

# In School or Out:

## Technology, Equity, and the Future of Our Kids

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In January, Newt Gingrich proposed a tax credit for the poorest Americans to purchase laptop computers, forgetting, for the moment, that the poorest Americans do not pay taxes and thus a credit does them no good. In this case, his heart may be in the right place, even if he later called the idea “nutty.”

Those who like to make prognostications say that we all need to have access to computers and to the network that will make us productive. That’s not presently possible for a good portion of the poor and minority children in our country. They are unlikely to have a computer at home and, in many cases, their schools don’t have enough computers for students to use more than an hour or two per week, and few schools have connections to the Internet anyway.

If you read the paper or listen to the nightly news, you don’t need to hear more statistics about the dramatic inequities in our nation — inequities reflected in many of our institutions, especially in the schools. There are differences in available resources, in facilities, in achievement, in health and safety, and in the pedagogy of the classrooms. The inequalities are often associated with race, sometimes with gender, but almost always with economic power. Kozol (1991) writes vividly about schools, and neighborhoods, and entire school districts that lack the economic clout to provide a safe and healthy educational environment in which students can learn. Computers, like many of the resources for teaching and learning, are not distributed equally, are not used in the same way, nor do they achieve the same impact in all schools around the nation.

This article is about equity and the use of technology for teaching and learning, focusing on children in the elementary and secondary grades. While much of what we know about equity comes from schools, the opportunities outside of schools to deal with the problems are substantial. At present, we can do more to influence computers in the schools than we can to attack the inequities in homes, but it may be in the homes or in out-of school settings where the future will be found. First we need to know how the battle has been engaged.

Just as with the statistics of inequality, we may no longer need a statement of public policy to accept equity as a public goal. How we define the term may be up for discussion, but not the notion that, whatever the criteria, we need more of it. I’m using equality as a quantitative description of parity or an allocation of resources. Equity is a qualitative construct referring to judgments about justice or fairness. Achieving equity may actually require the application of inequalities. For example, poor children have little, if any, access to computers at home, and if access is related to learning and competence, then for schools to provide equity,

they may have to give poor children more in-school access — an inequality of access for those wealthier students with computers at home.

Most of the indicators we use to assess how close we are coming to achieving equity are measures of equal apportionment, and the usual analysis covers three concerns: gender, race/ethnicity, and social class. The research evidence consistently indicates that computers, as well as other technologies, are not distributed equally among — nor are they used equally well by — all students in our schools. Poor, minority, and female students have less access to computers at home and less access to computers at school. Over the past decade or so, these inequities often led to preventive and compensatory efforts.

### **Gender Equity**

Efforts to increase the participation of girls in math and science started soon after Sputnik and were in full swing when the earliest desktop computers began to enter schools. Since many of the earliest adopters of computers were science and math teachers, researchers quickly discovered discrepancies in the gender of students studying computer science. Girls did not report having the same interest in, access to, nor did they do the same things on computer as did boys. And to confound the data, most teachers believed that computers were a male technology, with little meaning for the future careers of females.

A few educators created programs to encourage girls to study computers and computer science, especially in afterschool clubs. These were places where girls could demonstrate their skills without competition and pressure from boys. Importantly, teachers were also provided with inservice programs to teach them ways of encouraging girls to participate more in math and science classes and to sensitize teachers to the appropriate ways to involve girls “fairly” in classroom computer activities. It turns out that these kinds of interventions do indeed change teacher attitudes and generate more equitable access to computers in school.

Strong gender differences are emerging again, as new technologies become available. Most of the CD-ROM games are of the “twitch-and-kill” variety, made by 24 year-old boys for 14 year-old boys. And it also seems that on Internet, the preponderance of users are male. A look at some of the chat room dialogue will give you an idea why females stay away.

### **Racial/ethnic and social class differences**

Racial and ethnic characteristics and social class have a great deal to do with the kinds of computer use we find in schools. Instructional practices used for poor and minority children can be distinguished from the more ambitious “best practices” found in wealthier areas. Students in poorer schools receive a different — and qualitatively poorer — kind of instruction, using different materials and resulting in inequitable outcomes. They receive fewer of hands-on and higher-order thinking activities that engage young minds and help them to think critically, write better, and develop the groupwork skills they will need in the workplace. Moreover, these students don’t have many opportunities to explore fine arts, practical and life skills, and other enriching curriculum areas.

Inner city schools may also “feel” different than more affluent, suburban educational settings. Order may be more important than learning. Sitting quietly, at the desk with your hands folded is valued; discussing problems and working with your neighbor is not. Doors stay open so that the principal can walk by and see that instruction is taking place. Equipment is stored in locked closets and can be obtained only by signing up a week in advance and, if the union rules let the custodian do it, he will open the closet door for you at a specified time. Computers are in laboratories and all students present will be working on the same activities at the same time.

This is not unusual, not exceptional, nor is it universal. There are programs that engage the imaginations of students, that involve teachers and administrators, that deal with higher-level thinking and problem solving — and that use computers and other technologies productively.

### Access

This nation’s elementary and secondary schools, both rich and poor, have limited numbers of computers and provide their students with relatively limited access to them. Even with hundreds of thousands of computers purchased each year, the ratio is one computer for every fourteen students, expected to be 1:10 next year. Moreover, the average school computer is more than five years old and is most likely to be an 8-bit machine, unable to use the software developed over the past few years. Schools use a five-year purchasing cycle and even so, at the current pace of change, Windows 98 will be out before most schools can run Windows 95. Old computers are not discarded, they migrate to other grades. Schools want to grow the installed base, not develop a consistent and high level of capability. And it’s easier to get an Apple IIe repaired in some schools, than to get it replaced.

According to the 1994 data from Quality Education Data (QED), students in poor schools have even less access to computers (and CD-ROMS and modems) than their counterparts in rich schools. As the percentage of students who qualify for Title I funding (a compensatory education based on low income and low achievement) increases, access to computers goes down significantly. As with poor students, students in schools with high percentages of multicultural students have less access to computers. While both differences are statistically significant, the disparity is greater for multicultural settings.

To make matters worse, poor, inner city schools and the richer suburban ones use those computers differently. Students at risk of school failure, often racial minorities, and often in urban, inner-city settings, tend to receive instruction using the computer for isolated skill development and remediation — they work on drill-and-practice programs — and never get beyond repetitive applications of basic skills, such as computation and the mechanics of written language. Here they can repeat their errors and practice skills that will be assessed on standardized tests.

While at-risk students use software focusing on skill development, their teachers are often the least prepared to take advantage of the computer. Large inner city schools tend to group computers in labs, so that an entire class can use

the technology at the same time. Their teachers drop their kids off at the lab for computer work, and there is little connection between what is being done in the classroom and what is attempted in the computer lab.

In contrast, suburban schools and wealthier urban schools, tend to use computers for more independent and creative functions. They are more likely to have distributed computers into classrooms, in addition to have centralized business and writing labs. Rather than drill-and-practice, these students use word processing for creative writing, do science simulations and develop conclusions based on evidence, accomplish meaningful tasks in problem solving and critical thinking. Rather than the teacher or the computer directing all aspects of their classroom instruction, these students have more responsibility for their own learning, especially their learning on the computer.

The low SES students gain most of their experience with a computer when it is in control: asking questions, expecting a response, and informing the student when he or she was correct. In contrast, the high-SES students gain considerable experience when they are in control, giving the computer a series of instructions, and observing the consequences of these instructions. (Sutton, 1991)

### **Equity as access to technology**

We might take a lesson from the history of “Sesame Street.” The concept for this television series emerged when researchers noted that the knowledge of children who were entering school from families in poverty differed dramatically from those children from more-advantaged homes. So Sesame Street was designed to narrow the gap between the haves and the have-nots by raising the knowledge floor for at-risk children. As a consequence, these kids might be able enter school knowing as much as their suburban cohort. As it turned out, after the first year or two of availability — even with outreach programs to the homes of at-risk children — the gap between rich and poor widened further. Studies conducted by ETS showed that when children from suburban homes watched the show, often with parent and child watching together and discussing the material, their scores went up even more than the urban kids for whom the program was designed. And middle class homes tended to watch more often, increasing the amount of learning taking place.

This is not to suggest that we take Sesame Street away from everyone who is not at-risk, rather that we need to figure out more ways of providing information and developing skills to those children we are currently missing at home and in school.

Out of the concerns for providing better quality learning opportunities for children came the belief that equity meant equal access to technology. In practice, it meant providing every school with at least one computer, or one VCR, or one videodisc player, or one copy of a piece of software — regardless of need or ability to use it effectively. Larger schools (mainly in the inner cities) often complained that, proportionately, they were on the short end of the stick and needed more equipment because of their school size. But middle class clout helped to direct technology equity efforts at the state level, so that every building got something.

The idea that access to technology equals use (appropriate or not) of technology is a fundamental and troubling fallacy in the equity struggle. Without sufficient support, staff development, software, continuing technology upgrades, and so on, there is no equity. Without the belief that it is important — more important than practice test-taking, than football practice, than doing another drill sheet, it will not have the same power that it does for white students in upper middle class schools.

This fundamental assumption — that computers make a difference in learning, a difference that is meaningful and cost-effective — is not always supported by the research. Computers can be useful in improving learning or they can be a distraction and time filler; the choice is made in the classroom and the home, not the manufacturing facility. The real changes in learning come from interventions not from hardware. We want to alleviate the inequities using technology, not create equal access to inadequate instruction.

### **Equity for Better Education**

Educators and policy makers need to consider how we can use technology to improve the education of at-risk children. Often these children do not need technology as much as they need a reason for attending school, higher expectations for success, and the institutional structure that provides them with a means of support. They also need access to ideas and information that match abilities and interests.

How can we use technology to provide these children with a better education? Ensuring that schools have the same amount of equipment will not do it. Providing schools with teachers who care and know enough about how to use computers effectively will help. Installing a technology infrastructure without a reason for using it does not help. Refurbishing a building and making it beautiful and safe, does. Making certain that children have enough to eat and warm clothes to wear in the winter, is also a good starting point.

We need to explore strategies that tackle some of the equity problems facing our children (and adults).

### **Technology to make connections between home and school**

Disadvantaged schools lag behind other schools in their connections with students' families. The two major educational resources available to disadvantaged students — parents and teachers — are not receiving the training and guidance they need to be more effective in helping these students succeed.

As long ago as the early 1980s, Houston, Texas schools were pursuing an aggressive program to provide equity for disadvantaged, at-risk students and equality of access and use of computers. To reach out to the families of inner city students — to create greater equity with more affluent students — the district developed a range of activities including: a software library for parents, computer camps for disadvantaged students, parent training and loaner computers, business-school partnerships, technology magnet schools, and mobile computer classrooms.

In inner city Oakland, children are connected by computer and modem to suburban schools to share ideas and resources — and work together on common

projects. Extending the schoolroom into the larger world is a motivating and enriching experience for inner city children. In another disadvantaged Oakland school, donated 286's are sent home for the semester, so kids can do homework, play educational games — and get their parents involved with the school.

The school-home connection has been carried much further by the Buddy Project in Indiana. Students in fourth grade receive a computer, printer, and modem to take home and use until they go on to middle school. For most of the families, this is the first computer in the house — and it is almost always the only one available to all members of the family. Students receive instruction in school about how to use computers, and are taught how to help their parents and siblings learn. Parents, too, can attend afterschool sessions to learn more. And through telecommunications, parents and teachers can communicate, everyone knows what the homework assignments are, and kids can work together after school on projects.

These examples are but a few of the programs currently underway that use technology as part of larger efforts motivating at risk children. Most of these programs are not yet widespread, and all require the intervention of a well-prepared instructor, as well as specified technology. But these were selected because they have made an effort to create a larger community for at-risk students.

Hornbeck (1992) notes that “the single greatest obstacle faced by poor and minority students is the low expectations most have for their performance. Expectations are powerful, self-fulfilling prophecies.” Students' self-concept is improved along with attitudes towards school and towards the subject being studied, when students master and can demonstrate skills using technology. Even if teachers do not change their expectations after direct experiences of student performance, the other students in the class will. Computer expertise, just as other special skills, is a valued commodity outside of schools, especially as students get closer to the job market.

### **Equity as a valued social policy**

While talking about equity is easy, acting as if it is an important moral imperative is not so easy. School boards and policy bodies often deliberate and discuss the need for equity, but they usually find it easier to provide equality of resources rather than equity of outcome. The challenge of equity is also its threat to the established order. If we as a society are troubled by the poor education many are receiving, if we are worried about a workforce that cannot compete internationally or even provide satisfactory efforts on the job, if we are discouraged about a growing underclass that is unable to participate in the larger society, if we are upset about a troubled economy, then doing something about the education of all children should be a central policy and practical activity.

The difficulties are not caused by inequities of technological resources, but of more fundamental issues including access to health care and nutrition, early childhood intervention and support efforts, employment and training opportunities, the development of community role models and leadership structures, and so on. These are the focus of ongoing societal struggles and change efforts. But we also know that technology is a leadership issue, engaged by

school boards in rich and poor districts alike. There is a status in having the biggest and latest toys that should not be underestimated. That is why the wealthier districts have the toys, even if they are not needed to meet the instructional needs of more advantaged students.

Technology serves as a symbol of a school's ability to prepare an educated and qualified workforce, and local and state policy makers must tackle the more difficult issues of getting to underlying educational needs, not merely providing equal numbers of multimedia stations. Schools boards need to see that technology is used, not for window dressing, but for substantive efforts to provide appropriate and improved instruction for those who need it the most. And resources are needed to provide support for at-risk students; they may need more and more powerful computers, a systematic means of upgrading their technologies, and instructional strategies that make sense for a population that has very little opportunity other than through schooling.

Solutions to equity problems — whether gender-, race-, or economically-related — will take time and money and, more importantly, a public moral commitment to reach this goal. People do not resist change, rather they resist the social and political consequences of change. We need to move the change effort to letting others move up the educational ladder — and use technology effectively to accomplish it.

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