of homework.”

“Makes homework and testing easier, everything is on it, so no forgetting materials in locker or visa versa at home. Lost homework is at a minimum.”

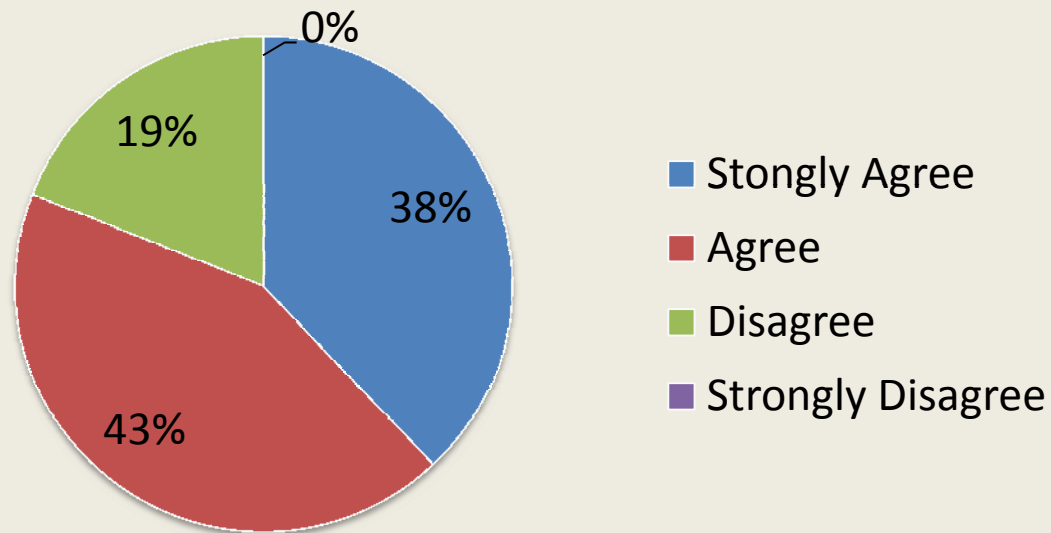


Strengthen the 21st Century Skills
Necessary for Future Student Success
iPad Pilot Goal #4



Strengthen the 21st Century Skills Necessary for Future Student Success Teacher Survey Results

“I believe that using the iPad has led to an increase in student communication.”

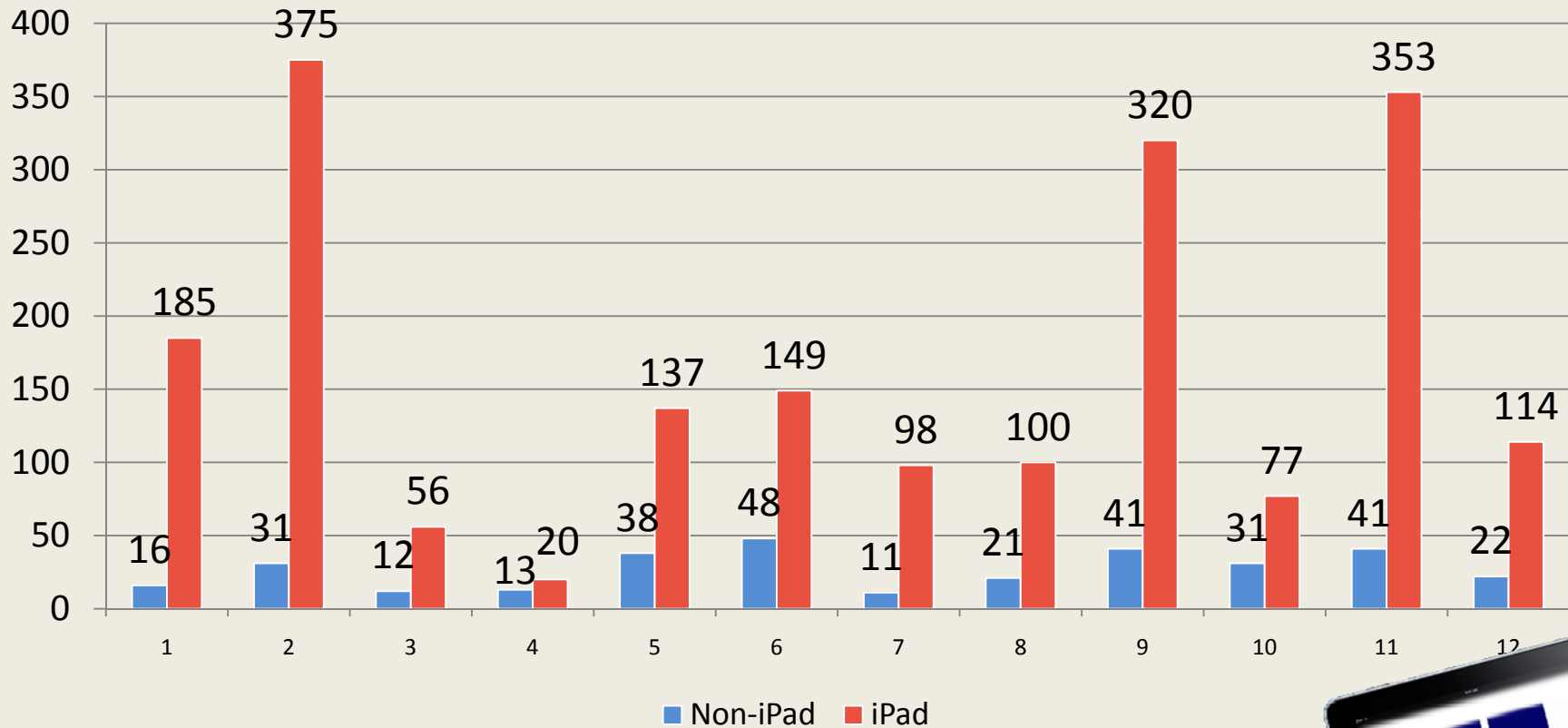


81% of teachers responding to a survey agree that the 1:1 platform has led to an increase in communication.

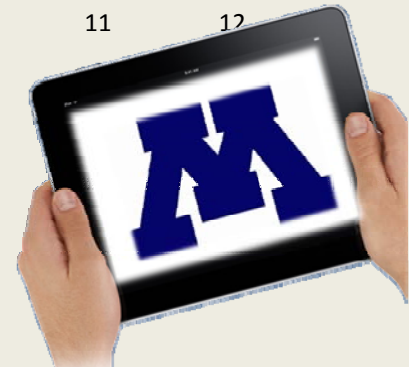


Schoology Use in the Classroom

Average Page View Per Student in iPad Pilot Teachers' Schoology Courses
Semester 1 2011-12

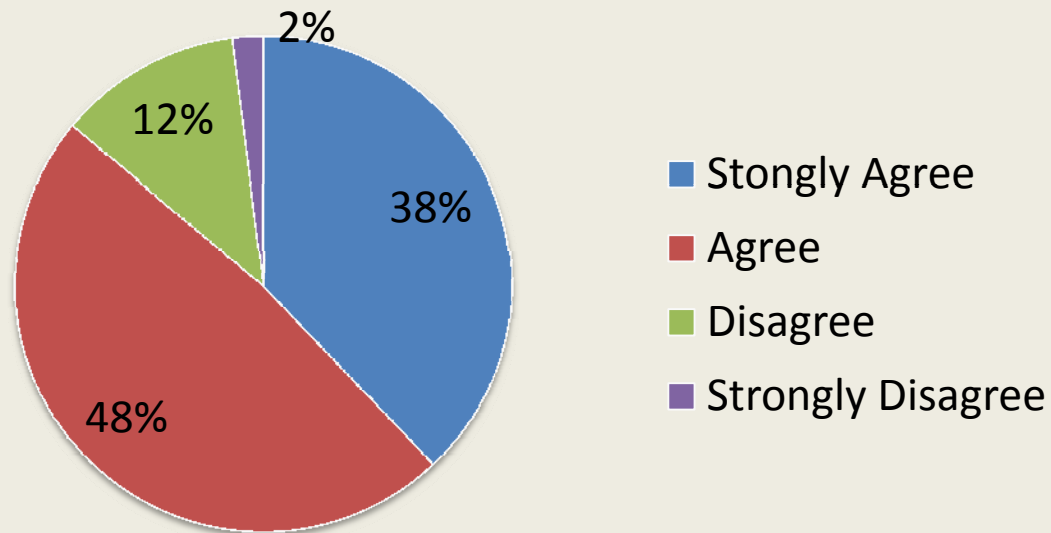


*Four out of 16 iPad Pilot Teachers did not have comparable data.



Strengthen the 21st Century Skills Necessary for Future Student Success Teacher Survey Results

“I believe that students will be better prepared for the future
due to the use of iPads in my classroom.”



86% of teachers responding to a survey agree that the 1:1 platform
has better prepared students for the future.



Training and Support

2012-13 iPad Expansion



Training and Support 2012-13 iPad Expansion

First Year iPad Teachers:

- Spring iPad training prior to fall teaching
- 1 Day August training
- 2 full sub days during school year
- 2 half-day sub trainings during year with experienced iPad teachers
- On-call TOSA Support, classroom observations

iPad Teachers with One Year of Experience

- Before/after school quarterly meetings
- 2 half-day sub trainings during second year
- On-call TOSA Support, classroom observations

iPad Teachers with 2+ Years of Experience

- Before/after school quarterly meetings
- On-call TOSA Support, classroom observations



Training and Support 2012-13 iPad Expansion

Minnetonka Public Schools #276

Home Profile Inbox Resources

DAVE EISENMANN · Minnetonka Public Schools

MHS iPad Pilot Students: 01 ▶

Guidelines & Policies

Add Materials Options ↶

⌘

MHS iPad Rules Video Series - Care of the iPad Part 1 THE DAY
iPad Invasion
Minnetonka, MN
01:30

iPad Rules Video Series - Care 2
01:24

iPad Rules Video Series - Personalization Extreme Makeover iPad Edition
01:37

Send Message
Edit Course
Edit Settings
Edit Members

Materials

- Updates
- Gradebook
- Attendance
- Analytics

Information

Grading period
2011-12

Members (396)

Admins (3)

Care and Use 1: <http://vimeo.com/28090375>

Educational vs. Personal: <http://vimeo.com/28725971>

Lost and Found: <http://vimeo.com/28386367>

Cyber Safety: <http://vimeo.com/35886574>



Cost Savings

2012-13 iPad Expansion



Cost Savings

Increased Use of Web-based Resources

\$250,000

Average amount
spent annually on
instructional
materials at the
secondary level

\$50,000

Anticipated amount
required once fully
operational



Cyber-Security

2012-13 iPad Expansion



Cyber-Security


2012-13 iPad Expansion

- App Store not available on the iPad
- iPad is locked down and only District-approved apps are available
- Dedicated iPad server allows District to track individual iPad use
- If students manipulate the iPad profile, it is detectable
- Web browser is filtered through District network (CIPA approved)



Training and Support 2012-13 iPad Expansion

Academics | Activities | Administration | Calendar | Contacts | Community Ed | Employment | Newsroom | Schools | Services




Minnetonka Public Schools #276

Inspiring in Everyone a Passion to Excel

Parent Guide

District > Administration > Technology > iPads > Parent Guide


- Contact Info
- Cyber Safety
- Fast Facts
- Software
- Tech Plan
- Technology Resources
- Technology Site Visits
- Videos and Articles
- iPads
 - About the iPad Pilot
 - Agreement Form
 - Apps & Downloads
 - Care and Maintenance
 - Cameras & Microphone
 - Lost, Stolen, Damaged
 - Make A Commitment
 - Parent Guide
 - Questions & Answers
 - Security
 - Technology Policies



Parents' Guide to Student Use


Cyber safety is an important parent-child discussion to have from elementary school through high school. Experts warn that children are vulnerable to online dangers while in their own home. This guide is drawn from a wide variety of professional sources that provide practical advice for guiding your child's use of the iPad and other technology.

In accordance with the District's Electronic Technology Policy (#524), outside of school, parents bear responsibility for their use with information sources and other possibly offensive content. The District is not responsible for their student's use of school-issued email accounts or the District's electronic technology.



Common Sense media agreement for parents and teens in high school

- I will protect my reputation and privacy.
 - I will create privacy settings on social networking sites.
 - I will keep my password private.
 - I will not give out my personal information (like my address) to someone I don't know.
 - I will not put myself at risk by posting or sharing or scandalous photos.
 - I will not post anything on my profile that I want my parents, teachers, college admissions officers, or future employers to see.
- I will think first.
 - I know that not everything I think about or say is private.
 - I agree to think about how my actions affect others.
- I will demonstrate my maturity.
 - I agree to only use the Internet responsibly and respectfully.
 - I agree not to use technology to cheat in school.
 - I agree to flag and report inappropriate content.
- In exchange, my parents/teachers will...
- Be open...



Student Responsibility

2012-13 iPad Expansion



Student Responsibility

2012-13 iPad Expansion



- Minimal lost / damaged iPads
- Damaged textbook costs will exceed damaged iPads
- Continued emphasis on safety and care of device



Budget Detail

2012-13 iPad Expansion



Budget Detail

2012-13 iPad Expansion

2012-2013

- Ninth grade students receive a new iPad
- Tenth grade students use their iPad from 9th grade

	2011-2012	2012-2013
Freshmen	720	750
Teachers	50	50
Total	770	800
iPad	\$445,060	\$303,200
Training	\$42,200	\$42,200
Apps	\$23,100	\$24,000
Total	\$510,360	\$369,400

Additional Classroom Data (slides not used in presentation)



Semester 1 Final Grades

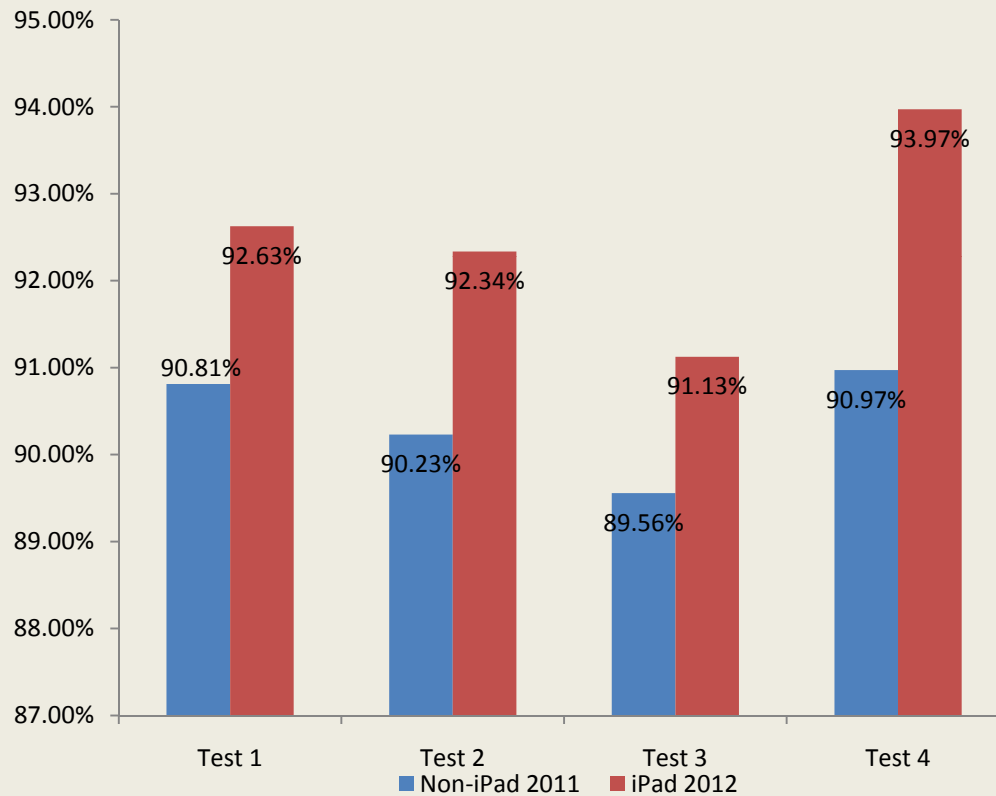
Greater percentage of A's and B's or a lower percentage of D's and F's in 11 of the 16 pilot teachers' iPad versus non-iPad cohort

Teacher	A	B	C	D	F
Teacher A iPad Course	32%	46.3%	14.3%	3.9%	3.6%
Teacher A Non-iPad Course	24.5%	29.2%	24.1%	9%	3.3%
Teacher B iPad Course	55.7%	27.1	10.9%	1.8%	4.5%
Teacher B Non-iPad Course	21.4%	33%	29.1%	12.6%	3.9%
Teacher C iPad Course	34.5%	41%	19.4%	4.8%	.4%
Teacher C Non-iPad Course	26.5%	42.9%	23.9%	6.3%	.4%
Teacher D iPad Course	25.5%	38.8%	26.3%	8.2%	1.1%
Teacher D Non-iPad Course	17.2%	38.3%	28.7%	12.9%	2.9%



3rd Quarter Math Unit Comparisons

3rd Quarter Higher Algebra Average Test Scores 2010-2011 versus 2011-2012 Scores



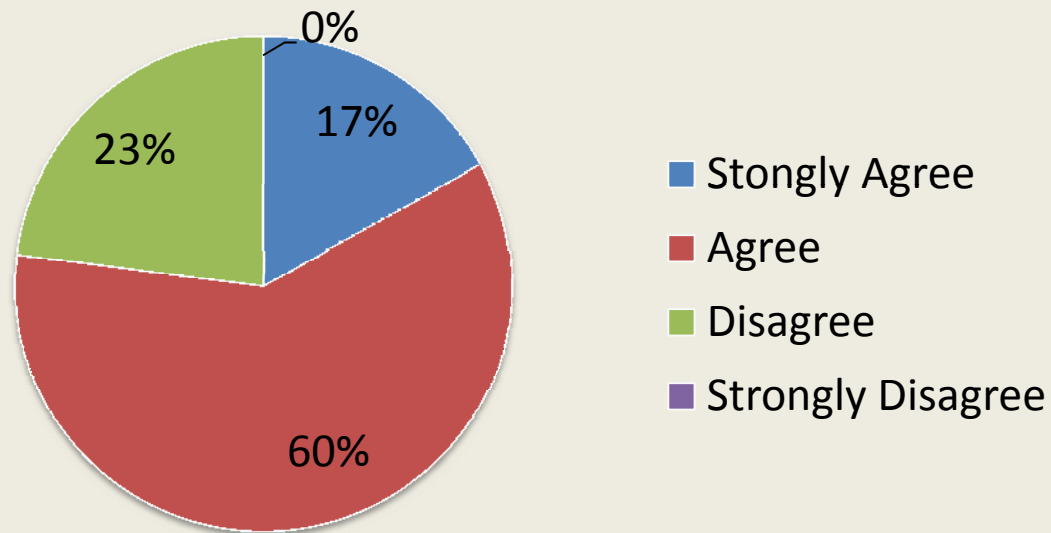
4 common assessments given across 8 classes and 3 teachers.



Enhance and Accelerate Learning

Teacher Survey Results

“The use of iPads has led to an increase in student learning in my classroom.”



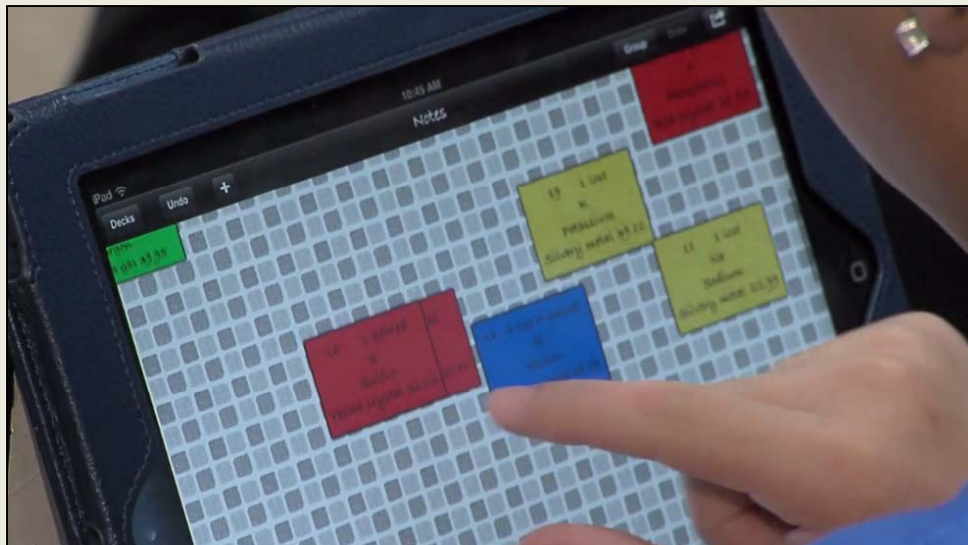
77% of teachers responding to a survey agree that the 1:1 instructional platform has accelerated learning in their classroom.



Enhance and Accelerate Learning

Quote from the Parent Survey

“My 9th grader has ADHD. The iPad has revolutionized her ability to stay organized and get better grades. The less paper, the better for her. She is getting much better grades now than she did in middle school. I mean, the difference between D/F's in middle school versus now A/B/C's in high school. It was a Godsend for her. I will have to plan for her to have one in college. We were unable to afford an iPad, so the school providing it has been priceless in opening her opportunities to colleges and degrees she previously wouldn't have considered with D/F's as the norm before...”



Leveraging Technology for Individualizing Instruction Classroom Example in Math

(Calculators Allowed)


ORIGINAL PROBLEM AND STUDENT WORK

Solve for x.

$$16x^{5.2} + 4 = 12.5$$
$$\begin{array}{r} -4 \quad -4 \\ \hline 16x^{5.2} = 8.5 \end{array}$$
$$\left(16x^{5.2}\right)^{1/5.2} = (8.5)^{1/5.2}$$
$$\frac{16x}{16} = \frac{1.509}{16}$$
$$x = 0.094$$

YOUR CORRECTIONS GO HERE

↓

$$16x^{5.2} = 8.5$$
$$\frac{16x^{5.2}}{16} = \frac{8.5}{16}$$
$$\left(x^{5.2}\right)^{1/5.2} = \left(\frac{8.5}{16}\right)^{1/5.2}$$
$$x = .885$$


Leveraging Technology for Individualizing Instruction Classroom Example in Special Education



Writing Example before and after using Dragon Dictation on the iPad

Student example from this fall pre-iPad (ADHD and Learning disabilities)

- “I want to my grampus for the summery and went camping at ion river camp grand and dirtbicking on the trills and at my grampus hose. I hand a lot of fun I do this every summery. I am imaging to go up to my grampus hose unfing this summery. I I'm looing frown word to at.”

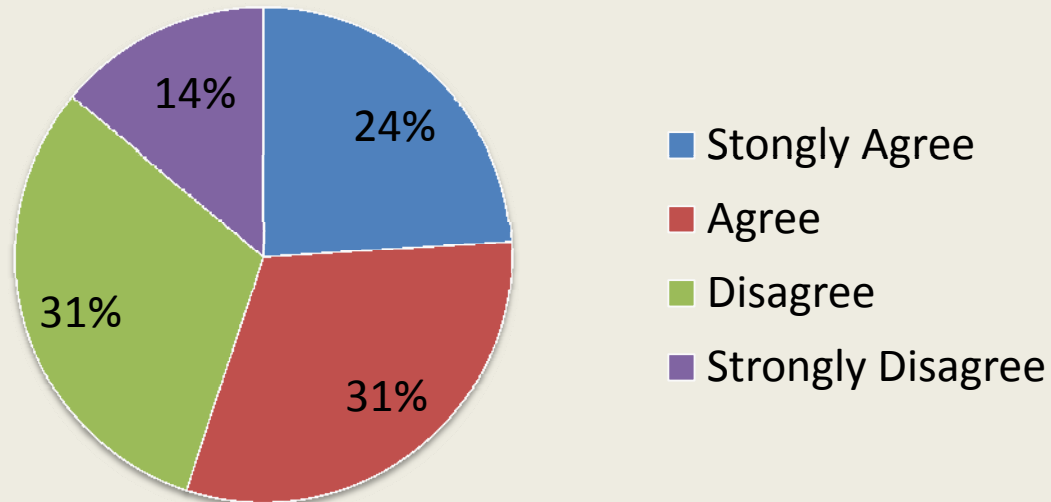
Same student after using dictation App on iPad

- “Jeremy is very brave and I'm surprised he knew what to do in this bad situation. He was very smart by pulling the key from the ignition and steering the bus to the side of the road. I would do the same thing if I was on the bus. I would help all my friends and the bus driver.”



Leveraging Technology for Individualizing Instruction Teacher Survey Results

“I believe that using the iPad has allowed for an increase in instructional time in my classroom. (Collecting and returning papers, grading, etc.)”

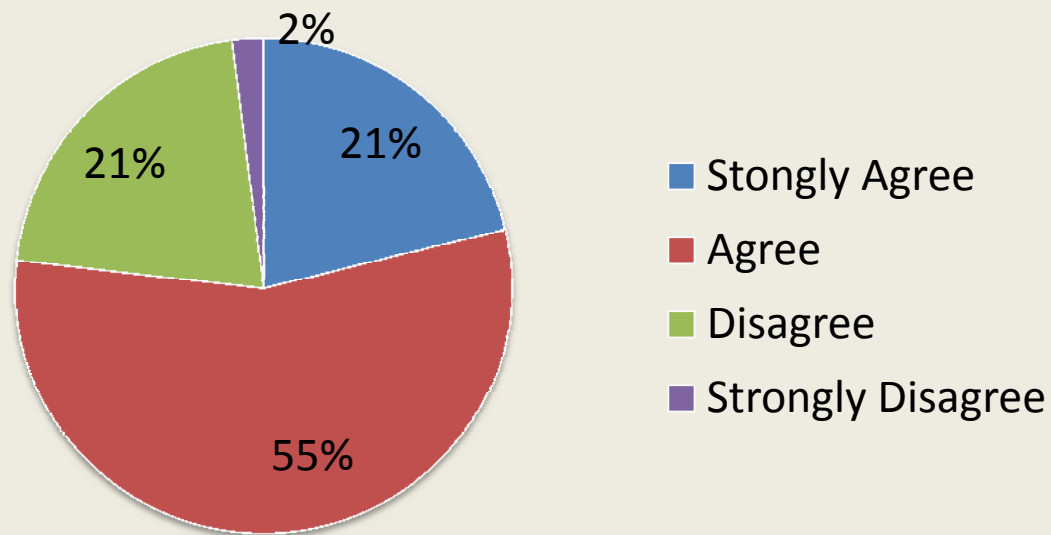


55% of teachers responding to a survey agree that the 1:1 platform has allowed for an increase in instructional time in their classroom.



Leveraging Technology for Individualizing Instruction Teacher Survey Results

“The use of iPads has led to increased student engagement in my classroom.”



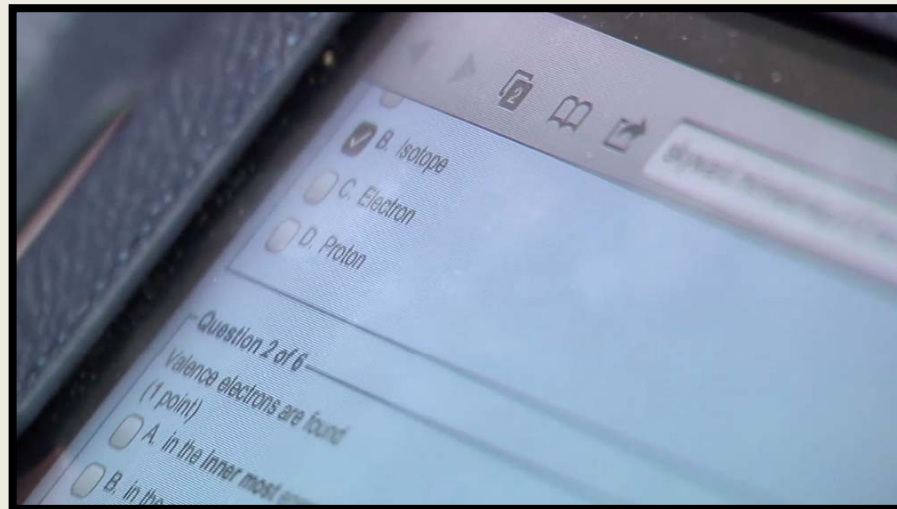
76% of teachers responding to a survey agree that the 1:1 platform has increased student engagement in their classroom.



Leverage Technology for Individualizing Instruction

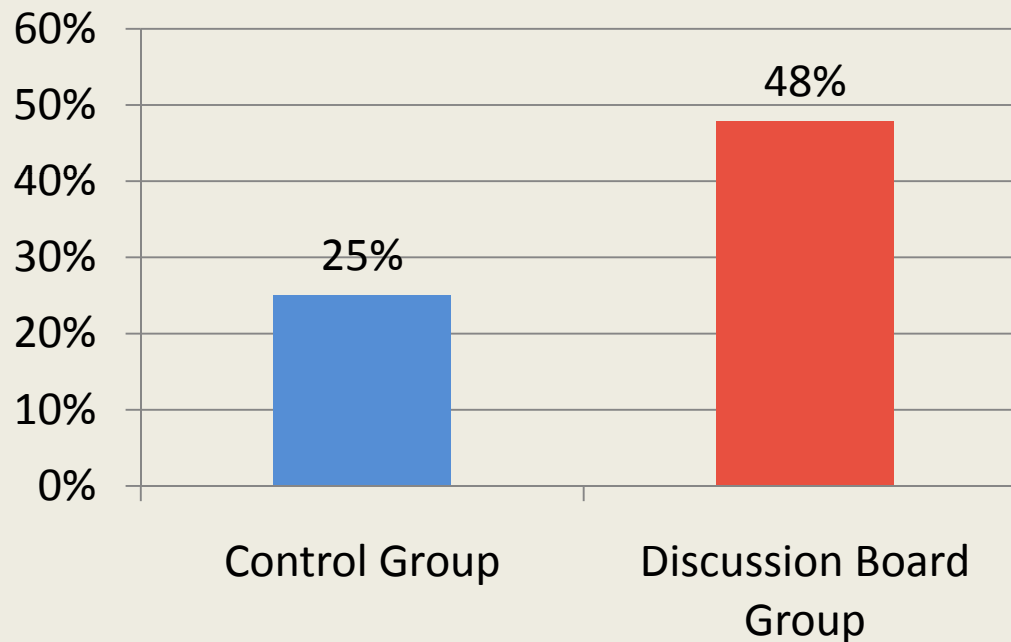
Quote from the Parent Survey

“My child's grades are significantly higher in the iPad classes. He is able to stay more organized when everything is online, no paperwork to lose. He is able to listen to his reading material which has led to more success for him because he is a slow reader. He is a visual/auditory learner therefore the iPad works very well for him.”



Promote Collaboration, Increasing Student Engagement Use of Discussion Boards in Civics Classroom

Percent improvement from pre-test to post-test



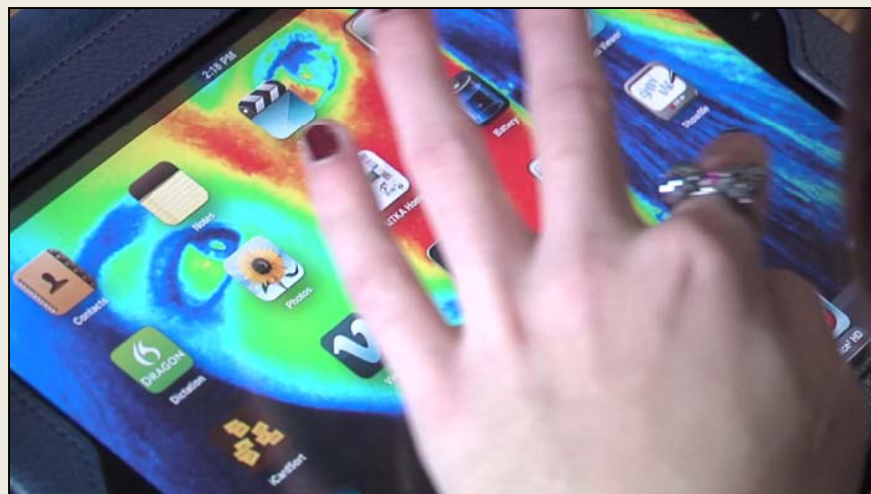
Discussion Board group outperformed the control group by 23%



Promote Collaboration, Increasing Student Engagement

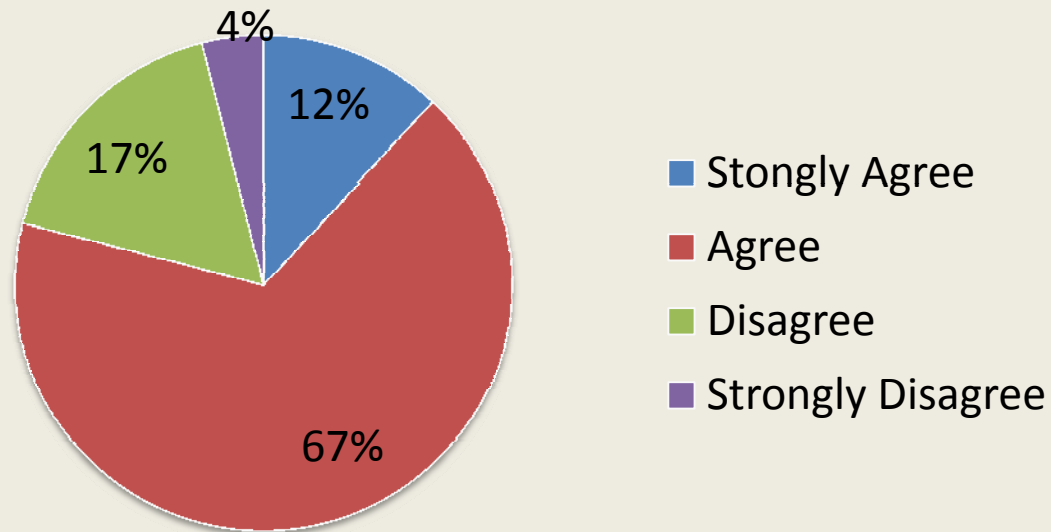
Quotes from the Student Survey

- Faster test/quiz results...easier to take notes!
- More interactive.
- Makes learning a lot more fun.
- I am more organized and more likely to turn in assignments on time.
- The iPads are excellent for studying.



Strengthen the 21st Century Skills Necessary for Future Student Success Teacher Survey Results

“I believe that using the iPad has led to an increase in problem solving
among students in my classroom.”

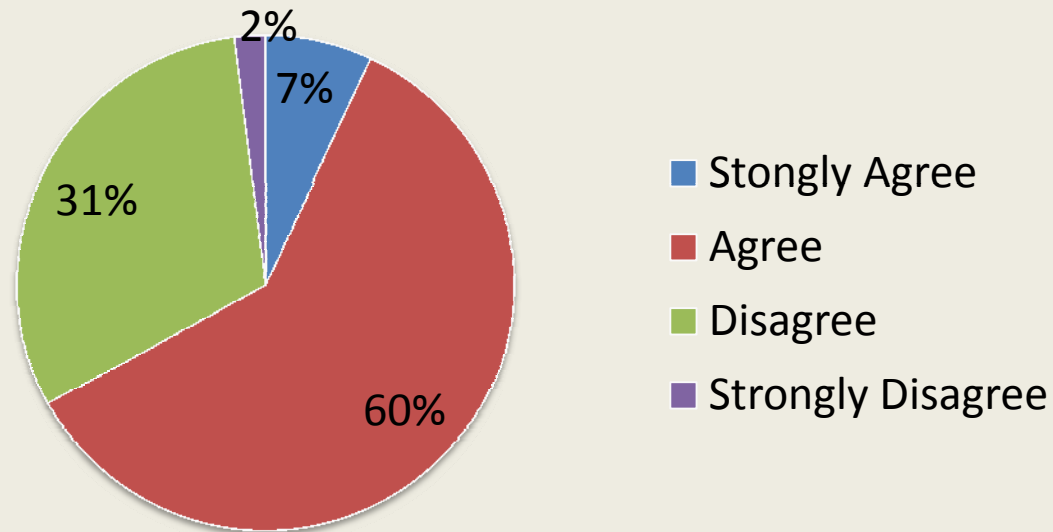


79% of teachers responding to a survey agree that the 1:1 platform
has led to an increase in problem solving skills.



Strengthen the 21st Century Skills Necessary for Future Student Success Teacher Survey Results

“I believe that using the iPad has led to an increase in critical thinking
among students in my classroom.”



67% of teachers responding to a survey agree that the 1:1 platform
has led to an increase in critical thinking skills.



Collaborative Problem Solving with Google Forms Classroom Example in English

Home - Google Docs Acts 3-4 Review, Hour Two

https://docs.google.com/a/student.mtka.org/spreadsheet/ccc?key=0AjW4GF3L2Fv3dFppeTFzQBxTExsSidFNWR1bEISMKe#gic

Mail Calendar Documents Sites Contacts More

Acts 3-4 Review, Hour Two

File Edit View Insert Format Data Tools Help Last edit was made 24 hours ago by SARA.MARTINSON

11pt

Item	A	B	C	D	E	F	G
Item	Act.Scene	Name	Original Text & Citation	Explicated Text	Context / Significance / Explanation	Literary Terms you could use with this passage	
Romeo Characterization (2-5 lines)	3.1	Group Collaboration	Tybalt, the reason that I have to love thee / Doth much excuse the appertaining rage / To such a greeting. Villain am I none. / Therefore farewell. I see thou know'st me not.	<i>There is a reason I have to love you and it excuses this rage. But to call me a villain, of which I am not is wrong. So goodbye.</i>	Romeo does love tybalt because he has now married her cousin, but tybalt hates Romeo. Despite this, Romeo does not chose to hate Romeo, he just says goodbye.	Rising action: Romeo realizes he has been softened up by marriage because he just wanted to avoid conflict	
Climax of Play	3.1	SAMPLE	O, I am Fortune's Fool! (3.1.142)	<i>Fate has made a fool of me!</i>	This line is the climax of the play. Romeo has just killed Tybalt and at this point realizes that he cannot fix this. He feels that Fate has played the ultimate trick on him.	Plot: Climax Characterization of Romeo Conflict (Romeo vs. Fate)	
Romeo's Punishment & Rationale	3.1	Group Collaboration	Immediately we do exile him hence./... Let Romeo hence in haste,/ else, when he is found, that hour will be his last. (3.1.197-204)	1. We banish Romeo immediately 2. Romeo disappear 3. For if he not, when he is found he will be killed	This line is falling action of the play. The prince banishes Romeo after he killed Tybalt. This puts a wrench in things between Romeo and Juliet because they are now separated from city to city.	Conflict (Romeo vs. Distance)	
Metaphor by Juliet (2-4 lines)	3.2	Colin S.	Come, night. Come, Romeo. Come, thou day in night. / for thou wilt lie upon the wings of night / whiter than new snow upon a raven's back (3.2.20)	<i>Hurry up night. Hurry Romeo. You're like the day that comes during night. You're whiter than the snow on a black raven's back.</i>	Juliet is alone and is waiting for romeo to come up the cords the nurse was sent to get. He has been banished because he killed tybalt.	Characterization Plot, clom	
Simile by Juliet (2-4 lines)	3.2	Lindsey S	So tedious is this day/ As is the night before some festival/ to an impatient child that hath new robes/ And may not wear them (3.2.30-33)	<i>So long is this day as the night before a celebration to an anxious child with new clothes that can't wear them until then.</i>	Tybalt has just died and Romeo has been banished. Juliet is waiting for her eveni from Nurse and can't wait for her evening with Romeo.		

Sheet1



Strengthen the 21st Century Skills Necessary for Future Student Success Quotes from the Parent Survey

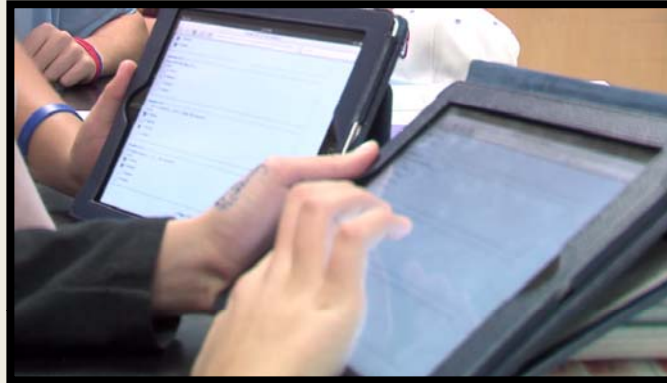
“I feel that the training for the students made it clear what the "rules of use" are. It is the responsibility of students to self-regulate and parents to monitor if they are uncomfortable. I commend the district on taking us into the electronic future!”

“We were all pen and paper and typewriter, early computers, so it is light years of change. Having instant and frequent feedback as he goes through his school day and homework makes a world of difference. Having access to resources (video tutor for math, Schoology conversations with teachers to clarify questions) has made taking challenging courses possible for my son. Grades appear the same day, as do answer keys in some cases, so rechecking missed answers helps him learn the lesson before the teacher builds on it the next day. Interactive lessons make school more interesting, and help my son remember what he learns better than when we memorized and recited facts.”



Strengthen the 21st Century Skills Necessary for Future Student Success

Quote from the Student Survey



“It is easier to get notes and communicate with teachers.”

“In my math class, we worked in a group to research colleges and made a commercial on them. We made a video tutorial on how to do the math [to figure out college expenses], and then we shared it with the class.”

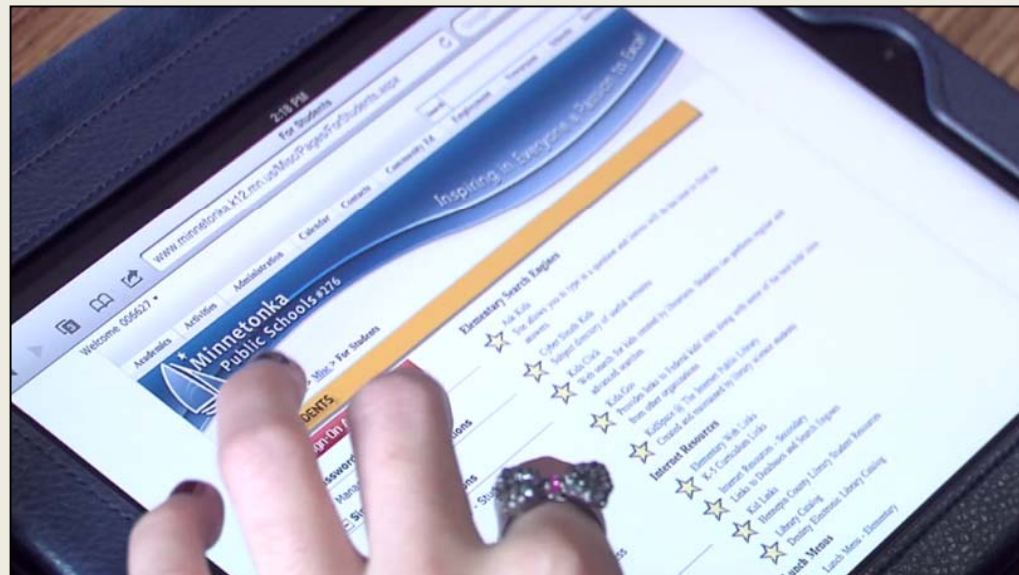
“In history class, we made a business web page from different iPads, so we could have more than one person working on it at the same time. We didn’t even need to be near each other. We could do our web page from separate houses at the same time.”



Strengthen the 21st Century Skills Necessary for Future Student Success Quote from the Teacher Survey

“Use the Schoology discussion board to discuss an article... Students do not respond just to the article, but to their classmate as well. EVERY student participated in a discussion. That doesn't happen in a typical class discussion.”

“Use Schoology discussion boards to have students share ideas for a plan or project (for example, creating and sharing a plan for an economic project). Then, the time in class can be spent on evaluating the plan, rather than presenting the idea.”



Benefits of the 1:1 Instructional Platform

Common Themes from Student and Parent Surveys

- Equity of access
- Increased engagement
- Increased organization
- Instant access to information
- More formative assessment
- Efficiency (i.e. turnaround time on grading)
- Increased communication between students and teachers
- Environmentally friendly (i.e. less paper)
- Curricular acceleration
- Increased enrichment opportunities
- Increased collaboration between students
- Immediate feedback



Concerns of the 1:1 Instructional Platform

Common Themes from Student and Parent Surveys

- Inconsistent adoption of digitized materials
- Limitations of the device (i.e. screen size, program features, graphing, desire for keyboard or stylus)
- Distractions with games and social media
- Glitches with some apps
- More difficult to monitor student's online behavior at home
- Loss, breakage, theft
- What are the plans for next year?



Summary of 1:1 Instructional Platform (iPad) Pilot Results

- Data shows positive academic achievement results
- Teachers are using new platform effectively to individualize instruction
- Students (and staff) are collaborating in new ways to support learning
- 1:1 instructional platform is increasing the level of engagement
- 21st century skills are accelerated (technology, critical thinking, etc.)
- Costs are manageable and offer potential for savings in some areas

