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A comparison of three studies in the area of educational technology

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Abstract

A common problem that occurs as schools try to implement new technology is the resistance of the teachers to the technology. The intention of these new technologies is to help improve the students learning of a particular content area. However often the people in the front lines of distributing this technology to the students are inadequately trained in the use of the technology. Another question is, how effective are these strategies compared to other possible strategies? This paper will compare three papers, all of which are about the introduction of technology into a traditional class subject. We will conclude with a discussion of the trends, mentioned before, that are in common for all three papers.

A comparison of three studies in the area of educational technology

Introduction:

One on-going issue in education today is the use of technology in classrooms. Schools across the world are making an effort to incorporate more and more technology into the lives of their students and staff. What is not often clear is the effect this new technology has on the learning of the kids. Does technology help students understand concepts more clearly? Another question about technology that comes up is, are teachers being adequately prepared to use this technology with their charges?

We have read three articles this semester which deal with this issue. All three of the articles are trying, as their main goal, to justify the use of technology in K-12 education. Each article has a slightly different angle with which they are approaching the problem.

First we will compare the three articles and provide a bit of information about all three articles. This seems most easily done with a table.

Comparison:

Study name	Summary	Strengths of the study	Weaknesses of the study
Usage of computers and calculators and students' achievement: results from TIMSS 2003 (Dr. Radovan Antonijević, 2007, University of Belgrade)	This study takes the Trends in International Mathematics and Science Study from 2003, which is a comparison of 47 countries 8th grade students, and uses it to draw conclusions about the effectiveness of using computers in teaching. This study restricts itself to just 4 of the 47 countries, specifically the Netherlands, the USA, Bulgaria, and Serbia (Dr. Radovan Antonijević, 2007)	Very well organized and easy to follow the argument. Use data which seems to support their data.	A major flaw in the study is the use of only 4 countries to make the comparison, and no real explanation why those 4 countries were chosen. Since we have no clear indication why these 4

	Some of the conclusions drawn by Antonijević in this study are that the use of computers does not affect achievement in the mathematics, but does affect it in science (, 2007) and that the use of calculators in mathematics class enhances student achievement.		countries were chosen, it could be they fit the data model for which the researcher was looking.
Middle School Students Technology Practices and Preferences: Re-Examining Gender Differences (Leslie M. Miller, Heidi Schweigruber and Christine L. Brandenburg, 2003)	This study is basically intended to show that girls have nearly caught up to boys in the gender gap in technology. They use surveys, handed out during science and computer classes, to gather information from 568 middle school students. The survey basically asks the students what do they use a computer for, and how comfortable with a computer they are (there are a variety of other questions.	Each point of their argument is carefully justified with reasonable statistics. One can follow their train of thought during the article.	Study has some flaws in how they chose their students which are not resolved. Selection does not appear to be random enough. There are some errors in the calculations of one of the tables from which some conclusions are drawn.
The Effects of Incorporating a Word Processor Into a Year Three Writing Program (Natalie Beck and Tony Fetherston, 2003)	This study is looking at using a word processor exclusively for writing in a time when this was not commonly done. The intention of this article is to show that using a word processor enhances a student's self-esteem and hence they become a more relaxed, better writer.	The article provides a lot of background information to make it easier to understand the issue. The procedure used is clearly explained.	The sample size for this research was much too small. There appears to be some other possible factors besides the use of the word processors that may be affecting the results. For

			example, the novelty factor is not addressed, as is the influence of the teacher's pedagogical style.

Analysis:

In the article by Dr. Antonijević he states, 'It would be hypothetically unexpected to conclude that using computers on “every or almost every lesson” can enable lower students’ achievement in science.' By this he means that the use of computers should improve students' performance. However interestingly enough, in an earlier paragraph, he indicates his surprise at 8th grade Serbia science students without access to computers out-performing their Serbian counterparts who use computers in science. This type of inconsistency makes this research slightly suspect.

Beck and Fetherston state that "Students' writing development has the potential to be greatly assisted by the introduction of word processing and an effective teaching program." However earlier in the article they mention that they are doing their research in the classroom of a teacher who has only normally used very traditional methods to teach writing. Hence one wonders how much of an influence the novelty effect had on these students.

Miller, Schweigruber, and Brandenburg indicate that "... the delivery of educational information via the Web has become extremely feasible..." The implication of this statement is that this process of using a computer for education is desirable because we very rarely do studies to determine the feasibility of activities in which we do not intend to engage. Most of this paper is discussing the impact on gender on the use of a computer, and much of the discussion of the

paper focuses on computer games. However the purpose of this article is to show that because gender bias in the use of a computer is waning, the use of computers in education is more compelling. A major problem with their argument is the digression into using computers for playing computer games which reduces the effectiveness of this paper.

Conclusion:

Each of these articles seems to be written with a specific intention, to encourage the use of computers in the classroom as learning aids. The article by Antonijević tries to convince us to use computers by describing the effectiveness of computer aided instruction by measuring raw achievement scores versus computer use in the classroom. The Beck and Fetherston is most obviously pro-computer use as it is advocating the exclusive use of computers for writing. Finally the Miller, Schweigruber, and Brandenburg is implicitly supporting the use of computers in education by pointing out the fading gender bias in the use of computers, which could be an argument against their use.

My opinion is that, although they provide compelling arguments, the gaps in their logic do harm to their cause. Each article seems to have some logical flaw in its construction and this makes their point less convincing. What would be nice is if these questions could be answered in a better fashion. Given the enormous proliferation of computers into education in the USA, there must be some metrics which can be used to justify their promotion. Failing this, one may have to reconsider whether the investment has been worthwhile.

Beck, N., & Fetherston, T. (2003). The effects of incorporating a word processor into a three year writing program. *Information Technology in Childhood Education Annual,* 139-161.

Miller, L. M., Schwingruber H., & Brandenburg C.L. (2001). Middle school students' technology practices and preferences: re-examining gender difference. *Journal of Educational Multimedia and Hypermedia,* 10(2) 125-140.

Antonijević, Dr. R (2007). Usage of computers and calculators and students' achievement: results from TIMSS 2003. Paper presented at the International Conference on Informatics, Educational Technology and New Media in Education (4th, Sombor, Serbia, Mar 31-Apr 1, 2007)