

As technology has grown over the past few years it has started to enter into the classrooms of many teachers. Computers, in particular, have edged their way into many educational settings for various reasons. These reasons vary from novelty, to efficiency, to information access, to many other things. Whatever the reasons are, computers have taken a very prominent role in education. Although computers can be great assets to a learning environment, questions arise about when they are beneficial and when they are not. In fact, when they are integrated improperly, computers can actually have negative effects on learning. When bringing a technology such as computers into a primary classroom, students do not necessarily benefit from the experience and in some cases the computers can actually impede the learning process.

One of the issues that arises when thinking about integrating computers into a lesson is whether or not it will take more work and effort to teach. Students in a primary classroom are not likely to be experts on using such technology. In fact, it will very likely be the case that the teacher will have to show the students how to use the program before they can actually get into the content of the lesson. This requires a lot more time and effort on the part of the teacher. Not only do they have to teach the content, they have to give a demonstration and a lesson on how to use the computer to do the assignment. In addition, nine times out of ten it is not necessary to use the computer in the lesson. Think about the activities that go on in a grade one or two classroom. At this level they are learning to read, write and do basic arithmetic. A computer is not **needed** for any of these activities. However, the counter argument to this could be that the computers can make the lessons more exciting and intriguing for the students. This is true, but is it really worth the hassle when most teachers can probably make the lesson just as

interesting and exciting, maybe even more, simply with their own enthusiasm and creativity? What is the point of going to a whole bunch of trouble teaching students how to work a computer program when it is not at all necessary? Why not just use traditional methods such as pens, paper and books? Many people may argue that in today's world it is almost mandatory that in order to succeed a general knowledge of computers is obtained. Why not give the kids a head start? While I would not disagree that the world is becoming more technology based, and that people need a good grasp on using things such as computers, I would argue that students do not need to start learning about this technology at such an early age. Let them get to a point in their education where they have a good grasp on the basics before they must learn additional skills. It will not hurt them to wait until grade four or five before they begin to use computers. It is extremely likely that they will graduate with the same computer knowledge and skills that they would have if they started using the technology at an earlier age.

Psychologically, students at a grade one or two level are not ready to use computers as a method of learning. One reason is that the cognitive load involved in doing so is too high. It will effect how much of the lesson they are able to retain. Because the students not only have to learn whatever content the teacher wants them to take in, plus how to use the computer as well, their attention and focus will be split. Essentially, they will be overloaded with information. This overload will result in the central lesson not being embedded into working memory. Students will not get what they really need out of the lesson. For example, there is a computer math program called Jumpstart for second grade students. There are various activities that the students can do. When I was working with the program I came across a math activity. It completely

stumped me. I could not help the student because I did not know how to work the program that was meant for an eight-year old! Another example of a math program on a computer that caused trouble for a student is a program called Math Blaster. In this program students have to zap the correct number that answers the equation in the middle with the mouse. The problem was that it was hard to line up the mouse with the number that was moving across the screen rather quickly. It was also difficult to locate the correct number quick enough to be able to click it. There were so many additional things to think about that it was interfering with learning basic addition skills. The cognitive load involved was much too high. Now, I'm sure that there are many computer programs that are not so difficult to use, but finding the right one can become very complicated. Is it worth the time and effort to locate the right program? Teachers must ask themselves whether or not the computer is adding something to the lesson that would otherwise not be there?

Another psychological consideration to be made is the students' ability to focus. Using computers for the first time, or any time for that matter, can bring about a lot of excitement amongst young children. The novelty of the technology can cause enough disruption among students that the intention of the lesson may get lost. Students can only pay attention to something for so long before they get distracted. Putting a distraction right in front of them can be a very unwise decision. Lets face it, when students, especially young students, are introduced to a new activity or excited about an upcoming one it is hard to restrain their excitement. Take physical education for example. To grade two students it is a fun time to play. Think about how noisy and excited they are when they line up and how difficult it is to keep them quiet while they are walking down

the hallway. Essentially, the scenario with computers is the same. There is so much room for playing and exciting things to do that they can easily forget that they are supposed to be learning something.

Obviously, computers are fun for students in many areas. The idea of using such an exciting tool is one of the main reasons why children like to use computers. They also love the fact that they can play games. Though I have not shown a lot of confidence in computers' effectiveness as lesson tools in a primary classroom, I do believe that there is a place for them in educational settings of this sort. There are programs out there that do have educational value and if at all possible, students should have access to such programs. It can be fun and motivating to learn on a computer. While I do not see computers as an effective method of teaching class lessons, I do believe that computers can be used effectively for individual students. Perhaps they can be used as a reward or opportunity for students to continue learning if they finish an assignment early. Students could also have access during free time when they can do as they wish. By doing this students can gain experience using such a tool and continue their learning in a fun and hopefully productive manor.

Computers can also be good assets for teachers in a way other than using them to teach a lesson. The Internet provides a broad range of information in which teachers can find ideas for creative lessons, effective methods of teaching, information that is not in their library of books and many other things. By having access to the World Wide Web teachers can bring new and exciting information into their classrooms. Computers can also allow for better organization and communication. Teachers can make handouts for students that are needed for lessons or just to give information. They can also use

computers as a means for writing newsletters to parents about events and progress in the classroom. Computers can be great assets to a classroom when they are used appropriately.

The difficulty of finding the right program, teaching students how to use that program, and the fact that students at the primary level can be easily distracted and overloaded with information, suggests that computers are not an effective way to teach a lesson. Although computers are not necessarily the best way to pass on information to primary students, they still have a place in the classroom. Having computers in a classroom can broaden the information that students can obtain, help the teacher to organize and communicate better, and give the students a chance to become familiar with such a largely used technology. Though computers do have their downfalls, when they are used properly they can be a great addition to a classroom.

### **Comments on the draft:**

I can tell you "just sat down and wrote it" -- it has that kind of conversational, stream-of-consciousness feel to it. :-) Other than the prose itself -- which is too informal and unstructured -- my main concern is that your focus is too wide, making it difficult to have a position statement that is both substantive and defensible in five pages. In addition, you have no references cited or evidence to back most of your claims at this point.

However, I do think you have an interesting passage that might serve as the seed for a supportable position paper. At the bottom of page 2 through page 3 you discuss the issue of cognitive load and then provide examples of two pieces of software that you feel demonstrate the problem. With those two pieces of software you point out two difficulties: (1) That in order to use the software to learn something, the students have to be able to figure out how it works (e.g. the interface for one activity in Jumpstart was too confusing); (2) that sometimes the task students are asked to do requires skills or knowledge other than that which they are supposed to be learning (e.g., hand-eye motor skills rather than mathematics skills was the focus in MathBlaster) -- thereby diverting or splitting their attention away from what they ought to be learning.

I think you could make your position paper about the inappropriateness of these two pieces of software (or even just one of them) for use in the primary grades due to their effects on "cognitive load." I'm not entirely certain you're using that term correctly, though I believe you are not far off of its general sense. If you go this route, it would be good for you to look up the formal definition in a psychology or educational psychology text book

and explain it in the paper. (And you can cite the text.) Then do a more formal analysis of these two programs with respect to "cognitive load." This would entail giving a brief description of how they work and what the creators claim they are supposed to teach children. (The software itself can be cited. So can the company's websites with promotional material describing what they are meant to teach.) Then describe the ways in which the programs' interface and/or task divert or split the students' attention away from what they are supposed to be learning. Your position statement might go something like....

"Jumpstart and Math Blaster are two popular programs designed to teach young children mathematics. However, the interface and task design of both places a cognitive load on students that diverts their attention from concepts they are supposed to be learning and makes the programs inappropriate for use in a classroom."

You may find the three research/review articles described at the end of this message useful. The one with Andee Rubin as an author I would definitely look at if you can. He (she?) is a major researcher in mathematics and in technology to support mathematics. Talk to a librarian about retrieving any of these if you're unsure how to do so.

I hope you find this suggestion a compelling one. Let me know if you want to discuss it or other ways of focusing the paper more further.

----- PAPER ABSTRACTS -----

ERIC\_NO: EJ595977

TITLE: Mathematically Rich, Equitable Game Software.

AUTHOR: Murray, Megan; Mokros, Jan; Rubin, Andee

PUBLICATION\_DATE: 1999

JOURNAL\_CITATION: Mathematics Teaching in the Middle School; v5 n3 p180-86

Nov 1999

ABSTRACT: Identifies characteristics of mathematically rich, equitable game software for middle school students. Introduces and compares two games called Math Blaster and Logical Journey of the Zoombinis. Contains 15 references. (ASK)

DESCRIPTORS: Computer Software; \*Computer Uses in Education; \*Educational Games; Elementary School Mathematics; Mathematics Activities; \*Mathematics Instruction; Middle Schools

PUBLICATION\_TYPE: 052; 080

CLEARINGHOUSE\_NO: SE562508

ISSN: ISSN-1072-0839

AUDIENCE: Practitioners; Teachers

LANGUAGE: English

ERIC\_ISSUE: CIJMAY2000

ERIC\_NO: EJ575985

TITLE: A Medley of Preschool Packages.

AUTHOR: Hohmann, Charles

PUBLICATION\_DATE: 1998



JOURNAL\_CITATION: Child Care Information Exchange; n122 p93-95 Jul-Aug 1998

ABSTRACT: Reviews three software programs appropriate for preschool children.

"Millie & Bailey Preschool" by Edmark covers early concepts in language and math.

"Jumpstart Preschool" from Knowledge Adventure offers 20 activities, including songs,

and it tracks each child's progress. "Reader Rabbit's Preschool" by The Learning

Company introduces preschoolers to letters, numbers, shapes, and the fun of learning

with computers. (TJQ)

DESCRIPTORS: \*Computer Software Reviews; Computer Uses in Education; Early

Childhood Education; Educational Technology; \*Language Skills; \*Learning Activities;

\*Mathematics Skills; Optical Data Disks; \*Preschool Children

PUBLICATION\_TYPE: 072; 080

CLEARINGHOUSE\_NO: PS528142

ISSN: ISSN-0164-8527

LANGUAGE: English

ERIC\_ISSUE: CIJUL1999

ERIC\_NO: ED443705

TITLE: Teaching First Grade Computation: A Comparison of Traditional Instruction and

Computer Enhanced Instruction.

AUTHOR: Shults, Patricia Ann

PUBLICATION\_DATE: 2000

ABSTRACT: A first grade teacher in a rural elementary school in upper East Tennessee

observed that her students needed a better way to improve their computation skills than

those of traditional instructional methods. The school system's new Mathematics textbook was correlated with commercial Mathematics software. The teacher wanted to find out if using this software to enhance traditional instruction would make a significant difference in the students' computation skills. The psychologist, Jean Piaget saw children as active learners and viewed them as constructors of their own knowledge. He stressed that learning should be meaningful to the learner. According to Piaget, children from ages two to seven are in the preoperational period. In this period, students can manipulate symbols and recognize numerals as symbols for numbers of objects. Teachers should incorporate developmentally appropriate practices that instruct children in a meaningful way. Students should be actively involved in the learning. Developmentally appropriate practices should stimulate intellectual growth by stressing physical manipulation of objects. There are many debates concerning whether manipulation of computer objects is considered physical manipulation and whether it has the same value as manipulation of concrete objects. Sixteen first graders participated as the subjects for this study. These students were divided into a control group and a treatment group. During the nine-week experiment, both groups received traditional instruction covering addition and subtraction facts in a large group setting. In addition, the treatment group used Math Blaster[R] Jr. software for an hour each week to practice computation while the control group received an hour of traditional instruction to equalize the time on task. The control group was given time on the computer so that lack of computer access would not impact the finding. The control group did not use any type of Mathematics software. At the experiment's end, the subjects were given the computation subtest of the CTBS/4 as a post-test. The mean scale score for the control group and for the treatment group were determined. Upon t-

test comparison of the mean percentile scores, it was found that there was no significant difference between the scores at the .05 level of significance. However, the control group's mean score was higher than the treatment group's mean score. The teacher had observed that the treatment group subjects became disinterested in the Mathematics software in the latter part of the experiment. The teacher believes that this disinterest led to the lower mean score by the treatment group. (Contains 40 references.) (Author/YDS)

DESCRIPTORS: \*Computation; Computer Software; \*Computer Uses in Education; Grade 1; \*Learning Theories; Mathematics Instruction; Piagetian Theory; Primary Education; Teaching Methods

IDENTIFIERS: \*Piaget (Jean)

PUBLICATION\_TYPE: 040

PAGE: 47

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EDRS\_PRICE: EDRS Price MF01/PC02 Plus Postage.

LEVEL: 1

LANGUAGE: English

GEOGRAPHIC\_SOURCE: U.S.; Tennessee

NOTE: Master of Arts Research Project, Johnson Bible College.

ERIC\_ISSUE: RIEJAN2001