

The Effect of Technology on Student Achievement
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Section I

A. Introduction

Students today live with technology being a big part of their lives. Many students enter kindergarten with some experience with computers and the Internet. Current research indicates a correlation between use of technology for instruction and increased student achievement.

In the early 1990s, technology in schools was limited, with only 35% of schools having Internet access in 1994. Since that time, technology in schools has exploded, with virtually every school having Internet access by 2005.

This paper is based on determining the effects of the use of technology on educational performance in the areas of math and ELA(English/Language Arts).

B. Area of Focus Statement:

The purpose of this study is to determine if increased exposure to a variety of educational technologies, focusing on ELA and math, will improve the achievement of fourth grade students.

C. Research Questions

- Will increased exposure to technologies, focusing on math and ELA skills improve student performance?
 - How much time do students spend in the technology lab? Will increasing time in the technology lab increase student performance?
 - How much time do students spend using technology at home? Will increasing use of technology at home increase student performance?

- How can I use student motivation to use technology to improve students' performance in content areas (math/ELA)?
 - What technology programs motivate students? Will incorporating some of these programs into instructional time increase students' performance in math/ELA

D. Related Literature

In the last 15 years, technology has exploded in education. With the addition of technology as an instructional tool, students and teachers have many more resources at their fingertips. Technology can be used in many ways in the classroom, from remediation to direct instruction.

There is much literature available that addresses the correlation between using technology in the classroom and student achievement. Pytel (2007) shares that laptops, used with supervision, can “improve academics and increase enthusiasm for learning in low income students.” Her research follows that of Warschaur (2006), who conducted a large action research project involving the use of laptops and its connection to literacy. In both of these instances, the findings were inconclusive. Students who were well taught and monitored on their laptops were more successful than those who were not given the proper training. Many studies show a link between technology use and student achievement, however, there are still many questions about this topic.

Schacter (1999) has compiled current research on how education technology impacts student achievement. Research shows that students who have access to one or more of the following types of educational technologies show “positive gains in achievement.” (Schacter, 1999)

- Computer assisted instruction
- Integrated learning systems technology
- Simulations and software that teaches higher order thinking
- Collaborative networked technologies
- Design and programming technologies

Middleton and Murray (1999) also completed research regarding the impact of using technology to improve achievement in math and reading. This research concluded that the higher the level of technology use by fifth grade teachers, the higher the academic achievement of those students.

Additionally, Kingsley and Boone (2008) report that seventh grade students, who used technology (the Ignite! program), in addition to textbook and lecture instruction performed better on a standards-based, multiple-choice test than those students who did not have use of the technology program.

In addition, Fengfeng (2008) researched the correlation between using computer math games and student achievement in math. His research (2008) did not show significant gains in achievement, however, he does report that using computer math games caused students to develop more positive attitudes toward math.

E. Description of intervention or innovation

I will be gathering information to support my assumption that integrating technology into instruction, and using technology for remediation, will improve student achievement in the area of math and ELA. Additionally, I will gather information regarding the type of technology that is motivating to students. Those types of software will be integrated into instruction.

Section II:

A. Overview of Data Collection Strategies

Students, parents and teachers will be surveyed at the beginning and end of this study. These surveys will provide information regarding what types of technology is motivating to students. Additionally, the surveys will provide information regarding time spent using technology both in school and at home.

B. Data Sources

- *Surveys(pre and post):* Students, parents and teachers will be asked to fill out surveys at both the beginning and end of this study. These surveys provide insight into topics such as student motivation and technology use in school and at home.
- *Pre/Post Tests:* Records will be checked to compare student performance on state mandated testing. Scores from the Math and ELA sections of the testing will be reviewed, and 3rd grade results(pre study) and 4th grade results (post study) will be compared. Additionally, students will take a teacher created pre and post test to determine if increased exposure to motivating technologies will improve student achievement.
- *School Records:* School Technology Lab records will be reviewed, to track the increase of time using technology.

C. Data Analysis Plans

I will organize the technology use survey data (both pre and post surveys) based on the frequency a teacher and his/her students report using technology. I will analyze the pre/post test data to determine if a significant improvement has occurred in those classrooms where a teacher has reported increased use of technology. I will also look at the home use data, to determine if there is a correlation between increased use and student achievement.

Section III

1. Involved in this action research project will be fourth grade teachers at the John F. Kennedy Elementary School in Franklin, MA, their students and the students' parents. All participants will be asked to fill out surveys honestly, and to the best of their ability.
2. Prior to beginning this project, I will secure permission from my building principal and the parents of the students participating. I will need to secure parents and teachers who are willing to participate in this research as well.
3. Timeline:
 - September:
 - Collect test scores from previous spring's state testing (grade 3) in the areas of math/ELA
 - Students, parents, and teachers participate in "pre- survey" regarding motivating technologies and technology use in and outside of school
 - Students complete a simple pretest in the areas of math/ELA
 - October:
 - Motivation survey is analyzed and the information shared with teachers
 - Teachers begin to use types of motivating technologies with their students

- Teachers and students begin to log technology use
- October-March:
 - Teachers and students continue to log technology use
 - Teachers work to include motivating technology in their instruction
- April/May:
 - Students complete teacher created post-test
 - Students participate in state mandated testing
 - Students, parents and teachers complete post surveys

4. May-July: Develop recommended actions

5. In order to implement recommended actions, the following strategy would be recommended:

- A. Receive permission from administration and parents
- B. If needed, purchase necessary hardware/software for classroom use
- C. Develop training in the use of technology in the classroom
- D. Develop a “support group” of teachers to discuss and share successes, failures, and/or worries.
- E. Provide regular review /check in with teachers to assess the need for follow up training and support.

In order to successfully implement changes to instruction to involve more technology, many people would need to be involved. First, the building principal’s support would be imperative. With this support, funding can be sought and teachers will be trained. Of course, the classroom teachers also must support any change that may take place. Have teachers “on board” will make a transition much easier. I would anticipate

the biggest obstacle to this innovation would be funding for both technology and for training. I work in a school where the teachers are willing to do anything necessary to help the students in their classes succeed. The difficulty often lies in training and funding. That is why the support of administration is so vital to the success of this type of innovation.

6. In order to monitor this innovation, I would survey teachers and students at least one time per year. The teacher survey would involve the time spent using technology, and the student survey would involve motivating technology. This information would be interpreted to help in determining the need for continued teacher training.

References

Fengfeng, K. (2008). A case study of computer gaming for math: engaged learning from game play?. *Computers & Education*, 51, 1609-1620.

Kingsley, K.V., & Boone, R. (2008). Effects of multimedia software on achievement of middle school students in an American History class. *Journal of Research on Technology in Education*, 41(2), 203-221.

Middleton, B., & Murray, R. (1999). The impact of instructional technology on student academic achievement in reading and mathematics. *International Journal of Instructional Media*.

Pytel, B. (2007). Laptops: jury is out. *Educational Issues*.

Schacter, J. (1999). The impact of education technology on student achievement what the most current research has to say. *Milken Exchange on Educational Technology*.

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

LITERATURE MATRIX

Authors	Year	Variables Considered in the Study		
		Frequency of computer use in school	Availability of computer outside of school	Types of programs/website utilized
Kingsley, Karla V., Boone, Randall	2008	X		X
Fengfeng, Ke	2008	X		X
Schacter, J.	1999	X	X	X
Middleton, B.; Murray, R.	1999	X		X
Warschauer, M.	2006			X
Pytel, B.	2007			X

Data Collection Matrix

Research Questions	Data Source		
	1	2	3
1. Will increased exposure to technologies, focusing on Math and ELA skills improve student performance?	3 rd grade MCAS Scores- ELA/Math , spring 2008	4 th grade MCAS Scores- ELA/Math, spring 2009	Teacher survey regarding performance in Math /ELA
2. How much time do students spend in the technology lab? (Survey given in Jan. and May)	Teacher Survey	School Technology Lab Records	
3. How much time do students spend using technology at home? (Survey given in Jan. and May)	Student Survey	Parent Survey	
4 What technologies are motivating to students?	Student Survey	Teacher Survey	Teacher Observation

Data Analysis Matrix

Data Collection Technique	Data Analysis Strategy		
	1	2	3
1. Pre/post test	<p><u>MCAS tests, given at the end of grade 3 and at the end of grade 4.</u></p> <p>Organize data by student for each subject (Math/ELA).</p> <p>Create table ranking student performance, , with the highest ranking student at the top of the list. Compare the two years' scores to determine if there is an increase in performance.</p>	<p><u>MCAS tests, given at the end of grade 3 and at the end of grade 4.</u></p> <p>Organize data by student for each subject (Math/ELA)</p> <p>Create a line graph, showing the students and their scores from 2008 state testing and from 2009 state testing. Overlap the lines in 2 colors to show the difference.</p>	Teacher Created Pre/Post test in Math/ELA
2. Pre/Post Survey of students and parents regarding technology use at home	Likert Scale focusing on "Frequency" Compile means of each item on Likert scale on survey	Group items with mean scores of 3 and above as Very Frequently/Frequently, a mean score of 3 as Occasionally, a mean score of 2 or below as Rarely-Never	
3. Survey of teachers	Likert Scale focusing on	Group items with mean scores of 3 and above	

<p>regarding amount of time spent using the technology lab.</p>	<p>"Frequency" Compile means of each item on Likert scale on survey</p>	<p>as Very Frequently/Frequently, a mean score of 3 as Occasionally, a mean score of 2 or below as Rarely-Never</p>	
<p>4.Survey of students and teachers regarding technologies that are motivating.</p>	<p>Likert Scale focusing on "Interest". Compile means of each item on Likert Scale survey</p>	<p>Likert Scale: Group items with a mean score above 3 to indicate motivating, scores below 3 as unmotivating, and scores of 3 as indifferent</p>	

Technology Survey

<http://www.zoomerang.com/Survey/survey-intro.zgi?p=WEB228VFNCQ22A>

What Type of Technology Do You Like?

Please rate each of the following computer programs, websites, and other technologies on a 1-5 scale, indicating how interested you are in using the program/website at school. Use the following scale: (1) is "Not at all interested", (2) is "May be interested", (3) is "No opinion/neutral", (4) is "Interested", and (5) is "Definitely Interested".

- 1 Not at all interested
- 2 May be interested
- 3 No Opinion/Neutral
- 4 Interested
- 5 Definitely Interested

Programs:

Kidspiration or Inspiration

1 2 3 4 5

Power Point

1 2 3 4 5

Everyday Math Games

1 2 3 4 5

Websites:

<http://www.internet4classrooms.com/skills-4th-langbuilders.htm>

1 2 3 4 5

<http://www.internet4classrooms.com/skills-4th-mathbuilders.htm>

1 2 3 4 5

<http://www.funbrain.com/>

1 2 3 4 5

<http://readkiddoread.com/home>

1 2 3 4 5

Other Technologies

Virtual tours of places you read about

1 2 3 4 5

WebQuests

1 2 3 4 5

Networking sites (such as Facebook and My Space)

1 2 3 4 5

Please answer the following questions:

Please list your favorite use of technology at home.

Please list your favorite use of technology at school.

Thank you for your opinions.