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## EVALUATING CHILDREN 'S LEARNING WITH COMPUTERS: A SENSIBLE APPROACH

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Main idea: Our research with young children's learning must be based upon careful observation and thoughtful questioning - a qualitative approach.

Introduction: The USA is seeing the end of a decade of conflict in the research community.

While most contracts and power have been held by researchers with a quantitative orientation, the balance in recent years has shifted to emphasize qualitative ways. The quantitative approach uses standardized tests extensively, expects to measure numerically, and uses "statistical significance" as the "bottom line" (a term from business & accounting). Increasingly, researchers are studying more powerful tools. An example would be a doctoral dissertation proposal I reviewed before coming to Peru, proposing to investigate with statistical tests the effects of slight variations in ink color and paper tint on resumes for job applicants. As a doctoral research study, using the powerful tools available, I felt that it should don't be done.

A second more qualitative approach, is gaining acceptance, as its proponents assume positions of leadership in professional associations. (Eisner in the AERA, Letterman & Lincoln in the American Evaluation Association). Over half of the members of our national research association consider themselves "qualitative researchers". The approach is exemplified by the cultural anthropologist, who asks broad questions first and spends extended periods of time living in the settings trying to understand the unique culture.

For the past five years I have been working 1/4 time as a qualitative researcher, an ethnographer, for a federally funded project the Comprehensive Child Development Project, administered by the agency that funds Headstart in the US. Our site in Utah is one of 36 sites nationally - some in rural areas like ours, some in inner city setting, one on an American Indian Reservation. My argument today is that this is an important kind of research, that it requires extensive time to observe and ask questions. I believe that this kind of research is needed in researching the young child. A leading authority on use of computers is Dr. Seymour Paper T the Massachussets Institute of Technology (MIT). Papert was a co-founder of the World Center for Computers, France where I spent money year in 1983-84. In his recent book, *The Children's Machine: Rethinking School in the Age of the Computer*, he states:

"The method of controlled experimentation that evaluates an idea by implementing it, taking care to keep everything else the same, and measuring the result, may be an appropriate way to evaluate the effects of a small modification. However, it can tell us nothing about ideas that might lead to deep change. One cannot simply implement such ideas to see whether they lead to deep

change: A mega changed system can come into being only through a slow, organic evolution, and through a close harmony with social evolution. It will be steered less by the outcome of tests and measurements than by its participants; intuitive understanding".

What does this mean in practice? It means that you have to spend extensive periods of time observing how children learn. You have to ask thoughtful questions, make inferences, and take extensive notes. And you have to write down your reflections afterward, starting with an open mind and letting the guiding concepts emerge, rather than beginning with a set of formal research questions or hypotheses. And that approach is hard for the "traditional" quantitative researcher to support. It's messy. It takes more time. It's less predictable. But it gives results that are meaningful and important.

I want to end with a short story that illustrates how difficult it is for people to stay with the investigation of young children's development. It happened at a conference in July for the Project Directors and ethnographers of the Comprehensive Child Development Project.

The ethnographers had been meeting for a full hour on a Wednesday morning. Our fifth such meeting since the National Project began in 1991. At the end of the morning break, we were asked to form into 4 committees by sitting at a specific table to discuss the concerns of one of 4 groups: the child, the parents, the family, and the community. Some of us were sitting around a table and 2 of us chose the topic for our groups - the child. But in the next 5 minutes, most of the group got up and moved to another table. Maybe they were not interested in discussing the concerns of "the child" or maybe they were just more prepared to discuss the other topics.

But after they left, the 4 or 5 of us who were left began by discussing why, in a project supposedly centered on "Child Development", many of our group would choose not to discuss from the child's point of view, and even be uncomfortable representing it. And then the reason began to emerge. One person noted: "When I began to work on this project, I spent lots of time observing children, but over time, to respond to the questions imposed by the federal government's guide-lines, I've gotten away from that". In fact, we have been asked to write specific reports (30-60 pages, typewritten) on topics like "the impact of the CCDP on the community", the change in employment patterns of parents, the reasons for families dropping out of the project, etc. All of us reported experiencing a drop in enthusiasm as our work had been more and more directed away from children. Some of the group had hired teaching assistants to do the duties of observation, some had redirected their efforts more towards adults (staff and parents) but all had seen a deliberate redirection of their efforts in the project's later years.

I was chosen as the spokesperson to report back there results of our group's discussion. I stated that I felt that the people leaving the table devoted to the concern of the child was metaphoric of how each of us, in our own way, had been subtly redirected from direct work with children toward more adult (and more academically respectable) themes and in a project where the major focus is child development. And I find that same kind of redirection occurring in research constantly, from what happens in direct experience with learners to delegating observation to graduated students and trying to superimpose grand theories of what should be happening. I

believe that our research must get back to direct experience with the child's world asking skillful, probing questions, and thoughtfully reporting what really goes on.

## REFLECTIONS ON TEACHING AND LEARNING WITH COMPUTERS

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Main idea: Computers for learners of any age, especially the young child, must emphasize direct experience.

I have been in Peru for only two weeks now, and have been learning new things each day. A rather humorous incident occurred in the first week I was here. Let me read you the entry from my journal (8/14/95):

When I was shown the technology lab at the Leon Pinelo School, I commented on one of the bamboo fences outside, asking where the bamboo came from. Sheyla answered that it was from Peru, that bamboo grows right in Lima. Then I heard her say jokingly to Eddy Luque, the administrator accompanying us: "So we bring him to see our high tech school and what interests him? Bamboo!"

While that statement was humorous at the time, the intent of the question was serious. Because one of my roles in the United States is as leader of the Boy Scouts. As a Scoutmaster, the boys in my troop (ages 12-14) learn skills in "Pioneering" which involves lashing logs together with ropes. For example, with one group, we built a signal tower some 4 meters high. With another group, we constructed a bridge across a small river. My thought when seeing those bamboo poles was: What amazing things our scouts could make by lashing those poles together. Similarly, I have worked as a volunteer art specialist in the elementary school class my son is in, doing a favorite art project with straws and telephone wire to make geometric shapes. The different classes have shown amazing amounts of creativity for their ages in making pyramids, boxes, and other three-dimensional objects. In my mind, the bamboo poles or the common drinking straws have a similar purpose: to allow young learners to express themselves in exploring three dimensional spaces. I believe that these exercises -- bridge building or model building -- will help the new learner to visualize in three dimensions and may someday result in sculpture or housebuilding with serious purposes.

For me, the computer must be tied to personal experience in similar ways. To be effective, the computer must be a tool to enrich a student's life, to allow more meaningful interaction with the student's environment. Our job as educators is to recognize the value of different types of thinking in our students and to encourage them to express their own values and messages with elements of the environment. Papert (1994) speaks of our use of different types of learning as "bricolage" a French word meaning tinkering or fixing by successive efforts.

I consider myself to be quite utilitarian in my approach: whatever works is useful and should be encouraged. My university classes often involved working on real projects, for real clients. For example, last quarter, my class on evaluation did projects for Josten's Learning Corporation, evaluating software for them, and for another university's development of a design for a videodisc for Russian language instruction at the elementary school.

Thus, at the preschool level, I would avoid exercises that take the child to a level of abstraction beyond that which is meaningful. If the child knows no numbers or letters, I would not use the computer in a way that required keyboarding. Use of a mouse or touch screen would be useful, but only if their use allowed the child to do something playful or imaginative that could not be done in another way. I believe in that the preschool years and kindergarten years, to paraphrase Piaget, "the work of the child is play." The exposure to the computer, if it is to be valuable, must be meaningful in the child's terms, and most frequently that involves play.

My son Michael now 9 years old, frequently stops by my office and tries out programs on my computer. He often chides me for having nothing but boring programs on the computer: I should have more games, he says. So over time, I have added more games, and that has been a learning experience for me. I think as educators, especially with young children, need to relax our ambitious expectations and allow children to do things that are meaningful (and often involve play). Even better, as we can see with Logo, is to allow the child to build something of use to himself or herself -- a picture, an animated figure, the movement of a turtle, for example.

It is in that spirit of meaningful play that I would want my own children to be exposed to computer. I want them introduced to computer culture, because I believe that culture will play a more powerful role for their generation than it has in shaping ours, but more than that I would want them to gain a sense of self-efficacy that will encourage them to use the computer to "widen their world" in the years to come.