Integrating Technology Into a 1st Grade Classroom

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Integrating Technology Into a 1st Grade Classroom

Abstract
America's public schools are in the middle of one of the most exciting periods in history. Changes in society, technology, and the economy are creating a demand for well-educated people. Vice President Al Gore has estimated that by the year 2000, sixty percent of new jobs in the United States will require advanced technological skills (Clinton & Gore, 1998). Burness et al. (1997) maintain "Hundreds of reports and articles have detailed the shortcomings of our school system as well. The gap between what people need to know to thrive in today's world and what they learn in school is very real." (p. 1) Our educational system was not designed to prepare youth for the rapidly changing, highly technological society of today. It was created for a simpler time. Forty years ago a student could drop out of high school, walk into a factory, and earn enough money to raise a family.
Integrating Technology

Into a 1st Grade Classroom

A Graduate Project

Submitted to the

Division of Educational Technology

Department of Curriculum and Instruction

In Partial Fulfillment

Of the Requirements for the Degree

Master of Arts in Education

UNIVERSITY OF NORTHERN IOWA

by

Kimberly Swartz

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This research paper by: Kimberly Swartz

Titled: Integrating Technology Into a 1st Grade Classroom

has been approved as meeting the research requirement for the Degree of Master of Arts.

December 2, 1999
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Sharon E. Smaldino
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Rick Traw
Head, Department of Curriculum and Instruction
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CHAPTER ONE

Introduction

America’s public schools are in the middle of one of the most exciting periods in history. Changes in society, technology, and the economy are creating a demand for well-educated people. Vice President Al Gore has estimated that by the year 2000, sixty percent of new jobs in the United States will require advanced technological skills (Clinton & Gore, 1998). Burness et al. (1997) maintain “Hundreds of reports and articles have detailed the shortcomings of our school system as well. The gap between what people need to know to thrive in today’s world and what they learn in school is very real.” (p. 1) Our educational system was not designed to prepare youth for the rapidly changing, highly technological society of today. It was created for a simpler time. Forty years ago a student could drop out of high school, walk into a factory, and earn enough money to raise a family. Wagner (1998) states:

The problem is that our assembly line forms of schooling no longer fit the needs of the new economy. The same thing occurred in the late 19th century when the one-room schools of the agrarian era no longer fit the needs of the increasingly industrial and urban society. Those schools were not failing any more than today’s schools are failing. They were obsolete, as are today’s schools—and that is a very different problem, requiring a different solution. (p. 513)

A growing number of business and political leaders in our country feel that our schools are failing. Calling schools a failure means that blame must lie somewhere. Therefore, schools blame one another, teachers blame parents, and parents blame teachers. This type of climate makes it difficult to undertake any serious changes because
no one has much faith in the ability of the other. Wagner (1998) states, "To make the implementation of higher standards a reality for most children, we must develop a new practice of whole-school change that is consistent with our understanding of how learning takes place and how organizations change" (p. 514).

Reforming public schools is not a new idea, but for the last decade it has gained more attention. In its report related to educational reform, the United States Department of Education states:

For the past decade, Americans have mounted a major effort to reform education, an effort that continues today, its energy undiminished. The reform movement has captured the serious attention of the White House, Congress, state capitals and local school boards (United States Department of Education [USDE], 1994a par. 26).

There is not a universal understanding of what that reform should be. Ideas that do seem to be universal are: public education needs improvement; higher standards are needed along with greater accountability for the use of tax dollars by schools; and that technology should somehow be a part of this school reform (Schwartz & Beichner, 1999). There has been a great deal of disagreement about the specifics of public school reform, but the direction of school reform has been due in part to the Goals 2000 legislation, which began in 1989 during an assembly of the nation's governors (USDE, 1994b). At the same time, the National Council of Teachers of Mathematics released the first of their three standards documents describing a math curriculum that emphasized problem solving, reasoning, communication, and mathematical connections. These standards had monumental effects on other curriculum areas, and educational leaders in other areas began creating standards for their own discipline areas. Educational funding
agencies began to make use of the standards by disseminating grants based on the new standards. State departments of education were encouraged to develop standards-based curriculum and new forms of assessment of these standards were developed.

At the same time, the Clinton administration was committed to bringing the resources of the Internet to American classrooms. In the President's Education Technology Initiative, President Clinton and Vice President Gore (1998) call on parents, teachers, leading CEOs, and others to join in a new national mission to equip schools with the right technology.

The four pillars of our challenge are quite simple:

- Modern computers and learning devices will be accessible to every student.
- Classrooms will be connected to one another and to the outside world.
- Educational software will be an integral part of the curriculum, and as engaging as the best video game.
- Teachers will be ready to use and teach with technology. (par 4)

Educators and others are working to find ways to best apply all these approaches to learning, including brain research that shows people learn best by being actively involved. Abbott and Ryan (1999) support this belief. “The mass of evidence that is now emerging about learning and brain development is spawning a movement towards educational practice which confirms the earlier intuitive understanding about learning through direct involvement with the activity. This we now refer to as constructivism” (par 6).

According to George Lucas (cited in Burness 1997), founder of The George Lucas Educational Foundation:
Many people are wrestling with how to improve the educational system so it is more responsive to the needs of learners. All over the country educators, parents, policy makers, business and community leaders, and students are rethinking the mission of schools and adopting innovative approaches to teaching and learning. People are also beginning to recognize that technology can be a powerful tool for change in education, just as it is in the world of business, science, and entertainment. (p. iv)

With the fact that students need to be prepared for jobs with technology and need to be able to work together to solve problems, now is the time that schools must work toward a constructivist model of learning. As Goleman indicates (1998):

The rules for work are changing…These (new) rules have little to do with what we are told was important in school; academic abilities are largely irrelevant to this standard. The new measure takes for granted having enough intellectual ability and technical know-how to do our jobs; it focuses instead on personal qualities, such as initiative and empathy, adaptability and persuasiveness. (p. 3)

This model calls for students who are actively involved in all kinds of simulations and problem solving situations, collaborating, communicating, and making decisions. Technology lends itself easily to this model of learning.

It has been almost twenty years since the first computers were introduced into the classroom. The number of computers in classrooms varies depending upon where you look (Schwartz & Beichner, 1999). While many schools have computers in them, the number of computers per student and how the computers are being used varies. The use of computers in high schools looks differently than the use in middle schools or
elementary schools. Primary classrooms tend to look very different in their use of technology than intermediate elementary classrooms. In the past, primary classrooms have not had many computers in them. When computers were used, typically you would see individual children working alone on a computer. Teachers of primary age children have been unsure of how to integrate technology into their classrooms to help promote those same valuable skills of collaboration, communication, problem solving, and higher level thinking skills.

Given these imperatives, this report will attempt to answer some questions on how and if technology should be integrated into a primary classroom. It will look at one first grade classroom that was chosen as a prototype, or experimental classroom, to see if integrating computers is feasible at this level.
CHAPTER TWO

Literature Review

Sakatani (cited in Burness, et al., 1997) states, "Besides teaching our children the three R's, we might better prepare them for the 21st century by developing their capacity for the three C's - comprehension, creativity, and compassion" (pg. 34). Within our changing technological society, children will need to have these skills more than ever. Educators know that what is most important is the teacher, what is being taught, and how it is being taught. Students should be working together to collaborate, investigate, and communicate ideas in all different kinds of ways to prepare them for the future. Particular attention should be given to the potential role technology has in achieving the goals of current educational reform efforts through the use of a constructivism or problem solving method of instruction (Burness et al., 1997).

Papert (1996) describes educational change through the use of technology in two ways. He defines one way as microchange, the low end of the scale using such things as a word processor for writing assignments and searching on-line for research assignments. Papert stated he does not know what megachange will look like, but "real megachange will come only when most learning is taking place in the course of carrying out challenging projects lasting weeks, months or years" (p.160). With such projects, technology provides the means for creation and access to information needed by the students. At the heart of such a change in education lies the constructivist approach to education, which is a theory of knowledge that all understanding is personally created based on the learner's experience and interactions with the world. Abbott and Ryan
assert, “Constructivist learning is an intensely subjective, personal process and structure that each person constantly and actively modifies in light of new experiences” (par. 7). The focus becomes the development of higher-order reasoning and problem-solving skills through collaboration. Collaboration takes place among students in cooperative groups during interaction and dialogue between students and other people.

Wilhelm, Friedemann, and Erickson (1998) state, “Technology can serve as a catalyst to educational change. The rewards of this change are not in the technology, but in the possibilities created by teaching well with technology” (p 159). When computers were first introduced to classrooms, the focus was on the innovation – computers and software. Little thought was given to how technology would be integrated into the instruction and how it could influence assessment. In its early stages technology was used in the classroom in one of two ways, the first being computer assisted instruction. It focused on drill and practice of basic skills and was used mostly with students from disadvantaged backgrounds. The second way technology was used in the classroom was with instructional games and simulations, which generally offered more challenging material, or remediation, but did not meet requirements for state curriculum guidelines, which were being implemented. Mergendoller (1997) indicates:

Recent analyses of educational technology use in American schools indicate that computers are used about 1-3/4 hours per student per week in an average elementary school. For the majority of that time, the computer is used as an electronic workbook to drill students in basic skills and give practice in solving simple academic problems. (p. 12)
Educators are starting to realize that computers should be used to enhance learning, rather than to improve teaching. Solving problems through the help of technology can be an important element in students’ learning if it is used in a natural way. Computers in and of themselves cannot promote higher-level thinking skills, collaboration, and problem solving, but they can be instruments used within the classroom to move toward these goals if used appropriately. Computers should be woven into lessons that advance students’ learning and should not be noticeable. Milone (1998) states, “Outstanding technology programs seem effortless” (p. 6).

Computers are natural extensions to learning within problem-solving based classrooms. Burness, et al. (1997) explain:

Technology is not a cure-all for America’s schools; it’s a tool that is only as useful as the decisions we make about how to use it. But, in the hands of creative teachers and inspired students, technology makes possible classrooms in which all students are working to their full potential. (p. 211)

The job of teachers is no longer to distribute facts, but to help children learn how to use the information that is available to them. Students are able to find data and expertise from around the world, so teachers can focus on assisting them as they learn. There becomes more time for them to work one-on-one or with small groups of children. Integrating computers into the classroom is not an easy task. Educators need to look at what history has already taught us, use the knowledge we have gained about how the brain works and people learn, and know what our goals for students are. Then computers should be used as a device, when appropriate, to enhance learning within the classroom instead of allowing technology to drive the curriculum.
Innovative approaches to learning means students are challenged with complex, authentic tasks, involving multidisciplinary projects, cooperative learning groups, flexible scheduling, and authentic assessments (Means & Olson, 1994). The computer assists students as they are engaged in all kinds of simulations and problem solving, as well as researching on the Internet and using databases. They can collaborate with peers and access experts world wide through computers. Instead of reading about a topic in a textbook that may not be up to date, students have the opportunity to conduct their own original research. Teachers and students are able to complete assignments once thought to be too difficult, but because there are numerous resources and reference points at which to begin, that is no longer true.

Students can search out experts and communicate with other people about the topic they are researching. Learning can become more exciting and more immediate than even watching TV. Students and teachers can acquire the technological skills necessary for a specific project and not worry about knowing everything about the tools. Teachers are no longer the “body of knowledge” within the classroom (Means & Olson, 1994). The teacher can become a facilitator of learning, freeing them up to spend more time with smaller groups of students. Technology can help students to have a deeper understanding of concepts and improve their motivation to learn. Schools have the duty to work together with students and teachers to share new information technologies and use them to the best of their ability to improve the educational system.
CHAPTER THREE

Methodology

The Marshalltown School District has integrated computers in all grade levels. The use of computers looks different at different grade levels. In the high school and middle schools, there are computer labs set up where teachers and students use computers for specific classes. At the elementary level, grades 3-5, each classroom has five computers in the room so technology can be integrated using collaboration on an ongoing basis. In K-2 grades, each classroom has one computer. As educators are learning more about how computers can help promote higher level thinking, Marshalltown School District is in the process of finding out if multiple computers should be used to integrate technology in the primary classroom (J. Lindholm, personal communication, May 23, 1998).

One classroom was chosen as a prototype or model to integrate computers. Seven networked computers were placed in the classroom. Funding for this program came from the Marshalltown Technology budget and from Title VI, federal innovation money. There was approximately $12,000 to spend. This included hardware, software, furniture, and training for the classroom teacher. The classroom that was chosen included children of all abilities and socio-economic levels. It also included ESL children and special education students integrated into the classroom. Support from the principal, media specialist, and grade level teachers were also a consideration in choosing the classroom.

This first grade classroom used an integrated curriculum and technology was to be infused into all subject areas, but the main focus was to be geared towards language arts because it is the foundation of learning in the first grade curriculum.
The vision for this "technology rich" classroom was to have multiple networked computers where students would work together collaborating, communicating, and problem solving. Students would use the computers during independent center time for challenge activities as well as on-line tutoring. First graders in the room would have experience in global learning by e-mailing other students, as well as being involved in cross-grade-level activities. As technology enhanced higher level thinking skills with students, the goal was to encourage students to become facilitators of learning. Throughout the year, all first grade students, including students in the other two first grade classrooms in the building, used the computers.

The goals of this technology prototype classroom related to the goals of the Marshalltown Community School District Technology Plan. These goals are:

1. Students will be intellectually and personally empowered for citizenship in a changing world.
2. Technology will be integrated into the curriculum to have the greatest positive impact on student learning.
3. All students, teachers, and administrators will acquire the knowledge and skills to use many technologies as tools of learning, instruction and management of records.
4. Students, teachers, and administrators will have access to the tools of management, information and communication that well planned technology provides.
5. The ongoing maintenance, repair, and upgrades necessary will be provided to keep the technology program current and useful. A well planned Technology School to Work pathway for students (which includes consultation, repair, instruction and installation) will be a part of the maintenance plan.
The following ideas were some of the initial ways envisioned for evaluating the use of integrating computers in the classroom. The effectiveness of technology for students would be evaluated by:

a. comparing attendance records from kindergarten to first grade
b. satisfaction survey filled out by students at the end of their Kindergarten year and at the end of their 1st grade year
c. teacher observation and rubric of on-task behavior and participation during group time
d. students would self-evaluate their on-task and cooperative performance in a group using a teacher made rubric
e. end products of assignments would be evaluated by each student individually and for their groups, as well as a teacher evaluation
f. teacher feedback from observation would be the main evaluation tool

After evaluating this program, the Marshalltown School District Technology Committee will make a recommendation about using this model to integrate computers into K-2 grade classrooms.

It was decided that seven computers would be purchased for the classroom. This would allow groups of three students to use the computers together. The next decision centered on how to arrange the room for best use of the technology. Students needed to be close to the computers so they were available when needed, yet out of the way when not in use. Each computer was placed on one end of a group worktable. This allowed room for students to work at their tables, but the computers were accessible at any time. All that needed to be done was to move the mouse and keyboard out to the middle of the
students’ table. All of the computers and student tables were placed around the edges of the room. That left a large area in the middle of the room for group activities on the floor.

A large screen TV was hooked to the teacher’s computer station so lessons could be presented to everyone. The teacher’s station was also used as a computer for groups to use after the whole group lesson was complete. A printer, scanner, and digital camera were all purchased for the classroom’s use. The computers did not arrive until November, so that gave the teacher and the class time to build community, creating a sense of belonging within the classroom, and to discuss the technology that was coming into the classroom.

Before the computers arrived, one of the first things to be done was to create a needs assessment to find out more about the students in the classroom and what should be expected of them regarding technology use. A survey was sent to kindergarten teachers to find out what types of technology skills the students were exposed to in the previous year and what the expectations regarding the use of technology were for students when leaving kindergarten (see appendix A). The results from that survey indicated that most kindergarten children had minimal experience with computers. Typically they had used the computer to listen to multi-media books and they had used the mouse to move through age-appropriate software. There was some minimal keyboarding that was done, usually just typing their name. Kindergarten teachers did not have any clear expectations established for students when leaving their classrooms, but generally felt students should know the different parts of the computer along with being able to use the mouse and keyboard for minimal typing. Another survey was sent to first grade teachers to explore their expectations regarding technology for first grade students (see appendix B). They
felt the students should come to first grade knowing how to operate a mouse and how to start and make choices when operating age-appropriate software. First grade teachers felt that by the end of first grade, students should know how to start and shut down a computer, be able to use age-appropriate software, and be able to print. They felt the computer should be used as a form of communication and to gain information including using the Internet. Second grade teachers were surveyed about the expectations they had for students when entering their classroom, but no responses were given (see appendix C). Another survey was sent to the technology committee at the school to find out what teachers of older students have learned about working with children and computers (see appendix D). The suggestions from the committee were to have two or three students working in a group and actively involved in higher-level thinking activities. A survey was sent home for parents of first graders to complete as well (see appendix E). This survey was to gain an understanding of the learners within the classroom regarding their past experience with computers at home. Eighty percent of the surveys were returned. Table 1 shows the results of the survey.

<table>
<thead>
<tr>
<th>Prototype Classroom – Students’ Computer Experience</th>
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<tr>
<td>No Previous Computer Experience</td>
<td>6%</td>
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<tr>
<td>Computer Experience In Kindergarten Only</td>
<td>50%</td>
</tr>
<tr>
<td>Computer Experience In Kindergarten And Home</td>
<td>44%</td>
</tr>
<tr>
<td>Computer At Home</td>
<td>41%</td>
</tr>
<tr>
<td>Internet Access At Home</td>
<td>18%</td>
</tr>
<tr>
<td>Previous Experience With Mouse and Keyboard</td>
<td>94%</td>
</tr>
<tr>
<td>Physical Limitation</td>
<td>0%</td>
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CHAPTER FOUR

The Project

When the computers arrived, colored dots were put on the keyboard to help the students recognize different keys. Because of the high frequency of their use, the keys that were focused on were backspace, enter, spacebar, and shift. A different color dot was put on each one to help students associate the function of the keys. When the computers came, they were not hooked to the network initially. It took several months before all of them were finally wired and hooked to the network. At this time, the first lessons taught were to boot up the computer and pass over the log on screen. The students were then taught the proper way to shut down a computer. This skill took a long time for some students to master. There were a few students who continually forgot and shut down the computer incorrectly. Students also had to be taught the correct way to handle CDs and how to put them in the computer so they were ready for use. After these initial lessons, paired students would use the computers during independent center time. Students became more familiar with how to turn on and shut down the computer correctly, as well as handling CDs. For some students this was a good time to begin to feel more comfortable with the mouse and the keyboard. Students were able to work with a partner using age-appropriate software. This gave them opportunities to problem solve when something was giving them difficulty.

One of the main goals for students working with the computers was to work collaboratively to solve problems. Many students do not come to school with the social skills they need to collaborate effectively, so prior to working cooperatively on the
computers, and throughout the school year, first grade students were instructed and practiced skills needed to work in cooperative groups.

Classroom management was an area of concern at the beginning of the year. Deciding how many students to have in a group, how to structure the groups, and how to manage reaching each of the groups with their questions were all concerns. The inability to anticipate problems that might be encountered with the technology and how to solve the problem and still keep the students focused was a big concern. Having more than one adult in the classroom was an important step in the management process. If one person had to troubleshoot technical problems, another adult was left to help the other groups. As the year progressed, problems could be anticipated and strategies were developed as to how to solve and avoid them.

Using the computers increased student motivation. Through teacher observation it was recorded that children were on-task more when working on the computers than during other work times throughout the day.

Throughout the year, as students worked together on projects, they began helping each other with the use of technology. At first, students wanted help from the teacher on most things that they attempted, but as the year progressed and students began to feel more confident, and rather than sitting and waiting for the teacher, they began to take the initiative and ask one another for assistance. Many students were able to tutor peers in how to find and open a file, manipulate software, boot up and shut down the computer, and maneuver a mouse. Students in the prototype classroom were partnered with students from the other two first grade classrooms for some projects. They were the facilitators and explained to the other students how to use a program. They were not to do the work
for them, or use the mouse, only explain and help those other students learn the technology. Some of the first grade students who were low to average in academic areas excelled in helping other students with technology, which in turn helped to increase their self esteem. For some activities, students were grouped heterogeneously, often by their leadership ability. Although all students were given a job on each of the projects, having a student with the ability to keep their group on task was an important factor in the groups. Having two or more leaders in a group sometime caused problems within the group, but was one of the collaboration skills practiced throughout the year.

After students were comfortable with the computers and had worked together in cooperative groups practicing social skills, the first computer project on which students worked was using a paint program to draw their family members. This project continued throughout the school year, and was used in a Hyperstudio presentation called, “All About Me.” The project incorporated units of study about safety, family, weather, and graphing. Students shared it with parents at conference time. Other computer projects that students worked on included using the Internet to find information about desert animals and writing stories about their animal. Pictures were drawn of their animals using a paint program. All the stories were put together to create a class book about desert animals.

Students worked in groups writing problems that involved addition and subtraction and drawing pictures to go along with their problems. Kid Pix was used in the project and all the problems were put together to create a multi-media slide show. Another multi-media slide show was created to go along with a unit about friendship. Students used the digital camera to take pictures of each other helping people at school. The pictures were imported into Kid Pix and students wrote sentences about how they helped one another.
The slide show was presented to other students and parents. It was also used at the end of the year to show the upcoming students some of the projects that would be worked on when they are in first grade.

Using the computers to write and draw pictures, many class books were created. Students were more motivated to write when they saw the professional results of the books. Many times students would ask to stay in at recess or after lunch to complete a technology assignment. In one project, students worked with fourth graders to explore a teacher-created hotlist of Internet sites about fish. This was done in conjunction with a unit about fish. The students then worked together to create a multi-media presentation about what they learned from this exploration. Parents were invited to the classroom so students could present this information.

Databases were created with students during a unit on telling time. First grade students interviewed other students about their age, place in the family, and the time they go to bed. The information was put into a database and students sorted the information to find relationships between the data.

Weather data was kept for the first one hundred days of school, and students put that information into a spreadsheet. They then used the spreadsheet to create a graph, which displayed the number of rainy days, snowy days, windy days, cloudy days, and sunny days. From these graphs, students compared the weather from each of the months and wrote about what they learned. This information was printed and showcased in a display for other students within the school.

Activities occurring during the school year were captured through the use of a digital camera. Those pictures were collected in a class journal, and students detailed the
activities through their writing. This class journal grew progressively throughout the school year. Students read it daily during silent reading time, as well as being shared with parents during conferences.

Throughout the school year, many different types of evaluations were used regarding the use of computers within the classroom. For some projects, rubrics and checklists were used that pertained to the academic, collaboration, and technology use (see appendices F & G).
CHAPTER FIVE

Conclusions and Recommendations

This pilot project has revealed some factors for consideration when deciding to integrate computers into a primary classroom. The physical environment of the classroom should be considered, including the computer to student ratio. In this classroom it was found that two or three students in a group worked best. When more than three students were sharing a computer, it seemed that the on-task time for individual students was reduced. At the primary level, students need many opportunities to have “hands on” time on the computer. This can be accomplished by having only a few students within each group.

The number of adults available for help in the classroom is another factor to consider. This is especially true at the beginning of the year when the computers are first introduced to primary students.

It is also important to have support and understanding about the changes in beliefs and practices from administration, colleagues, and parents. This support includes training for teachers to learn how to integrate computers into the existing curriculum. At this point teachers have few models of successful technology integration within the primary classrooms on which to draw. Colleagues need to be role models for each other, helping each other maneuver around obstacles of technology integration.

It is easy to find strong claims for the power of computers to improve students’ minds, but difficult to find scientifically valid research testing these claims. No significant gains were made in reading, writing, or math performance for students in the
prototype classroom compared to those of their peers (see Tables 2, 3, and 4). Students did learn specific facts and procedures relevant to operating computers as well as learning how to work collaboratively with their classmates to solve problems. The classroom provided encouraging information that computers can promote collaboration, communication, and problem solving among primary students.

Table 2

<table>
<thead>
<tr>
<th>Reading Benchmark Scores</th>
<th>On or Above Grade Level</th>
<th>Near Grade Level</th>
<th>Below Grade Level</th>
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<tbody>
<tr>
<td>Class 1</td>
<td>77%</td>
<td>9%</td>
<td>14%</td>
</tr>
<tr>
<td>Class 2</td>
<td>40%</td>
<td>30%</td>
<td>30%</td>
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<tr>
<td>Prototype Classroom</td>
<td>63%</td>
<td>12%</td>
<td>25%</td>
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Table 3

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<th>Writing Benchmark Scores</th>
<th>Excellent</th>
<th>Good</th>
<th>Satisfactory</th>
<th>Needs Improvement</th>
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<tr>
<td>Class 1</td>
<td>32%</td>
<td>5%</td>
<td>4%</td>
<td>4%</td>
</tr>
<tr>
<td>Class 2</td>
<td>5%</td>
<td>50%</td>
<td>25%</td>
<td>20%</td>
</tr>
<tr>
<td>Prototype Classroom</td>
<td>13%</td>
<td>81%</td>
<td>6%</td>
<td>0%</td>
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</tbody>
</table>

Table 4

<table>
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<th>Math End of the Book Scores</th>
<th>Above Grade Level</th>
<th>At Grade Level</th>
<th>Below Grade Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class 1</td>
<td>77%</td>
<td>18%</td>
<td>5%</td>
</tr>
<tr>
<td>Class 2</td>
<td>81%</td>
<td>14%</td>
<td>5%</td>
</tr>
<tr>
<td>Prototype Classroom</td>
<td>67%</td>
<td>24%</td>
<td>9%</td>
</tr>
</tbody>
</table>
Attendance records for students during their kindergarten and first grade year showed there was no significant decrease in attendance from one year to the next. During students' kindergarten year there were a total of 87.5 days missed throughout the year compared with 103 total days missed in their first grade year. Eighty-nine of those days were missed by eight (38%) of the students, some of which was attributed to chickenpox.

The attitude (see Table 5) survey was given to students at the end of kindergarten and again at the end of their first grade year. It shows that between the end of kindergarten and the end of first grade students felt more comfortable coming to school and using computers (see appendix H). They liked working with their classmates in groups more and felt they did a better job of it than they did in kindergarten.

Table 5

<table>
<thead>
<tr>
<th>Student Responses to “How well do you like...”</th>
<th>Very Well</th>
<th>Okay</th>
<th>Not So Good</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coming to school every day</td>
<td>Kindergarten</td>
<td>77%</td>
<td>9%</td>
</tr>
<tr>
<td></td>
<td>1st</td>
<td>86%</td>
<td>14%</td>
</tr>
<tr>
<td>Working on computers</td>
<td>Kindergarten</td>
<td>91%</td>
<td>9%</td>
</tr>
<tr>
<td></td>
<td>1st</td>
<td>95%</td>
<td>5%</td>
</tr>
<tr>
<td>Working with your classmates</td>
<td>Kindergarten</td>
<td>77%</td>
<td>23%</td>
</tr>
<tr>
<td></td>
<td>1st</td>
<td>86%</td>
<td>14%</td>
</tr>
<tr>
<td>How well do you think you...</td>
<td>Kindergarten</td>
<td>68%</td>
<td>14%</td>
</tr>
<tr>
<td>Work in a group</td>
<td>1st</td>
<td>90%</td>
<td>5%</td>
</tr>
<tr>
<td>Work with a partner</td>
<td>Kindergarten</td>
<td>86%</td>
<td>14%</td>
</tr>
<tr>
<td></td>
<td>1st</td>
<td>90%</td>
<td>5%</td>
</tr>
</tbody>
</table>
The first four goals of the Marshalltown Technology Committee were targeted on within this classroom. These included helping improve student learning, including empowering them for citizenship in a changing world. The classroom reflects the changing world in which children come to learn how to become a part of society.

Although reading and math performance of students in the prototype classroom did not differ significantly with first grade students outside of the classroom, assessment of their problem solving skills was not addressed as fully as it was hoped to be. More nontraditional assessment is needed to determine the effects of problem solving and collaboration when incorporating technology into the primary classroom.

Educators' focus should not be exposing children to technology now in order to prepare them for their future. The computers of the future will have little in common with computers of today. Instead, our focus should be on appropriate programs that will provide young students the opportunity to become actively engaged in learning through technology. When these types of programs are in place, students will have the capabilities and motivation to succeed and work with technology of the future (Snider & Gershner, 1997). When technology is used as a tool to support students in performing authentic tasks, the students are in the position of defining their goals, making decisions, and evaluating their progress. The sooner educators use constructivism theory of learning and incorporate technology within this type of learning, the more practice students will have to develop these skills and succeed in the 21st century.
References


http://www.ousd.k12.ca.us/netday/links/refs/Goals.html

http://www.edweek.org/htbin/fastweb?getdoc+view4+ew1997+1631+3+wAAA+%26%28

Appendix A

Needs Assessment – Kindergarten

1. What are the previous experiences that students had using technology in kindergarten?

2. What experience do Kindergartners have using the mouse?

3. What experience do Kindergartners have using the keyboard?

4. What are your expectations concerning technology for Kindergartners when they leave your room?
Appendix B

Needs Assessment - 1st Grade Teachers

What is the ideal number of students working in a group on technology?

Describe the ideal learning situation while working with technology.

What software is available and age appropriate in our building for first grade?

What material (software) lessons are you currently using with technology?

What do you feel are the entry-level expectations concerning technology in first grade?

Tell about the ways that you’re currently integrating technology into the curriculum in your classroom.

What should be taught about technology in 1st grade?
Appendix C

Needs Assessment – 2nd Grade

1. What are your expectations concerning technology for 2nd graders when they enter your room?

2. What kinds of software do you want students coming into your room to be able to use efficiently?
Appendix D

Needs Assessment – Technology Committee

What is the ideal number of students working in a group on technology?

Describe the ideal learning situation while working with technology.

What software is available and age appropriate in our building for first grade?
Appendix E

Needs Assessment - Parents

Dear Parents,

This year our first grade classroom is a primary technology prototype classroom for the Marshalltown School District. We will be implementing technology into our existing first grade curriculum through the use of six computers in our room. Our goal is to evaluate what effect technology has on reading and math skills as well as communication and higher level thinking skills. In order to better plan for the technology, I would like to know as much as possible about the learners in my classroom. Please take a few moments to fill out this questionnaire about your child and return it as soon as possible.

1. What is your child’s previous computer experience?

2. Does your child have access to a computer at home?

3. Has your child had experience using a keyboard or mouse before?

4. Does your child have any physical limitations that would prevent him/her from using the computer?

5. If you child has had experience with the computer, what are the names of the software s/he has used?

6. Would you be willing to volunteer your time in our classroom helping children learn how to use technology?

7. Does your child have access to the Internet at home?

Thank you,
Mrs. Swartz
Appendix F

Working Within A Group Rubric

<table>
<thead>
<tr>
<th></th>
<th>Not Yet</th>
<th>On Your Way</th>
<th>Way To Go</th>
<th>Exceeds Expectations</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Partner</strong></td>
<td>My partners did not help with any of the work</td>
<td>My partners did most of the work without my help</td>
<td>My partners did their fair share of the work</td>
<td>My partners did their fair share of the work and helped others stay on task to do their work</td>
</tr>
<tr>
<td><strong>Me</strong></td>
<td>I did no work</td>
<td>I helped just a little</td>
<td>I did my fair share of the work</td>
<td>I did my fair share of the work and helped others stay on task to do their work</td>
</tr>
<tr>
<td><strong>Friendly Group Behaviors</strong></td>
<td>We did not talk about our work</td>
<td>Our group used some friendly group behaviors, but also some unfriendly group behaviors</td>
<td>Our group usually used friendly group behaviors</td>
<td>Our group always used friendly group behaviors</td>
</tr>
<tr>
<td><strong>Quality Work</strong></td>
<td>We did not do quality work</td>
<td>We did some quality work</td>
<td>We did all quality work</td>
<td>We did all quality work and rechecked when we were done</td>
</tr>
</tbody>
</table>
# Appendix G

## Technology Baseline Assessment of Basic Operations

<table>
<thead>
<tr>
<th>Student Descriptor</th>
<th>Fall</th>
<th>Spring</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Turn on the computer*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shut down computer*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Use password to login to network*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mouse skills: Point, click, double-click, and drag*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Locate and use the Start button on a PC</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Open a program*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quit a program*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minimize a program</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximize a program</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Move between two or more programs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Move between two or more documents within a program*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Save work to server, floppy, or hard drive*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Save work in two places, and/or print hard copy*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Use Find tool</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Follow age appropriate on-screen directions*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Student handles and loads CD ROMs appropriately</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Move files and folders from drive to drive</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rename files and folders</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Demonstrate understanding of where files and folders reside on the network (including C: and A:) *</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Create and name a new folder*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Print a document*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Demonstrate the ability to cut, copy, and paste within a document*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Change font style, size, color, and alignment*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Use a computer at home</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Use the Internet at home</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Appendix H

Satisfaction Survey of Children Within the Prototype Classroom

Date: ____________________________

Please answer the questions below by circling the face that shows how you feel.

How well do you like ....
1. Coming to school everyday?

2. Working on the computers?

3. Working together with your classmates?

How well do you think you ....
4. Work in a group?

5. Work with partners at center time?