

The Influence of Technology Such As a SMART Board Interactive Whiteboard on Student Motivation in the Classroom

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Abstract

This article reports the findings of a study conducted in a small rural school in Ligonier, Indiana. Two individual classrooms were given the opportunity to complete two projects. The groups were exposed to one project in which they used a SMART Board and a project that used no technology. The objective was to determine whether the use of technology motivates students. The results indicate a link between the use of technology and the motivation of students in the classroom.

Introduction

Technology has become commonplace in the classroom. It is a method that is becoming firmly rooted in the delivery of curriculum (Wang, 2000). Past research indicates that students learn more content and faster with technology (Faucett, 2000).

Teachers try to use technology not only to manage the tasks of productivity, i.e. grading, curriculum, and correspondence, but also to open up new and exciting learning possibilities for students. Teachers need technology to have access to knowledge and information – not only for them, but also for their students (Wheeler, et al., 1999). The largest question for administrators, school boards, educators, and parents remains. What does the presence of technology in the classroom actually do for students?

We do know that its absence in the classroom can have certain effects on student achievement, especially if students are not instructed using variety methods. Research also provides evidence that students learn in many different ways. Focusing on basic skills using traditional teaching methods like lecture, drill-and-practice, and simple remediation is uninteresting to most students. These methods can cause reduced potential for learning, which can lead to feelings of helplessness, unmotivated students, and less chance of success – especially with disadvantaged students (Wheeler et al., 2000). Wheeler et al. have observed that students who use technology tend to improve their performance and problem-solving abilities while increasing their motivation toward reading, writing, and math (2000).

Other research has indicated that with a large range of preferred learning styles among students, utilizing a range of different processes in teaching and using technology has more appeal than using just one process (Williams, 2000). Is the presence of technology helping students "learn"? This is a specific problem in itself since learning can often be too broad in its definition and therefore difficult to measure.

Gay Fawcett, Executive Director at the Research Center for Educational Technology, has observed a tendency for some to dissuade the usefulness of technology in the classroom because of their misinterpretation of the term "learning." He attributed this criticism to some individuals in the private sector who reported that students were not "learning" simple things such as making change, phonics, or the location of states. Upon further discussion with individuals in the marketplace he determined that what these employers wanted their future employees taught were problem-solving skills, use and search of information, and the ability to work well with others (Fawcett, 2000). Because of this difficulty with learning, an underlying factor has eluded researchers in determining what impact technology actually has for students. This underlying factor is the *motivation* of students.

A basic definition of motivation is to provide a person with something that causes them to act. There is some evidence that has supported a relationship between student motivation, student performance, and their individual attributes (Atkinson, 2000). In an educational setting, it may indeed be difficult to determine what exactly motivates students. The largest problem is that the classroom is not the most conducive site for experimental research in student motivation, yet one cannot readily place a sample of students in an isolated laboratory setting. The number of variables and factors that affect students is phenomenal. Yet technology has become such a present variable in classrooms that its effect on motivation makes it very researchable. Although it seems that students enjoy using technology, it may be more interesting to determine how much it actually motivates them to learn; furthermore, little substantive research and research funding have been completed in this field (Lewis, 1999).

One of the most important conclusions in the area of motivation was made by Sousan Wang, Ph.D., Central Connecticut State University. She asserts, "...one of the most important advantages [of technology] is that it may offer a unique environment for interactivity, learner control and student interest and motivation" (2000). As we determine the link between technology and motivation we may understand how it enhances learning.

The Problem

The purpose of this study was to determine whether students would report being more motivated to learn using a SMART Board than when they were not allowed to use any technology.

Procedures

To obtain data to test the above hypothesis a double blind study was conducted in an eighth grade American history class.

Sample Selection

Two specific classrooms were chosen from among seven to conduct the study. The classes were chosen because of their times and the fact that students would not likely have interaction with each other to discuss activities going on daily in the classroom. The same teacher taught both classes and both lessons. Each class was not given any information as to whether it was observed except for being debriefed following the research period. Students were considered representative of the larger student population and diversity. The two classes brought the sample size to forty-nine or one set of 26 and another set of 23. Each would be given the opportunity to be a control and an experimental group in two separate exposures to the independent variable (SMART Board).

Method of Examining the Hypothesis

The control group and the experimental group were both exposed to a project on colonization in which they were required to prepare a presentation to the class. The control group was given the exact same directions for completing their projects, however, was not given the use of the SMART Board. The control group was allowed to use other methods of research, collection, and presentation such as books, encyclopedias, marker boards, posters, butcher paper, etc. The experimental group was given the exact same assignment; however, groups were given free use of the SMART Board for research, collection, and presentation. Following the first project, students were given a survey.

A second project was then completed on the concepts of civilization, exploration, colonization, and revolution and the students were required to give a presentation similar to the first project. The control group from the first project became the experimental group, and the experimental group from the first project became the control group. Students completed the projects much like the first one and then completed the same survey to keep the results consistent.

Data Collection

The seven-item Likert scale (see Appendix) was given to both the class of 26 students who had been exposed to the independent variable (SMART Board) and the other group of 23 serving as the control group that received no technology. The teacher conducting the study prepared the scale. It was completed in the presence of the teacher in order to avoid students not returning the questionnaires. Students were also asked to include written comments after the Likert items for clarification and input. Although the survey was given at different times to each group, the likelihood of students sharing responses with the other group was minimized by the selection of groups having class in the morning and afternoon. Students' names were not allowed on the survey to ensure that they would feel free to answer positively or negatively without fear of the teacher knowing their exact responses. Students were also given the same directions for completing the survey and the same amount of time.

Findings

As the results were tabulated a link between motivation and technology is observed. The results, indicated by the mean scores of the two groups for each question, show that as each group participated as a control group they reported less motivated responses. As an experimental group their responses tended to be more motivated (see Table 1).

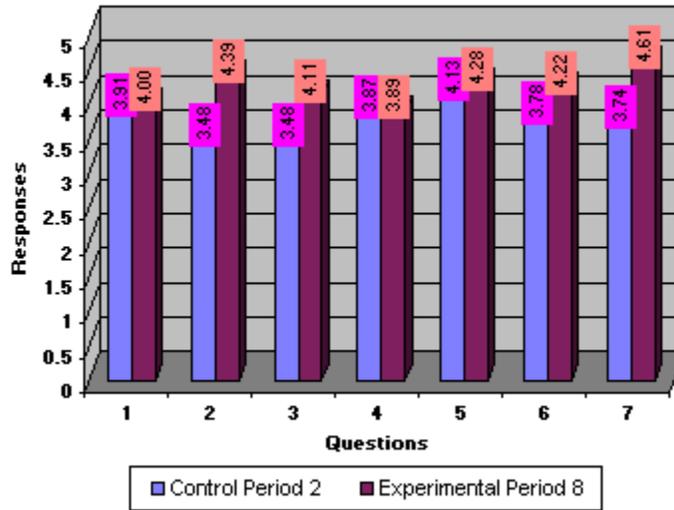
Table 1. The statements used and the results of students' responses to the seven-item Likert scale test as control and experimental groups.

	Control Period 2	Experimental Period 2	Control Period 8	Experimental Period 8
1. I have enjoyed studying this unit in history.	3.91	3.96	3.91	4
2. I would like to study more units this way.	3.48	3.67	3.36	4.39
3. I enjoyed giving a presentation.	3.48	3.63	3.05	4.11
4. I found the material interesting.	3.87	3.79	3.64	3.89
5. I liked the methods the teacher used to teach.	4.13	4.25	4.27	4.28
6. I learned using this method of presentation.	3.78	3.79	3.64	4.22
7. I would like to try something like this again.	3.74	3.83	3.59	4.61

The Likert items contained responses that ranged from 1, which meant that the student strongly disagreed with the statement, up to 5, which meant they strongly agreed – three being neutral. The means of all the scores in Table 1 are above neutral, indicating that, even though the difference in the means is slight, all students were motivated by the projects. However, the entire set of mean scores for the experimental groups was higher except for only one of the statements. On that statement – statement four, I found the material "interesting" – one group's mean score was 3.87 while its score as an experimental group was 3.79.

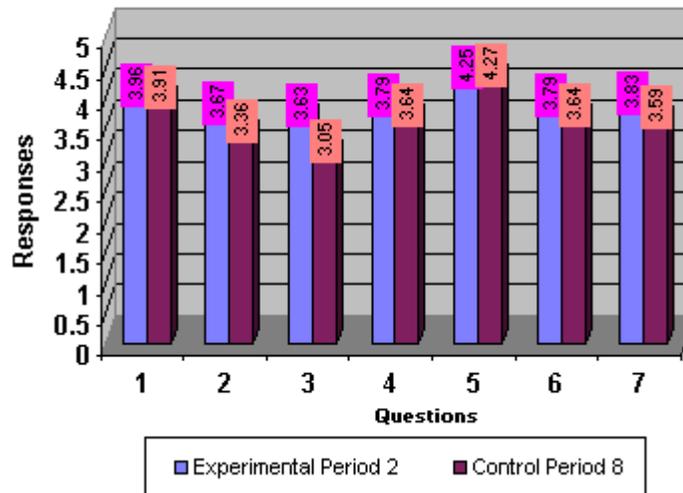
As the averages for the classes on each question are examined in graphs (see Graphs 1 and 2 below), two observations are immediate. The data follow a similar pattern. In other words, the plots show that even though both groups are motivated, the experimental group in each of the trials is generally more motivated.

Motivation Period 2 & 8 First Trial



Graph 1: Means for each Likert item are plotted for the control and experimental groups in the first project trial. The differences in the means show more motivation in the experimental group.

Motivation Periods 2 & 8 Second Trial



Graph 2: Means for each Likert item are plotted for the control and experimental groups in the second project trial. The differences in the means show more motivation in the experimental group.

A qualitative analysis of student comments provided in the comment section of the survey also indicates high motivation among many of the students participating in the survey. Table 2 below shows the responses of the control and experimental groups. Generally, the comments are more positive in the experimental groups; however, the control group also shared positive comments. The comments in the experimental groups, however, seemed to be more detailed and specific to the enjoyment of the learning experience. Enjoyment suggests higher motivation to learn. Looking at the comments of the control group, however, one cannot rule out motivation among this group also.

Table 2. Comments* of the experimental groups and control groups from both trials.

*Comments were not edited and contain misspellings and incorrect grammar.

Experimental Groups' Comments	Control Groups' Comments
I had fun with our presentations with a partner, but I'd like to do it with more than one person.	I liked it
I think that I got more out of this unit because it was funner to do than most units. It was like we weren't even learning, but we did because I remembered most of the stuff that was said in the presentations. The presentations were really fun! I like working with partners.	I think I would have learned more on this unit if the teacher taught.
I think some parts of the presentations were good.	It was fun except for doing the presentation at the end.
It would be nice if we could get more time to work on the projects. It might help a little if we could have picked our partners then together picked the colony we wanted. On the other hand it was nice like in a surprising way to pick our colony out of a cup.	The reason I mainly disagreed is because I am naturally shy
Keep doing what you are doing.	Did a great job teaching
I liked what we were studying but the 2 days to get ready for the presentations was scary. I think if I had a longer time to work on it, I would have gotten a better grade.	I like doing presentations
I really liked giving the presentation. I thought it was fun and it helped me learn more.	I'm not sure I want to do these again
I liked it when we did presentations. That was a lot of fun and I would like to do it again! I also liked when we could make up our own colonies. This class I love because we don't just sit at our desk and take notes. We get to do some things ourselves.	I really liked using this method. I was never able to do things like this in other schools. I think this method is the best way for me to learn what kind of history there was back then.
I didn't really learn much. Did not find it interesting.	I liked it, but not when we had to go up in front of the class. I liked to see other peoples presentations.
I like it when you give PowerPoint presentations.	It was fun.

I like it when we worked in groups.	This is a fun class
The only thing I didn't like was doing the presentation. I can get really nervous that it makes me sick, but I guess I better get use to the fact of doing presentations.	Partners are fun unless you get a person who won't help with anything
More time to do the presentation would be nice.	I kinda liked these projects that we did. They were fun to do.
I really enjoyed giving presentations to the class in partners! I hope we get to do it again!	I dislike presentations mainly because I get nervous and can't think. Also I can't decide on what to do.
I really liked the presentations we gave. I didn't like the outlining much, but when I study with it, it helps me remember the material.	It's embarrassing to get in front of the class
Mr. Weimer let us have fun while we were learning at the same time.	I think it would be better doing bigger groups rather than just two people. My partner was absent and that made me do most of the work on one day.
I had fun with our presentations with a partner, but I'd like to do it with more than 1 person.	

Conclusion

The tools used to determine the motivation of students when using a SMART Board were appropriate and did show a tendency (strong in some of the Likert items) and support the hypothesis. The number of students participating in the study was sufficient to provide a representative sample of the school population; however, using more students with a more stringent statistical analysis other than the difference of the means would be appropriate.

Looking solely at the mean scores, it would be unlikely that the scores on the Likert scale would show more motivation on all but one item by just chance. Giving this survey to the sample without any independent variable such as a SMART Board would most likely produce results showing more motivation 50% of the time without considering extraneous variables. The motivation of the control group and experimental group only decreased on item four (see Table 1). This means that motivation increased from the control to experimental groups on every Likert item except one.

This tendency in the data suggests that motivation may be affected by the use of technologies such as the SMART Board at least initially. The control groups were exposed to many different kinds of techniques for project work except for technology, while the experimental groups were only allowed to use technology such as the SMART Board. This would definitely indicate that technology is a medium suitable for classroom use, especially when completing projects. It is

difficult to determine, solely from this study, whether or not the effect of the independent variable is temporary.

A difficulty exists in generalizing this data to other classrooms because of the extraneous variables present in this and any classroom. Even though the sample does represent the local population well, it may not represent that in many other schools. One must look at the difference in the mean scores of the control and experimental groups with interest. Even though more research must be done in the area of motivation, the data has uncovered a link between using technology such as the SMART Board and motivation.

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Appendix

History Survey

Please participate in the survey by circling the response next to the statement that best fits your position. Thank you for your participation.

	Strongly Disagree	Disagree	Unsure	Agree	Strongly Agree
1. I have enjoyed studying this unit in history.	1	2	3	4	5
2. I would like to study more units this way	1	2	3	4	5
3. I enjoyed giving a presentation.	1	2	3	4	5
4. I found the material interesting.	1	2	3	4	5
5. I liked the methods the teacher used to teach.	1	2	3	4	5
6. I learned using this method of presentation.	1	2	3	4	5

7. I would like to try something like this again.

1

2

3

4

5

Comments: