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ABSTRACT

This background paper for a symposium on the school of the future reviews the current instructional applications of computers in the classroom (the computer as a means or the subject of instruction), and suggests strategies that administrators might use to move toward viewing the computer as a productivity tool for students, i.e., its use for word processing, database management, and other applications. Factors favoring the use of computers as a means or object of instruction are discussed, including teacher ignorance compounded by uninformed teacher trainers, and a bias in the literature in favor of the current approaches. Steps that principals can take to encourage the extension of teacher use of productivity tools to student use of appropriate tools are suggested. Fourteen references are listed. (MES)

BEHOLD THE TROJAN HORSE:

Instructional vs. Productivity Computing in the Classroom

Liza Loop

3-12-1985

"I wouldn't mind learning to write programs to solve MY math and science homework problems!"

"Well, I want to learn to USE the computer, not program it!"

"I'm a writer. I want to use the computer to help me compose and edit my work."

"Ha! The computer is no typewriter! It's a scientific tool. I want to use the computer to help with experiments. Why should I have to write a program that is already on the market? I need to learn to use programs." (Jackson, 1984:65)

These comments, made by middle school students in a critique of their school's "computer unit", reflect my own approach to computing. The computer (with appropriate software) is a tool that I use to accomplish my goals. It almost never "teaches" me anything (except humility) although I occasionally use it as an electronic page turner for text stored on diskette. I often bump up against the limits of hardware or software and realize that there is no way for me to command the computer to do exactly what I want done. But the computer never tells me what to do nor does it make judgements about my performance. Who would want it any other way?

Appearantly, the adults who inhabit most schools (i.e. teachers and administrators) have other ideas about the role computers should play in the classroom. The computer is seen as an "instructional tool", a fantastic new delivery medium that

teachers can use to expand their influence beyond the ordinary limits of time, space and human patience.

In this paper, I will explore a current teacher-administrator vision of classroom computing and identify some of the factors that keep computing "instructional". Next I will suggest some strategies that principals might use to encourage teachers to move toward viewing the computer as a "productivity tool" for their students. I will close with some comments on how the instructional view of computing works to prevent substanitive change in our secondary schools.

VISIONS OF CLASSROOM COMPUTING

To avoid misunderstanding, let us begin by differentiating clearly between "instructional use" and "productivity use" of computers. Instructional computing includes a variety of methods of managing and delivering curriculum and student evaluation. The familiar five "C's" come under this heading: Computer-assisted-instruction (CAI), computer managed instruction (CMI), computer based instruction (CBI), computer aided learning (CAL) and computer aided teaching (CAT).(Lawton 1982;50-55) We might apply the title: Computer as means of instruction, to these uses. Other instructional computing subjects are: computer literacy, computer science, and computer programming. These three might be more appropriately entitled: Computer as object of instruction. There is some variation of opinion about who should qualify as computer literate. Many proponents feel that "anyone who has written a program" has paid the appropriate dues (Nevision 1976) while others have stronger programming requirements (Leurhman

1984) or components of history, terminology, and social implications (Klassen 1981). But all agree that information about computing forms the bulk of the curriculum to be studied.

The literature of computers in education is replete with suggestions and arguments about the methodology, impact and effectiveness of instructional computing - both the "computer as means" and "computer as object" varieties. One can even find reference to use of computers as "Tool, Tutor, and Tutee" (Region VI TECC Center, 1983). But further investigation usually reveals that "tool" means tool for the teacher to use in delivery, management or evaluation. When the "tool" reaches the hands of the student, it will be applied only as a "tool for solving problems" defined and presented by the teacher. A search for published discussion of in-school use of the computer as a tool for use by students under their autonomous control yeilds little fruit.

A few peachy references do show up if one is persistent. Marc Tucker comments:

> "What is important, in my opinion, is helping the student to acquire the skills necessary to use the computer as a powerful tool in a wide range of applications, a tool at the service of the student. For some students, the power of this tool will come through an ability to program it, but for many it could and should come from knowing how to use the computer, its peripheral equipment, its associated telecommunications systems and off-the-shelf applications programs, to get things done - how to use it for writing, editing, getting and analyzing information, making drawings and graphs, doing differentiations in mathematics, recording and interpreting laboratory data, and countless other tasks. These are the skills likely to be increasingly important over the years for vast numbers of present day students." (Tucker :316)

These computer applications, often called "productivity tools" in the lingo of office automation are no different when

used by students than when used by office clerical staff or business executives. In fact, teachers are beginning to discover the secret of computerized productivity tools for themselves. When asked to rank tasks in order of importance, teachers in one study responded: 1) select courseware, 2) integrate corseware, 3) help students with special needs through understanding principles of instruction, 4) do word processing,... "However, if only those with a personal knowledge of particular applications were considered, the items above ranked; 4 [word processing], 1 [select courseware] ..." (Goddard, 1984:14). Word processing was ranked as the most important task, leaving courseware selection to second place. In other words, those in the know know that productivity tools such as word processing make it worth while to learn to operate a computer.

Although teachers are beginning to realize that productivity tools exist, the prevailing attitude was expressed by this comment from an instructor from the San Mateo County TECC Center at the 1984 West Coast Computer Faire in San Francisco:

> "Oh, no, we don't teach advanced programs like VisiCalc. Our students [teachers] are still beginners - they're learning to program in BASIC.

This teacher of teachers was evidently unaware that it takes several days, if not weeks, for an individual to produce a useful program in BASIC (some of us never do achieve that goal) but that most people who sit down with VisiCalc or a similar spread sheet application program experience gains in productive output within a few hours.

FACTORS FAVORING INSTRUCTIONAL COMPUTING

The step from teacher use of productivity tools to student use of those same tools should be an easy one. Why isn't it happening in classrooms? The answer is documented in thousands of articles about introducing computers into schools. They discuss the development and use of "educational software", not application programs. They assume that the teacher's role is to transmit the facts and skills of the curriculum, to "instruct". The computer is seen only as an instrument to augment that role. Teachers produce lesson plans, lectures, grades, dittos, assignments and student gains on test scores. Software that helps in these tasks, no matter how crudely, is offered to teachers.

The factors identified so far, teacher ingnorance compounded by uninformed teacher trainers and reinforced by a one-sided literature would be sufficient to seriously hamper any teacher who set out to acquire knowledge of productivity tools and then to transmit this knowledge to students. But the problem gets worse when we consider the roles teachers see themselves and their students playing.

The step from teacher use to student use cannot be taken until teachers really do use general purpose productivity tools for themselves. Teachers simply do not have time to master all possible uses of computers. Until we stop encouraging them to become masters at curriculum development and complex computer programming - all within a single summer "vacation" - they will miss the personal advantages of word processing, spread sheets,

simplified data base management packages, and electronic communications.

Not only are teachers naive about their own productivity, they rarely think of their task as one of increasing the student's ability to produce his own learning. Almost nowhere is the teacher presented with Arthur J. Lewis' point of view that:

> "we can encourage students to assume responsibility for their own learning - to become self-directed, lifelong learners. The ultimate goal of education is to shift to the individual the burden of his or her own education. (Lewis, 1983:10)

Teachers present the opposite point of view by placing themselves between the learner and the subject matter to be mastered. When they choose this strategy in computer use they are under constant fire to acquire skills at a formidable pace just to keep up with some students. Some teachers react by refusing to allow students to use productivity tools at all.

Why might a teacher not wish to permit a student to use a word processor, spread sheet or data base management program to prepare work for class credit? Because to do so will require adjustments in student evaluation, teacher pedagogy, and the teacher's role vis-a-vis the student. For example, the teacher can no longer give credit for spelling, arithmetic, or a "normally neat" presentation. Just how much improvement in content should be expected when the student no longer has to retype after editing? How can a naive teacher evaluate "help" received by the student from parents, friends, and software? And how does a teacher cope with a student who has demonstrated the motivation and the capacity to master the use of this computer

tool ON HIS OWN, without the guiding hand of the teacher?

The consequences of keeping computing "instructional" are now being seen in schools around the country. As Decker Walker points out in "Computers in the Curriculum," (Walker, 1985) the current mechanisms for curricular change are on overload. We can't design courses, develop materials, train teachers and obtain equipment fast enough. Worse yet, there is a perceived need for "educational software" that noone seems to be able to supply. Many advocacy groups, including National Commission on Industrial Innovation and Apple Computer's "Kid's Can't Wait" program are attempting to use what Walker describes as "intervention from higher authorities." Such use of political pressure may succeed in getting hardware inside the school building, but the same bottleneck is encountered at the building level - untrained teachers, difficulty in integrating computing into the existing curriculum and lack of software.

Walker's third strategy, that of sidestepping the formal school program and acquiring computing skills through alternative channels, solves half of the problem. It gets some kids using computers. However, it exacerbates the equity issue which we will discuss further below.

The fact that many parents are seeing to it that kids have access to computers and their accompanying productivity software places many public school teachers in an uncomfortable position. Either they must permit the use of computer output in their classes or they risk losing all credibility in the eyes of many students.

PRINCIPAL TO THE RESCUE!

The development of this dilema signals a critical turning point in the use of computers at any school. It is important that the classroom teacher receive strong support from the principal and the district or the road taken is likely to be drill and practice administered under strictly controlled access conditions. The teacher must be provided with the opportunity to become an active computer tool user so that he or she can understand and share in the changes that the students are experiencing. Opportunity often takes the form of a computer in the teacher's lounge (Lee 1983) and the availablity of software of the same type the students are using. In addition, manuals, magazines, and knowledgeable personnel (often another teacher) need to be identified and at hand.

The building principal is likely to be uniquely positioned to mobilize space, "emergency funds", and staff assignments to optimize the acquisition of computing skills by the teachers. He can set an emotional tone that favors encouragement of student use of computer tools without requiring the teacher to be an expert on every piece of software the students use.

The principal can also use the authority of his or her office to face the problem of equal access to computing facilities for all students. High priority can be given to having at least one computer with productivity software available to students in a resource center or library during school hours. If campus facilities are off limits to students after hours, the principal can make arrangements with public libraries and other

community facilities to insure that students who do not have private computing sources can use the public ones (Loop 1982). Equity problems are not easy to deal with but limiting computer use to structured drill and practice for set periods of time is no solution at all.

SUBSTITUTE OR SUBSTANITIVE CHANGE?

Now that we have come full circle - back to that paradigm of instructional computing, drill and practice - let us see if we can understand how computing might be used to maintain the status quo in schools. The argument rests on George Spindler's notion of "substitute change" and "change in principle" (Spindler 1985). Substitute change occurs when a new technique or "instrumentality" is adopted for performing the same task by the same people. Spindler offers the example of substituting a gas-powered rototiller for a horse-drawn plow to prepare field for planting. The same farmer uses a new technique to perform an old task. There may be some increase in speed and capacity with an accompanying decrease in labor required. However, the same field is plowed by the same person. Now consider change in principle - owner ship of the fields is consolidated, large, high-speed cultivator-planters are employed by entirely different personnel. Such a change has major impact on the daily life of the farmer. A change from delivery of curricular material by the teacher through books and lectures to the delivery of the same material via computer is a substitue change. It permits the maintenance of a teacher-centered classroom within which a constant body of facts and skills are transmitted to the student. The addition of six to eight weeks worth of facts about computers or a new course

in computer programming does not constitute change in principle for a school.

The introduction of computer-based productivity tools for student use is a small change, but it is a change in principle. It acknowledges that the product of schooling is learning, not teaching. Further, it establishes a partnership between the student (or learner) and the tool. It is the beginnig of a schoolwide shift predicted by futurists, from CAI and CMI to computer applications and programming (Dede 1983). But it is also a hope shared by more conservative educators such as Henry Levin:

> In our view there must be a greater component of problem solving, analytical reasoning, reading, and writing across the curriculum, rather than limiting instruction in these areas to specific courses...the computer should be considered a tool for learning rather than a subjec that will dsiplace mor fundamental learning required for an educational foundation. (Levin, 1983:55)

John Holt, George Leonard, Herb Cole and scores of other radical educators of the sixties accused the schools of blindfolding the children and holding them back from the real learning of which they were capable. Many of us who helped to bring computers into classrooms in the seventies thought we were importing an educational Trojan horse which would help students to tear down the constricting school walls from the inside out. Today we see our valiant charger giving educational pony rides while parents and politicians alike decry the impending downfall of our civilization because the educational systems is failing to prepare the next generation for responsible, creative adulthood. Can anyone believe a problem of such magnitude is soluble with "better educational software?"

REFERENCES

Computer Training Opportunities, Course Announcement Brochure from Region VI Teacher Education and Computer Center, Hayward, CA, September-November, 1983

Dede, Christopher; "Likeley Evolution of Computer Use in Schools" in Educational Leadership, v41 n1 p22 Sept 1983

Goddard, William P.; Pereira-Mendoza, Lionel, "Three Perspectives for Computer Applications in Education", in AEDS Journal, v17 n3 p14-23 Spr 1984

Havelock, Ronald, G. The Change Agent's Guide to Innovation In Education, Educational Technology Publications, Englewood Cliffs, New Jersey, 1973

Jackson, Roberta; "Learning With and About Computers" in Computers in the Schools, v1 n3 p65-71 Fall 1984

Klassen, Dan; "Computer Literacy" in Harper, Dennis O.; Stewart, James H.; RUN: Computer Education, Brooks/Cole Publishing Company, Monterey, CA; 1983

Lawton, Johnny; Gerschner, Vera T.; "A Review of the Literature on Attitudes Towards Computers and Computerized Instruction" in Journal of Research and Development in Education, v16 n1 p50-55 Fall 1982

Lee, Helen C. "How to Lure Teachers to the Michocomputer" in Principal, v62 n3 p26-27 jan 1983

Levin, Henry M.; Rumberger, Russell W.; "Secondary Education in an Age of High Technology " in NASSP Bulletin, v67 n467 p49-55 Dec 1983

Lewis, Arthur J.; "Education for the 21st Century" in Educational Leadership, v41 n1 p10 Sept 1983

Loop, Liza, Anton, Julie, Zamora, Ramon; ComputerTown; Reston, VA, 1983

Nevison, John M.; Computing as a matter of course; the instructional use of computers at Dartmouth College; Kiewit Computation Center, Dartmouth, N. H.; 1976

Tucker, Marc; "computers in Schools: A Plan in Time Saves Nine" in Theory Into Practice, V22 n4 p313-320

Walker, Decker F.; "Computers in the Curriculum" photocopy of typescript from author, Stanford University, 1985