

Appendix B: Sources of Survey Data for This Report

During the course of this report, OTA hired three contractors to collect and analyze survey data. This appendix describes the methodology of each contractor report.

Analysis and Trends of School Use of New Information Technologies

Henry J. Becker—March 1994

No original data were collected for this contractor report. Instead, the results of a number of major national surveys of educational technology conducted between 1989 and 1993 were re-analyzed and synthesized. The majority of the analysis comes from three surveys: 1) the United States portion of the 1992 Computers in Education Study of the International Association for the Evaluation of Educational Attainment (IEA), 2) the 1991 National Study of School Uses of Television and Video conducted by the Corporation for Public Broadcasting (CPB), and 3) the 1993 Survey of Member Teachers of the National Education Association (NEA) conducted for the NEA by Princeton Survey Research Associates. For all three studies, this contractor report also

profited from reports in progress or technical documents related to these studies. The major features of these three studies and the other four studies used in the analysis are described below. Additional features are shown in table B-1.

The 1992 International Association for the Evaluation of Educational Achievement Computers in Education Study¹

The IEA survey is the only recent national survey to provide detailed data about computer use in schools, primarily from school-level staff (principals and school computer coordinators) and student respondents, but also with data collected from teachers. The sample of schools, although rather small (571 schools with responses from computer coordinators), was a carefully drawn national probability sample including public, parochial, and private schools stratified by school size, reported student-computer ratio in 1988, size of

¹ Ronald E. Anderson et al., *Computers in American Schools, 1992: An Overview*, International Association for the Evaluation of Educational Achievement Computers in Education Study (Minneapolis, MN: University of Minnesota, 1993).

TABLE B-1: Sources of Data for "Analysis and Trends of School Use of New Information Technologies"

Study	Data about	Nature of data	Date of study	Nature of sample	Response rate	Number of cases
International Association for the Evaluation of Educational Achievement (IEA) Survey-Stage 1	Schools and teachers	Weighted data	Spring 1989	National probability sample, excluded schools with no computers at all, special education schools and primary schools (serving only below grade 4) Sampled elementary teachers grades 3 through 6 and secondary math, science, English, computer education teachers. Includes public and nonpublic schools	76% of schools (computer coordinator), 94% including partial telephone interview, 79% of teachers (weighted); 93% including telephone interviews	999 schools (1,227 including partial telephone interviews), 817 teachers (957 including partial telephone interviews)
International Association for the Evaluation of Educational Achievement Computers in Education Survey—Stage 2	Schools, teachers, and students in grades 5, 8, and 11	Weighted data	Spring 1992	National probability sample, excluded schools with no computers at all, special education schools and primary schools (serving only below grade 4) Sampled elementary teachers, grade 5, and secondary English teachers (grades 8 and 11) Includes public and nonpublic schools	82% of school-level computer coordinators, 72% of teachers, and 74% of students (About 15% of coordinator sample were partial phone interviews)	571 computer coordinators; 500 teachers, and 11,150 students.
Corporation for Public Broadcasting Study of School Uses of Television and Video	Schools and teachers	Weighted data	Spring 1991	National probability sample of public schools (excluding special, vocational, and alternative education) in districts with more than 300 students; teachers of all subjects and grade levels.	90% of schools (principal), 75% of teachers.	829 schools; 3,072 teachers; 2,920 with both questionnaires
National Education Association (NEA) Communications Survey	Teachers	Weighted data	Spring 1993	National sample (simple random sample) of NEA members	33% (reported by NEA as 78% when excluding those not reached by telephone).	1,206 teachers
Market Data Retrieval: "Education and Technology"	Schools, from district-level data collection	Printed statistics	Fall-winter 1992	Universe of public school districts. Information gathered at district level except followup mailings sent to schools in largest districts.	About 39% of public schools including 68% of schools in the nation's 893 largest districts	3,927 districts representing 31,172 schools.
National Educational Longitudinal Survey (NELS88) "First Followup"	Teachers and 10th grade students	Printed statistics	Spring 1990	National probability sample of 8th graders, two years later (nondropouts), sample of two of four major subject teachers	94% of students attempted in 1990 followup Unknown bias from low base year (1988) school response rate (61 %) 89% of teachers sampled in 1990	20,706 students, 15,908 teachers divided among 4 subjects
Quality Education Data school census	Schools, from district-level data collection	Raw data (no sampling done)	Summer 1992	Universe of public and nonpublic schools Information gathered at the district level	Near 100% but not uniformly collected on each variable	104,000 schools

SOURCE: Henry J. Becker, "Analysis and Trends of School Use of New Information Technologies," Office of Technology Assessment contractor report, March 1994

the metropolitan area community, and district poverty level. Disproportionate sampling was employed to overrepresent schools with larger student bodies and more computers. (Data analysis was performed using case weights to recreate the equal probability sample needed for valid descriptive statistics.) Response rates for different categories of respondents varied from 72 to 82 percent, including some partial telephone interviews. Extensive questions were included about computer-related hardware and software, utilization, processes of decisionmaking, and attitudes. Students reported their own computer experiences and were given a test of computer literacy which was, however, not used in this analysis. The 1992 IEA survey was a second stage of a longitudinal study that began with a similar study (minus the student data) in 1989.

Corporation for Public Broadcasting's 1991 National Study of School Uses of Television and Video²

The CPB survey is the only major recent national survey of instructional television and video presence and use in schools. It also is part of a series—in this case, the third conducted by CPB over a 15-year period. At the school level, the CPB survey was several times as large as the IEA computer survey (1,829 schools; 3,072 teachers), but it did not include student-level data. The sample design involved a multistage probability sample of public school districts, schools, and teachers, explicitly stratified by district size and urbanicity, and implicitly stratified by region and district wealth. Districts enrolling fewer than 300 students were excluded from the population sampled. Ninety percent of principals and 75 percent of teachers responded. Superintendents also com-

pleted a survey form, but this was not used in this analysis. Principals responded to questions about their school's experience using a variety of broadcast and stored video media and about school-level support for instructional media. Teachers reported about their use of TV and video in classroom instruction and their own personal experience and access to equipment like VCRs and camcorders.

The 1993 Communications Survey of National Education Association Teacher-Members³

The NEA survey was of a sample of current teachers from the NEA's national membership roster, and thus excludes teachers from most large city districts and others that do not have NEA as their employee bargaining agent. A total of 1,206 teachers participated in telephone interviews for this study. Excluded from the sample were special education teachers, resource teachers, and those who did not currently teach in grades K-12. The cooperation rate for this survey (i.e., the percentage of eligible sample members reached who agreed to be interviewed) was 79 percent. However, field work was terminated before the majority of initially sampled individuals could be reached. So from a formal standpoint, the response rate for this survey (interviews divided by estimated number of eligible members originally sampled and called) was only about 33 percent. However, the vast majority of the remaining 67 percent were not "refusals," but simply those who were not reached by telephone. In addition, the NEA survey was of limited use because it was not principally about teachers' technology *use* but rather about their *perceptions of access* to technologies. However, it was valuable in that it included

² Andrew L. Russell and Thomas R. Curtin, *Study of School Uses of Television and Video: 1990-91 School Year* (Arlington, VA: Corporation for Public Broadcasting, February 1993). Also see Research Triangle Institute, *Study of the School Uses of Television and Video: Methodology Report* (Research Triangle Park, NC: Research Triangle Institute, Mar. 20, 1992).

³ Princeton Survey Research, *National Education Association Communications Survey: Report of the Findings* (Princeton, NJ: June 2, 1993).

information about both computer and video technologies in the same survey and contained information not otherwise available about access to other technologies such as telephones and photocopying.

Other Survey Sources

In addition to the IEA, CPB, and NEA surveys, substantial information about the presence of technologies in schools was provided by an August 1993 report on the K-12 public school market for educational technology by Market Data Retrieval (MDR), Inc.,⁴ and from the master building-level and district-level datasets and related reports from Quality Education Data (QED).⁵ Both of these market research surveys supplied data on technology presence (although nothing on utilization), but each had disadvantages that prevented further use. Both market surveys reported data about individual schools but collected these data primarily at the district level, making detailed data less reliable, with impairment most likely in medium-sized and larger districts. It has been accepted for some time, for example, that QED's census of the number of school computers is roughly 25 percent under the estimates obtained using national probability surveys such as those of the IEA Computers-in-Education studies.⁶

Access to the MDR data was limited to published tabulations. Moreover, the MDR survey response rate was very low (roughly 25 percent) except for the largest 7 percent of all districts. Overall, only 39 percent of public schools (no private or parochial schools) were included in the tabulations in the MDR report. The QED dataset,

while encompassing more than 100,000 public, Catholic and other private schools nationwide, produced estimates that were at significant variance with similar data obtained from the CPB and IEA surveys—almost always reporting fewer schools having a given type of technology (e.g., videodisc players, modems, integrated learning systems)—even when one attempted to correct MDR results for their disproportionate number of schools from large districts. This almost certainly derives from the QED dataset being composed of accumulated reports over several years and thereby not only undercounting recent acquisitions but providing only partial data about types of technologies more recently added to its database (e.g., presence of CD-ROM). Nevertheless, both QED and MDR tabulations were useful at various stages in the analysis.

Finally, other statistics produced for this contractor report came from both original analysis and published tabulations of teacher and student data from the 1990 “first followup” of the National Educational Longitudinal Survey (NELS88),⁷ and from original analysis and tabulations from the 1989 IEA Computers in Education Survey. Use of the NELS88 survey was minimal because only a few questions dealt with technology, and use of the 1989 IEA survey was primarily for providing baseline data for measures of change. The 1989 IEA survey did contain much more detailed data on computer use at the teacher level than any other more recent survey available for this analysis, but because of its age (41/2 years as of this writing), its descriptive statistics on computer use

⁴ Market Data Retrieval, *Education and Technology, 1993: A Survey of the K-12 Market* (Shelton, CT: August 1993).

⁵ Quality Education Data, *Technology in the Public Schools: 1992-93* (Denver, CO: January 1993), *Educational Technology Trends, Public Schools: 1992-93* (Denver, CO: August 1992).

⁶ *Ibid.*, *Technology in the Public Schools: 1992-93*, p. 4.

⁷ Steven J. Ingels et al., *National Education Longitudinal Study of 1988: First Follow-Up Teacher Component Data File User's Manual* (Washington, DC: National Center for Education Statistics, November 1992); *National Education Longitudinal Study of 1988: First Follow-Up Student Component Data File User's Manual*, vols. 1 and 2 (Washington, DC: National Center for Education Statistics, April 1992).

were felt to be generally too outdated to be useful.⁸

Those seven surveys—the 1992 and 1989 IEA Computer surveys, the CPB video survey, the NEA member survey, the two market surveys (MDR and QED), and the 1990 NELS first followup survey—constitute the database for the Becker contractor report. Other sources of survey data were considered but excluded on grounds of insufficient national representativeness, unsatisfactory response rate, or lack of timeliness.⁹

State Technology Activities Related to Teachers

Ronald E. Anderson—Nov. 15, 1994

During the summer of 1993, telephone calls were placed to an educational technology coordinator or specialist in all states and the District of Columbia. After repeated calls, responses to a telephone interview were obtained from over 85 percent of the states. In addition, reports of various types related to educational technology were obtained from a majority of the states. A year later, in June 1994, a survey form was mailed to all state educational technology coordinators asking them to update and clarify several technology policy items. During the summer repeated calls, faxes, and mailings were used

to obtain responses from all the states as to the accuracy of the information collected.

Information Technology in Teacher Education: Surveys of the Current Status

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A comprehensive survey focusing on the use of information technology—“The USA Faculty Survey”—was mailed to a random sample of teacher educators in the United States. A second survey, reworded for recent graduates of teacher education programs, was sent to a random sample of public and private schools across the United States. This survey—called “The USA Recent Graduate Survey”—was addressed to principals who were asked to forward it to the most recently hired teacher. The only additional requirement was that the teacher who completed the survey must have graduated within the last two years.

Although the survey data presented in this contractor report represents one of the only efforts to date to gather information on technology in teacher education, a number of limitations should be kept in mind. A major limitation is the low rate of return for all of the surveys. The surveys sent to teacher education faculty and recent graduates

⁸ Henry Jay Becker, “United States Participation in the I.E.A. Computers-in-Education Study,” final report to the National Science Foundation, Grant #SPA-8850564, Center for Social Organization of Schools, Johns Hopkins University, September 1992.

⁹ The 1992 survey by Bank Street College, “Telecommunications and K-12 Educators,” directed by Margaret Honey (M. Honey and A. Henríquez, “Telecommunications and K-12 Educators: Findings from a National Survey,” Center for Technology in Education, Bank Street College of Education, 1993) provides useful information about the most active telecommunications-using teachers, but is based on a purposive snowball sample of high-end users rather than a representative sample of teachers.

Market surveys published in 1991 by LINK Resources Corporation (“K-12 Market for Technology and Electronic Media: Ninth Annual Survey”) and in 1992 by the Software Publishers Association (“1991-92 SPA K-12 Market Study Report”) both obtained roughly 20 percent response rates from school principals or other school or district officials, deemed insufficient to provide valid enough information about the full population of U.S. schools.

Several statewide surveys have been conducted during the past several years—for example, “Technology in the California Classroom: The Teacher’s Perspective 1991,” conducted by Robert G. Main for the California Technology Project—but it was decided that state-level statistical information would not be informative for considering national patterns and trends.

Finally, several once-informative national studies are now dated by the rapid rate of change in technology availability and use—among them the 1989 U.S. Census Bureau’s supplementary questions on computer use in the October 1989 Current Population Survey, as reported in their publication, “Computer Use in the United States: 1989,” Current Population Reports, Series P-23, No. 171, 1991.

were quite lengthy and the time required to complete the survey may have been one factor in the relatively low return rates. Another factor possibly contributing to a low rate of return was that the distribution method involved sending surveys to administrators who were then asked to distribute them to the appropriate instructors. For example, from the 1,223 faculty surveys mailed to teacher education institutions, a total of 250 were usable, which is 20 percent of the surveys mailed. As the percentage of usable surveys was relatively low, readers should be cautioned about over-interpreting the survey data.

The USA Faculty Survey

The faculty survey included questions about the institution and teacher education program, the faculty member's history of general and instructional use of information technology, attitudes toward technology, and ratings of barriers to wider use of information technology. The survey was developed after a thorough review of existing surveys on both K-12 use of technology and technology use in teacher education. Many of the items in the survey used here were based on items in previously published surveys. Once a draft survey was developed, it was evaluated by an advisory group of experts and by OTA staff. The feedback was used to revise the instrument, and experts were again asked to review it. For example, the original instrument was much longer than the final version. It contained items on how faculty used technology rather than simply whether they used

it or not. Most of the reviewers felt the original survey was far too long and recommended it be shortened. Many items were removed.

A random sample of 65 teacher education programs was selected from *Peterson's Guide to Colleges and Universities*.¹⁰ The only restriction on randomness was the requirement that all 15 of the largest teacher education programs in the United States be included in the sample. At least one survey was returned from 66 percent of the institutions sampled. A total of 250 usable surveys were returned.

The USA Recent Graduate Survey

The survey sent to recent graduates was a modified form of the faculty survey. The questions were rephrased to indicate the respondents were students in teacher education programs rather than faculty.

A random sample of 500 elementary and secondary schools in the United States was selected by a mailing list organization and supplied to the researchers on mailing labels. Both public and private institutions were included. A total of 100 surveys were returned, a return rate of 20 percent. However, a total of 70 surveys were usable and all the data in this section is based on the analysis of 70 surveys. The 30 unusable surveys were returned because the school had closed or no teacher met the criteria of having completed a teacher education program within the last two years. With only 70 usable surveys, the results should be considered tentative.

¹⁰ *Peterson's Guide to Four-Year Colleges*, 19th Ed. (Princeton, NJ: Peterson's Guides, 1989).