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ABSTRACT

Research on new information technology suggests that it can be a very effective teaching and learning tool, but there is much to learn before it can be used to its fullest potential in the classroom. Internet connectivity has become more available to rural areas, but inequity of access still remains a problem. Rural schools and schools with high percentages of low income or minority students have lower rates of Internet access than urban schools and schools with low percentages of low income or minority students. Households in rural areas are less likely to have computers or Internet access than those in urban areas. Technological inequality is more pronounced in parts of the rural South, reflecting a legacy of racial segregation. Although most schools are connected to the Internet, most classrooms are not. Investments in new instructional technology must include funding and time for professional development of teachers. Much current staff development does not address skills needed to move beyond replicating familiar classroom activities on a computer. Training is also needed for administrators, many of whom completed their administrative training before the emphasis on computer applications. With rapidly changing technology, constant efforts are needed to keep abreast of new developments. Access to technology may enable the neediest schools to overcome the effects of poverty and isolation, improve their educational quality, and allow students to become the technological leaders of the future. (Contains 17 references.) (TD)

THE RURAL SOUTH: Preparing for the Challenges of the 21st Century

Sponsored by the Southern Rural Development Center, the Farm Foundation, the TVA Rural Studies Program at the University of Kentucky, the USDA Economic Research Service and the 29 Southern land-grant institutions.

Challenge and promise: Technology in the classroom

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No. 18, March 2001

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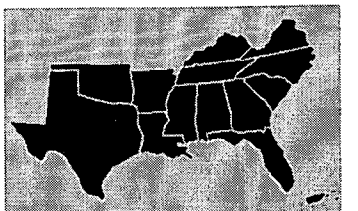

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Introduction

There is nothing new about technology in the classroom. Many of us remember the use of filmstrip, slides, phonographs, audio tape and movie projectors in the classroom when we were in school. In the 1930s and 1940s, radio was used to reach rural classrooms. Then, in the early 1960s, an airplane circled over southern Indiana broadcasting courses to schools across a wide region.

At about the same time, Kentucky moved to the national forefront, establishing a statewide educational television microwave network that gave rural schools access to classes and services they could not afford on their own [11, 12]. Now, all states across the South provide satellite transmission of courses [16]. While there were virtual high schools in the South already, Kentucky reportedly became the first state in the country to set up a statewide virtual high school in October 1999 [1].

There are several newer, cutting edge technologies now used in classrooms. They include the World Wide Web (Internet), television satellite broadcasts, compressed and interactive video, and courses using computer software. Satellite courses, however, have been around for some time and still serve the most students [16, 8]. The newest wave of technology has spread rapidly and research on some of this technology, such as television and certain forms of computer software, suggests that it can be effective in the classroom. Still, we have much to learn about using the World Wide Web and the latest forms of computer software.

Two Overriding Issues

This policy brief will address the use of technology in the classroom by considering two overriding issues and their impacts on rural schools in the Southern United States. The first issue being the relationship between technology and uneven economic development, social class, and racial and ethnic inequities.

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These complex factors form the basis for current discussions about the so-called "digital divide." The focal point of this discussion is access, not only to affordable telephone service, but also to computers and networks [9]. The second issue pertains to what goes on in the classroom. If you were to observe most classrooms today, you would find that little has changed since the nineteenth century despite major technological changes. For the most part, teaching continues to be based on a pedagogy of lecturing and recitation. This leads to the unanswered questions of: How will the most recent technological revolution actually change the process of teaching? Will new technology have a positive impact on student achievement?

Both of these issues are linked by dissimilarities in the rate of change in different places. Teachers don't adopt technology at the same time and access varies for regions and individuals. Issues such as these have already been recognized in laws and policies. For example, the federal E-Rate, which subsidizes rural school access to the World Wide Web, is one policy tool that has been used to insure access to this new technology regardless of location or fiscal resources. Regardless of acknowledgement, problems still remain. It is important to continue to recognize and manage technological change in a way that respects the diverse needs of students, teachers and communities across the South.

"Despite the rapid spread of Internet connectivity, inequity of access remains a problem."

The Problem of Access

Generally, rural schools report they have adequate access to computer hardware in the school [2]. In fact, a 1998 survey showed 81.8 percent of schools were connected to the Internet [13]. This figure was up from 35 percent in 1994 [17].

Despite the rapid spread of Internet connectivity, inequity of access remains a problem. Commercial investment in telecommunications infrastructure occurred in urban areas first, and was followed by weaker investment in sparsely populated rural areas [14]. In fall 1997, public schools with a high percentage of low-income students (71 percent or more of students eligible for a free or reduced-price lunch) were less likely to have Internet access than schools with a low percentage of low-income students (less than 11 percent of students eligible for a free or reduced-price lunch). At the same time, public schools with a high minority enrollment (50 percent or more) had a lower rate of Internet access than public schools with a low minority enrollment (less than 6 percent). Moreover, public schools with a high minority enrollment had a smaller percentage of instructional rooms with Internet access than public schools with a low minority enrollment [17].

Statistics also showed that rural students were less likely to have Internet access at home. Supporting data provided by the National Telecommunications and Information Administration, points out:

- At almost every income level, those households in rural areas are less likely to own computers than households in urban or central city areas.
- At every income level, households in rural areas are significantly less likely—sometimes half as likely—to have home Internet access than those in urban or central city areas.

- African-American households in rural areas are one-third less likely to own a computer and two-fifths less likely to access the Internet than the average U.S. African-American household [14].

While modernization and adoption of new technology have occurred rapidly in the South since World War II, the region still endures uneven development based on persistent geographic, socioeconomic, racial and ethnic inequities [18]. According to a recent study, small, rural schools nationwide with a low percentage of minority students are more likely to rank high in technology sophistication relative to the number of students having access to technology. Some Southern states that did not score highly on the index include Alabama, Arkansas, Louisiana, Mississippi and Oklahoma [7]. There is a continued legacy of racial segregation in the region's rural schools (where the vast majority of rural African-Americans in the United States live) [6]. Despite limited data, there is evidence to suggest that the quality of education provided in these counties is low, based on the low educational attainment of African-American children. More research geared to the availability of technology and its potential impacts in these schools is needed, but data from two sources suggests technological inequity in at least some parts of the rural South [13, 8].

The Issues

- Research of new technology suggests that it can be very effective in the classroom as a teaching and learning tool.
- There is much to learn about new technology before it can be used to its fullest potential in the classroom.

Problems of Access and the Classroom

- Internet connectivity has become more available to rural areas, however, inequity of access still remains a problem. This is commonly defined as the "digital divide."
- Despite the fact that most schools are connected to the Internet, most classrooms are not.
- There is a lack of investment in instructional technology that would allow teachers and administrators to adapt to the new technology and learn how it could be beneficial to their classroom. This includes the cost and time of teachers and students alike.
- With rapidly changing technology, constant efforts would need to be made in order to keep abreast of new and vital information regarding technology in the classroom.

Summary

- With access to the tools of technology in the classroom, many of the neediest schools might be able to overcome the effects of poverty and isolation. This would afford them the opportunity to improve the quality of their school, while allowing students to become the technological leaders of the future.

Information reviewed above suggests that although computers are now commonplace in most classrooms, many schools are not taking full advantage of the World Wide Web, email and other instructional tools. This problem seems to be directly related to income, race and geographic location, contributing to the creation of a "digital divide" between the have and have-nots. Networks and Internet access can link even the poorest, most isolated school districts to valuable educational resources such as libraries and "virtual field trips." It can also link teachers to other teachers and professional development resources, such as course materials and lesson plans [2]. Without access to these tools, many of the neediest schools are losing out on an opportunity to overcome the effects of poverty and isolation.

The Problem of the Classroom

New technologies do not seem to be used all that widely in the classroom. In 1997, for example, only 24 percent of instructional rooms in public elementary schools and 32 percent in public secondary schools had Internet access [17]. Most schools nationwide were connected to the Internet, but most classrooms were not.

Access to electronically delivered courses can benefit any high school student, but it is essential for students who: cannot get certain academic courses in their schools; need alternatives to traditional education; have physical difficulties or who have a prolonged absence because of illness; and home-schooled students. There already are a number of Web-based courses in use across the South, and there is widespread interest in increasing the number of Web-based courses for high-school students [15]. Generally, states using satellite instruction are focusing on higher-level, Advanced Placement and foreign language courses. These services, however, reach a relatively low number of students [15]. Also, the use of instructional software is extremely limited. A study in Kentucky, Tennessee, Virginia and West Virginia found that almost 84 percent of the teachers surveyed had never used instructional software [8].

"If teachers are not adequately trained and prepared, they will not use technology to the extent of its potential."

Investments in new instructional technology cannot be limited just to hardware and software. Professional development for school personnel is a critical component in the successful use of these technologies. If teachers are not adequately trained and prepared, they will not use technology to the extent of its potential. Other barriers to Web-based instruction include the cost and time of developing courses, the limited (less than 5 percent) experience of teachers and students who have used Web-based courses, and the need to closely follow students who are not self-directed or self-motivated. In addition, there are unresolved issues such as security, alignment with standards, ownership of courses, teacher workload, teacher contracts and quality control [15].

Barriers to the use of instructional software appear to include insufficient teacher preparation programs, lack of training and lack of time for training. Staff development does not address skills needed to move beyond replicating familiar classroom activities on a computer [8].

Two surveys by the Southern Regional Education Board found little connection between the drive to institute new technology and the capabilities of school leadership. Many current administrators completed their educational administration programs when there was no emphasis in computer applications or there were no computers used in the college or university administrative preparation programs. Training programs are only recently providing school leaders with technology management skills [5]. As a result, those who decide about technology policies and finances often have little or no technology training and few resources to help make informed decisions. Therefore, administrators may actually create barriers to technological change [16].

Policy Considerations for the Rural South

The foregoing discussion only touches upon a few of the myriad of issues related to technology in the classroom. The problem of access to the new technology may require individual states to offer increased assistance to rural schools to help with connectivity. The problem of using technology in the classroom can be ameliorated with professional development for teachers and administrators, along with adequate funding to implement and sustain rapidly changing hardware and software needs.

The networking of personal computers on the World Wide Web may have a different social impact than previous technologies. This raises several considerations for policymakers:

- *Ongoing evaluation of technology implementation in schools is crucial.* This evaluation needs to include not only student achievement, but also the impact of the new technology in the surrounding rural communities.
- *The role of teachers and administrators in the school and community needs to be rethought.* Already, rural schools are becoming important places for Internet access for the public; 30.3 percent of rural residents use the school for Web access outside the home, compared with a national average of 21.8 percent [14]. Rural schools, which often have been considered as community centers, may well be on their way to becoming even more of a focal point for the community.
- *New policies should be implemented to foster youth involvement in technology.* Unlike earlier technologies, such as television, the Internet requires active participation. It could become a tool for empowering rural youth who can become the technological leaders in communities, teaching each other, their teachers and other adults how to use computers and the Internet. In addition, the Web can open the way for students to become involved in entrepreneurial activities and community networking, thus helping to build and sustain their own communities [10].

> **"The Internet could become a tool for empowering rural youth who can be the technological leaders in communities."**

Global technology is no panacea for rural areas [4]. Yet, the Web may help improve the quality of rural schools by enhancing curriculum and allowing students to open businesses with global connections, while remaining in their own communities [10]. If this occurs, it will be possible to face a major challenge—determining the best way to use technology in rural communities so that it serves locally defined purposes without sacrificing the good things that rural communities and schools have to offer [3].

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