

gration of technology can be a budget reduction strategy.

4. The OTA report points out that the very opportunities opened up by the computer can create more work for the teacher, making the job harder initially.¹¹ *Planners need to understand the changing responsibilities of the instructional staff and provide time, resources, and flexibility for professional development, research, and planning.*
5. *Education planners must make strong efforts to insure that all teachers and students have equitable access to the new technologies.* Equity of computer use means providing comparable educational opportunities for all students to have "hands-on" activities which create an environment that enriches each student's learning style.



¹¹ U.S. Congress, p. 88.

The Special Committee on Educational Technology recommends the following general principles and policy positions:

General principles

1. When conceived and implemented appropriately, technological innovation can contribute significantly to the improvement of educational opportunity, to managing the increasing knowledge base, and to improving the quality of work life for school employees.
2. The integration of technology should be conceived in terms of a restructured school environment, not as piecemeal appendages grafted onto the current school structure and curriculum.
3. Schools must focus the uses of technology not on more routinized standardization of the learning environment but on the potential enrichment of the teacher's instructional lessons, on the capacity to individualize instructional objectives for students, to extend the shift from a centralized to decentralized learning environment, and to support the teacher by easing the classroom management burden of reports and paperwork, thus allowing the teacher to spend more time with students.
4. The teacher is central to the full development of technology's use in the schools. For the teacher personally the critical elements are access, training, and time.

Policy positions

1. All schools should develop and implement a plan to install a computer with adequate software on the desk of each teacher by 1991.
2. Classroom management software designed for teacher use to manage the instructional process should be made available for all teachers and be compatible throughout the school district.
3. The school district and the teacher association should investigate options for teachers to have access to computers in their homes for training,

Policy Recommendations

development of instructional materials, and research purposes.

4. Practical, hands-on, and regular training in technological applications for learning and managing should be provided during school hours at the school's expense.
5. Training in the use of technology to enhance instruction and professional productivity must be a part of the preparation every entry-level teacher receives.
6. Teachers should be provided encouragement, time, and resources to experiment with and research applications of technology, and to integrate technology into the curriculum.
7. The NEA should commence the planning to create interlinked, nationwide interactive networks for teachers.
8. The planning focus for educational technology should be on the educational needs of students and how educators meet those needs, rather than on the technology.
9. The planning must recognize the inherent value of full participation and collaboration by all involved parties in planning for technology integration into the schools.
10. The Association and its affiliates should be involved in the planning, implementation, and evaluation of long distance learning proposals and programs to provide students the highest quality learning experience.
11. Resources for educational technology must be adequate to provide balanced support for staff development, software, hardware, and research into curriculum integration and development.
12. Planners need to understand the changing responsibilities of the instructional staff and provide time and flexibility for professional development, research, and planning.
13. Education planners must make strong efforts to insure that all teachers and students have equitable access to the new technologies.

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**National Education Association
Communications Survey**

Report of the Findings

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June 2, 1993

Technology in the Classroom: A Teacher Perspective

Introduction

This is a report on the results of a national telephone survey of regular classroom teachers conducted by Princeton Survey Research Associates on behalf of the National Education Association. This is the first study to focus on in-school use of a broad range of technological tools in the same survey. The primary objectives of the study were to both determine the incidence of school-provided technologies and to assess teacher perceptions of their effects on the education process.

The Technical Appendix of this report includes a description of the survey methodology, a definition of the access to technology scale used for analysis, a "top-line" summary of question-by-question results and a copy of the questionnaire.

SURVEY HIGHLIGHTS

- Some forms of technology are now almost universally available to teachers: nearly all have access to photocopiers (97%), televisions (95%) and VCRs (98%) for classroom use at the school site. Roughly nine in ten (88%) have access to computers at school. Other electronic hardware, however, has yet to become standard equipment in schools. Less than half of teachers (43%) are able to use a modem at school, less than a third (28%) have access to a fax machine.
- Computers are installed in about half (52%) of classrooms today. Television sets are found in four in ten classrooms (41%). Unlike most other professionals, however, most teachers lack easy access to a telephone during their work day: only 12% now have phones in their classroom.
- Schools have been slow to replace outmoded technologies. Close to two-thirds of teachers (65%) report that mimeograph or "ditto" machine are still being used in their schools.
- Teachers in affluent and suburban schools are more likely to benefit from a high-tech environment. Schools on the cutting edge in terms of technology typically provide both computers in the classroom and access to modems and fax machines at the school site.
- Worst off in terms of access to technology at school are teachers in urban schools and less affluent school districts. In fact, large city schools are more backward technologically than schools in small town and rural America.
- Schools unable or unwilling to provide teachers with adequate computer technology may be failing to tap a valuable resource: computer skills that teachers have acquired on their own. Fully half of teachers (50%) in low-tech schools say they have a home computer.

- Copying materials for classroom instruction is a struggle for many teachers, especially those in urban areas and less affluent communities. As a result of school restrictions on their paper supply for copying, one-fifth of all teachers (19%) and high proportions of those in large cities (34%) and low-income school districts (28%) have taken heroic measures and used personal resources to meet their classroom duplicating needs.

- In terms of computer technology, access to modems distinguishes the "haves" from the "have-nots". Just over half (53%) of teachers in high-income school districts have access to a modem, compared with fewer than a third (30%) of those in low-income districts. By comparison, these two groups are about equally likely to report having computers in the classroom.

- In the elementary grades, computers tend to be distributed on a one-per-classroom basis and are regarded as an integral part of the learning process. In the higher grades, computers are more often distributed in clusters, and are still regarded as a separate area of instruction.

- TV sets in the classroom are associated with neither high-tech schools nor wealthier schools. In fact, teachers in the suburbs and in high-income communities are less likely than other teachers to say they have a set in their own classroom. In the Southeast and Mid-Atlantic regions, the average teacher has a TV set in the classroom; in other regions, the average teacher must share a set with other teachers.

- The absence of telephones in the classroom makes it difficult for many teachers to have confidential phone conversations with parents or others during the school day. Most of those without a classroom telephone use the phone in the school office for outside calls. Almost half of these teachers (44%) say that the phone they depend on does not allow for private communication.

- On-line computer databases and networks are an emerging technology in the schools. Only about one in five teachers with access to a modem (19%) has access to Prodigy, the most widely used on-line service. Just 10% of all teachers report having used modem or fax technology to exchange instructional information. Still fewer teachers have participated in a learning network (6%) or on-line collaborative teaching/distance learning project (4%) with their students. Only 4% have access to Internet -- the computer "network of networks" -- at school.

- Considering the major categories of computer software and electronic media, teachers make the most use of word-processing software (79%) and graphics software (56%). Less than half of all teachers, but a majority of those teaching math or science, have used spreadsheet software and software to calculate grades. About one in four teachers have used each of the following technologies: instructional laser discs/videodiscs (27%), CD-ROM discs (25%) and hypermedia/multimedia software (23%).

- Teacher perceptions of the importance of various technologies to classroom effectiveness largely reflect the status quo. Only one type of equipment is overwhelmingly thought to be essential: photocopiers with adequate paper supplies (84%). Access to TV/VCR combinations and classroom computers are widely seen as important, but teacher opinion is split on whether they are essential. Access to telephones in the classroom and on-line computer services at school are generally regarded as important, but not essential. Less than half (40%) of teachers believe access to fax machines is important or essential.

- There are sharp differences by generation in attitudes toward the importance putting a computer in every classroom. Six in ten teachers under 35 years of age (59%) believe computers in the classroom are essential. But that figure decreases steadily with age, slipping to 29% among teachers over age 55.

- Sizable proportions of teachers currently lack access to technologies they believe are essential resources. The most widespread unsatisfied technological need is access to a TV/VCR combination (31%) followed by classroom telephones (24%), on-line computer networks (18%) and classroom computers (16%). Most seriously deficient in essential technology are urban schools and schools in low-income communities. Three in ten teachers in large city schools (28%), compared with about one in ten (11%) in suburban schools, identify insufficient access to a photocopier as an unmet technological need.

- More technologically sophisticated schools are associated with a higher quality of education, better parent-teacher communication and greater student interest in learning. In the least technologically sophisticated schools, teachers consider insufficient technology as important an obstacle as inadequate preparation time and overly large class sizes.

- Roughly a third of teachers overall (31%) and half of those in high-tech schools (49%) believe that their own teaching effectiveness has improved "very much" as a result of technology. Only three teachers in ten (28%) do not think technology has made much of a positive impact on their performance in the classroom. Specifically, teachers credit technology with helping them more efficiently carry out routine aspects of their job, such as preparing written materials and record-keeping.

- Budgetary limitations are by far the most serious barrier to teachers' ability to make better use of classroom computer technology. Half of teachers interviewed (46%) cited money as "very much" an obstacle. Other potential obstacles are considered major by only one teacher in five: insufficient wiring in the school building (21%), lack of software (19%), unfamiliarity with computers (18%) and lack of technical support (18%).

- A majority of teachers (63%) believe it is essential that teachers and parents be able to contact each other during the school day. While most teachers do not now regard classroom telephones as essential, a large majority (71%) acknowledge that having a phone in every classroom would improve parent-teacher communication to some extent; more than a third believe it would result in a major improvement in communication.

- Female teachers, younger teachers, those in elementary schools, smaller schools and urban schools are the biggest advocates of telephones in the classroom.

DETAILED FINDINGS

Access to Technology at School

While some types of electronic technology are universally available to teachers today, others have yet to become standard equipment in public schools. Virtually all teachers have access to a photocopier (97%), but only three in ten (28%) are able to use a fax machine, a fixture in today's office environment, at their workplace.

In the classroom itself, half of teachers (52%) now have a computer, while four in ten (41%) have a television set. Fewer report having a cable TV hookup (34%) or a classroom VCR (24%). While not present in every classroom, these instructional resources are widely available to public school teachers. Roughly nine in ten teachers (88%) have access to computers at school; even higher proportions have access to televisions (95%) and VCRs (98%). More than six in ten (62%) say their school gets cable TV.

In most schools today, the technologies of the past have not been completely replaced by newer technologies. Despite the prevalence of photocopiers, as many as two in three teachers (65%) report that mimeograph or "ditto" machines are still being used at school.

Both the high-tech computer modem and the ordinary telephone are absent from most classrooms. Very few teachers have a computer modem in their classroom (4%), although four in ten (39%) say they can use a modem somewhere at the school site. Only 12% of teachers have a telephone in their classroom; hardly any teachers (1%) have a classroom telephone equipped with voice mail.

Based on their responses to a series of questions measuring access to 10 types of technology, most teachers work in the "medium-tech" environment described above: Computers are generally available at the school site, if not in the classroom; TVs and VCRs are widely available, while modems and fax machines are generally unavailable. (NOTE: For a description of the way the scale measuring access to technology was created, see Technical Appendix.) The remaining one-third of teachers divide almost equally between a high-tech (15%) and a low-tech school environment (18%).

Those who teach in high-tech schools typically have computers in their classrooms (82%) and access to fax machines (69%) and modems (94%) at the school site. Even in high-tech schools, however, telephones in the classroom are the exception, not the rule (33%). High-tech environments are most likely to be found at the senior high level, as well as in larger schools, suburban schools and in more affluent school districts.

Those who teach in low-tech schools generally have televisions (76%) and VCRs (97%) at their disposal, but are highly unlikely to have a computer in the classroom (9%), or access to a fax machines (8%) or modem (6%). Only about half of these technologically disadvantaged teachers (51%) are able to use a computer at any location on the school site. As expected, low-tech environments are more prevalent in lower income school districts. Low-tech schools are more often found in large cities than in small town and rural communities.

Schools unable to provide adequate technology for classroom instruction may be failing to take advantage of skills teachers have already acquired on their own. More than half of regular classroom teachers (54%) have a home computer. Teachers in low-tech school environments are almost as likely to have a personal computer at home as teachers in more technologically sophisticated schools.

STATEMENT FOR THE RECORD

on behalf of

THE NATIONAL SCHOOL BOARDS ASSOCIATION

on

S. 1822
TELECOMMUNICATIONS IMPROVEMENTS

to the

Senate Committee on Commerce, Science and Transportation
Subcommittee on Communications
253 Russell Senate Office Building
Washington, D.C.

May 25, 1994

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I. INTRODUCTION

The National School Boards Association speaks on behalf of public education nationwide and represents 95,000 school board members who endeavor daily to provide an excellent public education to every child in the country. School board members are the elected and appointed officials responsible for ensuring that our nation's public school children are given the best opportunity to succeed in an increasingly complex world. NSBA and school board members recognize that an integral part of providing that opportunity lies with the effective use of technology in the classroom.

We are facing a watershed moment in our history that stands to have an impact on how we function as a society, how we live, how we exchange ideas, and importantly, how we learn. The "information superhighway" promises to be an invaluable resource for our nation's school children. However, in order for the superhighway to work for schools, the system must be focused educationally, all classrooms must be connected, and schools must have total and affordable access.

II. PRIORITY ONE: CONNECTING CLASSROOMS TO THE SUPERHIGHWAY

How do we bring the education information superhighway into the lives of every school child? The Clinton Administration is proposing that every classroom be provided with two-way voice, data and video communication by the year 2000.

NSBA supports that goal and believes that it must be a key feature of any legislative initiative. Clearly, for this critical goal to be realized decisive legislative action must take place.

NSBA asks that Congress seize this moment to establish a concrete framework in policy. The process of bringing the information superhighway to every classroom will require ongoing public and private partnerships and funding sources that can only be developed by congressional action. This process should begin immediately, including assurances that traditionally underserved areas, such as rural and poor school districts, are made a high priority.

Furthermore, while the broadest vision of the information superhighway is one of infinite lanes and "unlimited" capacity, it is clear that this is likely to be the adult phase of this process. In its infancy, however, capacity and access will be more limited. With education as a priority in superhighway development, a significant portion of capacity must be reserved for public and educational use. Highly

affordable access to that "public right-of-way" must be guaranteed to educational institutions.

Also important to schools will be the relative interconnectability of the networks. Many states, localities, and school districts have already launched their information highways, making significant investments in particular systems or technologies. It is imperative that those divergent delivery systems be interconnectable and that educators and students have easy access to all networks. The goal of interconnectability should be achieved with no one technology arbitrarily dominating the superhighway because of legislative or regulatory action. Rather, states should work with localities and school districts to choose the technology that best serves their needs.

III. MAKING THE SUPERHIGHWAY AFFORDABLE FOR SCHOOLS

Affordability will be critical to the success of the education information superhighway. America's schools are not Fortune 500 companies. They operate on inflexible budgets that do not allow for major investment or pricing policies to cover innovation. To ensure affordability, Congress should look to those who stand to profit from the superhighway. Local and long-distance telephone companies, the cable and satellite industries, and any other corporations providing information technology must be required to provide the complete connection of all classrooms to

the superhighway without cost to schools. As these industries vie for legislative and regulatory relief from current constraints on competition, the gratis connection of the nation's classrooms must be part of the industry's entry fee to this public market. With the privilege of being allowed to offer these enormously profitable services comes a public responsibility to the education of our next generation.

Furthermore, to ensure that schools will be able to fully utilize the superhighway on an ongoing basis, the lowest preferential rates must be offered to educational institutions. These rates need to be predictable and unrelated to usage time in order to accommodate the typical budget process used by schools. Affordable access also must be made available educational institutions that are creating programs for use among schools or other educational institutions.

Finally, with the explosion of information that will soon reach the classroom door, assurances must be made that data placed on the highway for educational purposes rests in the public domain and other information is subject to fair use, the first-sale doctrine and other user protections found in copyright law. Educational information providers should not be able to restrict access by charging royalties or fees to school districts that use and disseminate information for strictly educational purposes.

Raising funds from schools with copyright fees and royalties runs counter to the very

IV. FOSTERING WISE-USE OF THE SUPERHIGHWAY

The potential horror-story of the information superhighway is the "500 channels and nothing on" scenario. The superhighway will be of little use to school children and teachers unless a broad variety of information and educational resources are available. Those resources should come from diverse public and private sources and, with an interactive voice, data and video network, from students and teachers themselves.

In addition, research and development of high-quality educational software and programming will be critical to creating an education superhighway. Financial incentives must be made available to software developers and other producers as part of this legislation to facilitate the development of educational applications and programming.

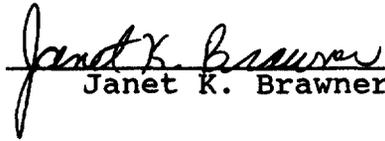
Teacher training also will be invaluable to the superhighway's success. It is appropriate that funding be provided to ensure that our teachers, administrators, and school board members are fully versed both in the new technologies and in teaching strategies that incorporate them. Without this ongoing training, our investment in communications technology will never reach its potential to provide effective, expansive, and creative educational opportunities.

V. CONCLUSION

As Congress crafts legislation that will both launch and govern the information superhighway for years to come, education must be a central concern that is carefully examined and articulated in the legislation. Lawmakers have an historic opportunity to ensure that all of our nation's school children have access to the information superhighway -- as both creators and receivers of the bounty that will be available. The National School Boards Association looks forward to working with the members of the Senate Commerce, Science and Transportation Committee on the development of this critical legislation.

CERTIFICATE OF SERVICE

I certify that the "REPLY COMMENTS OF THE AMERICAN LIBRARY ASSOCIATION, THE COUNCIL OF CHIEF STATE SCHOOL OFFICERS, THE NATIONAL ASSOCIATION OF SECONDARY SCHOOL PRINCIPALS, NATIONAL EDUCATION ASSOCIATION, AND NATIONAL SCHOOL BOARDS ASSOCIATION" were served by first-class mail this 29th day of June, 1994 to each addressee on the attached list.



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