Microcomputers in Public Schools and School Libraries

JUNE H. SCHLESSINGER AND RASHELLE S. KARP

ABSTRACT

SCHOOL LIBRARIANS WERE surveyed in 1982, 1986, and 1990 in order to follow the status of the introduction of microcomputers and their uses in public schools and school libraries. Results of the surveys are presented and discussed. Librarians from selected representative schools were interviewed to obtain more in-depth information about experiences with using microcomputers. In the schools surveyed, the percentage of schools holding microcomputers seems to have stabilized at around 90-95 percent. The number of computers held per school has shown a dramatic increase over the eight-year period. Brands of computers held have varied over the years, but Apple and IBM seem to be the brands of choice today. Microcomputers are distributed through all types of school libraries at all levels. Uses of computers in school libraries are basically for educational support including some online searching and for library management and administration.

INTRODUCTION

Through surveys conducted in 1982, 1986, and 1990, the authors have followed the status of the introduction of microcomputers and their uses in public schools and school libraries in Texas and Pennsylvania (Schlessinger, 1983; Karp, 1986; Schlessinger, 1986; Schlessinger, 1987). A review of the literature reveals no other such historical statistical studies, although *Information Power* (1988)

June H. Schlessinger, School of Library and Information Sciences, University of North Texas, Denton, TX 76203

Rashelle S. Karp, College of Library Science, Clarion University of Pennsylvania, Clarion, PA 16214

provides some interesting data about this area.

    This article compares the preliminary 1990 survey results from Texas and Pennsylvania to previous results and presents the results of selected case studies. The surveys used the same methodology and consisted of:

- random selection of fifty schools in each of three categories (elementary, junior high, and high school) from the state's educational directory;
- distribution of a simple questionnaire designed to determine:
    —whether microcomputers belonging to, and controlled by, the school system were on the premises, and, if so, how many and of what model;
    —whether any of the microcomputers held by the school were located in and supervised by the library, and, if so, what uses were being made of the equipment;
    —where, in addition to the library, the microcomputers were being used; and
    —comments on the future of microcomputers in schools and school libraries.

Survey Results

    Table 1 indicates the percentage of return of questionnaires by type of school for the 1986 and 1990 surveys in Texas and Pennsylvania. The percentages of return and the speed of return for all the surveys were relatively high, reflecting a continued high interest in microcomputers among school librarians. The 1990 results show a surprising uniformity of interests across the public school spectrum, even more noticeable than that exhibited on previous surveys. The almost equal percentages of return for the surveys for each state are also interesting.

Number of Microcomputers

    Table 2 presents the data for the percentage of public schools in Texas and Pennsylvania holding microcomputers. Table 2 suggests that the percentage of public schools in Texas holding microcomputers has stabilized at around 90 percent, with the picture remarkably similar across the spectrum of schools. In Pennsylvania, the percentage of public schools holding microcomputers seems to have stabilized at about 95 percent, with similar numbers across all levels. Unlike both the 1982 and 1986 Texas surveys, in which schools not holding microcomputers were looking forward to a future that included microcomputers, the schools not holding microcomputers in the 1990 (Texas) survey were generally not expecting a change in their status in the near future. In contrast to this, schools in Pennsylvania with lower microcomputer holdings indicated that the

trend toward microcomputer laboratories in schools should increase
holdings at all levels. The only group that seemed somewhat
discouraged were elementary school librarians, who indicated that
the elementary schools were forced to take castoffs from upper level
schools rather than purchasing newer and more appropriate hardware.

Brands of Microcomputers

Tables 4, 5, and 6 compare the holdings of brands of
microcomputers in each type of school for each year surveyed.

TABLE 1.
RETURNS OF QUESTIONNAIRES BY TYPE OF SCHOOL-1986 AND 1990.

| | Number (%) of Schools Responding | | | |
| | 1990 | | 1986 | |
Type of School	Texas	Pennsylvania	Texas	Pennsylvania
Elementary	28 (56.0)	41 (82.0)	31 (62.0)	38 (76.0)
Junior High	30 (60.0)	39 (78.0)	20 (40.0)	42 (84.0)
High School	27 (54.0)	45 (90.0)	30 (60.0)	35 (70.0)
Totals	85 (56.7	125 (83.0)	81 (54.0)	115 (76.7)

TABLE 2.
PERCENTAGE OF PUBLIC SCHOOL RESPONDENTS HOLDING MICROCOMPUTERS
IN 1986 AND 1990

| | Number (%) of Schools Holding Microcomputers | | | |
| | 1990 | | 1986 | |
Type of School	Texas	Pennsylvania	Texas	Pennsylvania
Elementary	25 (89.3)	39 (95.1)	29 (93.5)	36 (94.7)
Junior High	27 (90.0)	36 (92.3)	19 (95.0)	42 (100.0)
High School	26 (96.3)	45 (100.0)	28 (93.3)	34 (97.1)
Totals	78 (91.8)	120 (96.0)	76 (93.8)	112 (97.4)

TABLE 3.
AVERAGE HOLDINGS OF MICROCOMPUTERS PER SCHOOL IN PUBLIC SCHOOLS—1990

| | Average Numbers Held | | | | | | | |
| | Elementary | | Junior High | | High School | | Totals | |
Brand Name	TX	PA	TX	PA	TX	PA	TX	PA
Apple	20.0	13.7	22.8	25.4	23.3	38.9	22.1	26.4
IBM	6.1	2.2	4.7	4.1	20.0	19.0	10.2	8.8
Radio Shack/ Tandy	1.5	1.0	3.2	3.4	5.2	8.2	3.3	4.3
Commodore	0.6	0.1	4.1	2.4	0.2	1.4	1.7	1.0
All Others	1.2	0.5	3.2	0.1	5.1	3.3	3.2	1.4
Total Schools	25.0	41.0	27.0	39.0	26.0	45.0	78.0	125.0
Average Holdings by Type of School	29.4	17.5	38.0	35.4	53.8	70.8	40.5	41.9

TABLE 4.
AVERAGE HOLDINGS OF TOP THREE BRANDS OF MICROCOMPUTERS IN
ELEMENTARY SCHOOLS—1982, 1986, 1990

| | 1990 | | 1986 | | 1982 |
Brand Name	TX	PA	TX	PA	TX
Apple	20.0	13.7	9.1	5.2	0.2
IBM	6.1	2.2	0.1	0.5	0.1
Radio Shack/Tandy	1.5	1.0	1.2	1.2	0.7
All Others	1.8	0.6	4.3	2.2	2.0
Average Holdings	29.4	17.5	14.7	9.1	3.0

TABLE 5.
AVERAGE HOLDINGS OF TOP THREE BRANDS OF MICROCOMPUTERS IN
JUNIOR HIGH SCHOOLS—1982, 1986, 1990

| | 1990 | | 1986 | | 1982 |
Brand Name	TX	PA	TX	PA	TX
Apple	22.8	25.4	11.4	13.4	0.4
IBM	4.7	4.1	0.4	0.3	0.2
Radio Shack/Tandy	3.2	3.4	2.7	8.7	0.6
All Others	7.3	2.5	7.2	2.9	5.4
Average Holdings	38.0	35.4	21.7	25.3	6.6

TABLE 6.
AVERAGE HOLDINGS OF TOP THREE BRANDS OF MICROCOMPUTERS IN
HIGH SCHOOLS—1982, 1986, 1990

Brand Name	1990		1986		1982
	TX	PA	TX	PA	TX
Apple	23.3	38.9	12.2	19.1	5.4
IBM	20.0	19.0	0.6	2.6	0.1
Radio Shack/Tandy	5.2	8.2	9.4	6.7	2.8
All Others	5.3	4.7	3.0	3.0	2.2
Average Holdings	53.8	70.8	25.2	31.4	10.5

DISCUSSION

The 1990 data for Texas and Pennsylvania (two very dissimilar states in widely separated geographic locations) are strikingly similar. For example, average holdings in Texas public schools of 40.5 compare to Pennsylvania's average holdings of 41.9. Texas seems to be more interested in the lower school levels with higher average holdings in both the elementary and junior high schools, while Pennsylvania shows higher average holdings at the high school level.

Average holdings at all levels continue to show dramatic increases in both states. Texas shows an increase over an eight-year period in average holdings in elementary schools from 3.1 in 1982 to 29.4 in 1990, an increase by a multiplication factor of 9.5; in junior high schools from 6.6 to 38.0, a multiplication factor of 5.8; and in high schools from 10.5 to 53.8, a multiplication factor of 5.1. For Pennsylvania, the increases over a four-year period (1986 to 1990) are: for elementary schools, 9.1 to 17.5, a multiplication factor of 1.9; for junior high schools, 25.3 to 34.4, a multiplication factor of 1.4; for high schools, 31.4 to 70.0, a multiplication factor of 2.2.

In 1982 and 1986 in Texas and in 1986 in Pennsylvania, Apple computers were the most favored brand followed by Radio Shack and Commodore with no significant holdings of any one other brand. Although Apple continued to be the frontrunner in 1990, IBM is now second, and impressively so especially in the high schools. In Texas, Radio Shack use has dropped far back and Commodore seems to be disappearing from inventories. In Pennsylvania, however, the use of Radio Shack products has increased in high schools, perhaps because of its Tandy IBM compatible line. It would seem that Apple's lead, stemming from initial marketing and popularity in schools, is being eroded by the availability and visibility of the newer IBM models and, at least in Pennsylvania, of the Tandy IBM compatible model.

MICROCOMPUTERS IN SCHOOL LIBRARIES

Turning now to the situation in school libraries, Table 7 identifies the levels of holdings of microcomputers in these areas. Survey results indicate that, in Texas, 66.7 percent of schools holding microcomputers had some of those microcomputers located in the school library. The corresponding percentage for Pennsylvania was 76.7 percent. The data indicate a steady increase in the 1980s for Texas from 19 percent in 1982 and 42.1 percent in 1986, and for Pennsylvania from 41 percent in 1986 (see earlier surveys). Further, the data continue to show distribution of holdings of microcomputers in all types of school libraries at all levels in Texas and Pennsylvania. Curiously, although the overall incidence of microcomputers in school libraries in Pennsylvania is higher than that in Texas, marked differences may be noted between the figures for holdings in elementary schools and in high schools. Further research into the reasons for these differences seems warranted.

TABLE 7.
SCHOOL LIBRARY HOLDINGS OF MICROCOMPUTERS (1990)

Type of School	Number (%) of Schools Holding Microcomputers		Number (%) of School Libraries Holding Microcomputers in Schools with Microcomputers	
	TX	PA	TX	PA
Elementary	25 (89.3)	39 (95.1)	15 (60.0)	19 (48.7)
Junior High	27 (90.0)	36 (92.3)	17 (63.0)	30 (76.9)
High School	26 (96.3)	45 (100.0)	20 (76.9)	43 (95.5)
Totals	78 (91.8)	120 (96.0)	52 (66.7)	92 (76.7)

USES OF MICROCOMPUTERS IN SCHOOL LIBRARIES

Table 8 presents the data on uses of computers controlled by school libraries compared to equivalent data from 1982 and 1986. The data in Table 8 for 1990 are the first indication of more imaginative use of microcomputers in school libraries. Whereas all the microcomputers in Texas school libraries in 1982 were used for drill and skill type exercises, 1986 saw a welcome increase in uses for library management/administration with continued uses in educational support. The 1986 data for Pennsylvania showed a small interest in online searching. Also interesting to note for Pennsylvania in 1986 is that some computer programming instruction was present, which has disappeared in 1990 perhaps reflecting increased dependence on commercial software. The 1990 surveys reveal continued and growing use of microcomputers for educational support and library management with specific recognized use in library functions

(circulation, cataloging, and acquisition/selection), as well as uses in support of new technologies (desk-top publishing and online searching including CD-ROM applications). It should also be noted that use of microcomputers in Pennsylvania is heavier per school and more oriented toward online searching and less toward library management and educational support.

TABLE 8.
PERCENTAGE OF USES OF COMPUTERS CONTROLLED BY SCHOOL LIBRARIES

	1990		1986		1982
Use	TX	PA	TX	PA	TX
Library Administration & General Management Functions	69.2	21.0	75.0	33.8	0
Educational Support (for Teachers and Students)	50.0	29.1	24.0	57.3	100
Circulation Specifically Mentioned	26.9	12.9	0	0	0
Online Searching Including CD-ROM Use	13.5	34.8	0	8.8	0
Cataloging Specifically Mentioned	5.8	2.1	0	0	0
Acquisition/Selection Specifically Mentioned	3.8	0	0	0	0
Desktop Publishing	5.3	0	0	0	0
Average number of Uses of Library Microcomputers Per School	1.75	2.53	1.50	1.44	1.00

Data for uses of microcomputers in various areas of public schools other than the library were also collected in the surveys. The major areas of use remained the same in both states in all years (math/ computers, administration, English, and science), but the levels of use increased markedly, and 1990 shows broad use across the curriculum for the first time and in fourteen different areas. The library remains a major user.

Case Studies

Three representative Texas schools (one high school, one junior high, and one elementary school) were selected from the returns of the 1990 survey and were queried about their use of microcomputers,

employing a structured interview format. The questions and answers are presented here.

School Number 1. High School (Enrollment: 2,187)

Question 1a: What brands of microcomputers do you hold?

Answer: A mixture of IBM PS-2, Apple IIe, Texas Instruments, and Tandy.

Question 1b: What procedure was used to acquire these (PTA funds, district funds, etc.)?

Answer: A bond election for the district provided technology matching funds for the building. Other funding has been solicited—from PTA, principal, and book sales.

Question 1c: Why did you choose these brands in particular?

Answer: The district standardized initially with Apple for instruction and IBM for administration. Today IBM is moving into instruction because of its versatility, and Macs are also becoming common.

Question 2: Which library management uses of microcomputers (circulation, collection development, reference support, cataloging support, acquisitions, and serials control) have you made, with which software/hardware, and with what successes and difficulties?

Answer: The microcomputers are used in a networked system using software developed and serviced by Mediatrack of Dalton, Georgia, to support circulation, collection development, weeding, reference support (both online catalog and DIALOG searching), cataloging, acquisitions, equipment inventory, and electronic mail. An important use is searching on STARTEXT, a system provided by the *Fort Worth Star-Telegram*. Both STARTEXT and MEDIATRACK are considered "super."

Question 3: What student and teacher computer uses have been made (word processing, statistics, spreadsheets, games, drill for skill) in the library, with which software/hardware, and with what success or difficulties?

Answer: Much use is made of *Bank Street Writer* and *Print Shop*, especially by students. Software (copyright is purchased) networked from the Minnesota Educational Computer Consortium is used by both students and teachers. Considerable use is also made of *Appleworks* and *Crossword Puzzle*. Use of games is discouraged unless students program the games themselves. Teachers use grading software as well. In general, use of computers has been more enthusiastic and frequent by students rather than by teachers. As teachers receive more training, they become good users.

Question 4: Does the library control any administrative or curriculum uses of microcomputers? Any future plans?

Answer: No.

Question 5: Do you have any anecdotes about use, problems, or surprises you would care to share?

Answer: a. Parents with computer backgrounds are very interested; this is sometimes a strength and other times a great difficulty.

b. Students with heavy home computer backgrounds often know more than the librarian, sometimes a sensitive issue.

c. Small accidents (tripping the wrong switch) can cause great losses. They become humorous only after they are remedied.

d. Two persons for two hours a day were once required for book check in. Now this requires only one person for one hour.

e. Students were lined up to use the terminal even when the card catalog was available. It led to the disposal of the card catalog.

f. One student used STARTEXT to make reservations for a Caribbean Island Vacation. One learns to think of such difficulties before they occur.

g. Positive surprises came from the acceptance of the users, the level of service now possible, the level of reporting now possible, and the ability to relax more on the rigid policies and procedures previously in effect.

Question 6: What advice do you have for those just beginning?

Answer: The librarian needs the support of a technician, either from the software people or at the district level. It is also advisable to operate district-wide to ensure compatibility and lowest cost for the most effective use.

School Number 2. Middle School (Enrollment: 970)

Question 1a: What brands of microcomputers do you hold?

Answer: A mixture of Apple IIe, IBM, and Tandy.

Question 1b: What procedure was used to acquire these (PTA funds, district funds, etc.)?

Answer: A mixture of district and PTA funds supported the purchase.

Question 1c: Why did you choose these brands in particular?

Answer: The decision to use the Apple IIe was a district-level decision, based on its ability to run *Circulation Plus*. The IBM and Tandy machines were added for instructional and administrative use.

Question 2: Which library management uses of microcomputers (circulation, collection development, reference support,

cataloging support, acquisitions, and serials control) have you made, with which software/hardware, and with what successes and difficulties?

Answer: The major use of microcomputers has been for circulation and inventory. The database also has been used in collection development/acquisition to select books for ordering. Both cataloging and acquisitions are done centrally, and computer records are downloaded.

Question 3: What student and teacher uses have been made (word processing, statistics, spreadsheets, games, drill for skill) in the library, with which software/hardware, and with what success or difficulties?

Answer: Students have made infrequent use of *Appleworks* and more frequent use of games and SAT study programs. Teachers assign drill for skill exercises. Teachers make use of word processing, grade programs, and lesson plan programs, most often at departmental computers. Programs used in the library include *Print Shop*, *Library Graphics* and *Texas Graphics*.

Question 4: Does the library control any administrative or curriculum uses of microcomputers? Any future plans?

Answer: No.

Question 5: Do you have any anecdotes about use, problems, or surprises you would care to share?

Answer: One problem is that microcomputer use requires additional space, and more microcomputer use causes demand for more microcomputers. But they are very helpful in the library and popular as well.

Question 6: What advice do you have for those just beginning?

Answer: Especially if few computers are available, use during off hours should be encouraged, and that option should be made available. It is also wise to purchase software or to purchase the privilege to use software by copyright or site license payments.

School Number 3. Elementary (Enrollment: 800)

Question 1a: What brands of microcomputers do you hold?

Answer: A mixture of Apple and IBM.

Question 1b: What procedure was used to acquire these (PTA funds, district funds, etc.)?

Answer: District funds were supplied to place computers in this new school in a networked system. Other sources of funds are now being considered.

Question 1c: Why did you choose these brands in particular?

Answer: The original computers were a district choice by the

Computer Services Coordinator. Currently, the district seems to be phasing Apples out, with more IBM machines being purchased.

Question 2: Which library management uses of microcomputers (circulation, collection development, reference support, cataloging support, acquisitions, and serials control) have you made, with which software/hardware, and with what successes and difficulties?

Answer: Circulation is accomplished with *Circulation Plus* on IBM. An AV module was installed on-site with help and is very useful. Collection development statistics are provided through *Circulation Plus* and are helpful for selection decisions and weeding. An electronic catalog is planned for the near future and is eagerly awaited. Cataloging is centrally done by the district.

Question 3: What student and teacher uses have been made (word processing, statistics, spreadsheets, games, drill for skill) in the library, with which software/hardware, and with what success or difficulties?

Answer: There is considerable word processing use on the network using WASATCH software, which has replaced Apple software. Additionally, teachers bring in their own software. Simulation uses are frequent, as are game playing on Apple, especially math games. Drill for skill uses are programmed by WASATCH and heavily used (math, geography, English, etc.). There has been a great increase in the use of reference materials and in reading and writing motivation traceable to available computer programs. An online encyclopedia from WASATCH is being eagerly awaited. Teachers were at first reluctant users but now are very positive, with great use of testing, grading, and progress recording on computers.

Question 4: Does the library control any administrative or curriculum uses of microcomputers? Any future plans?

Answer: No.

Question 5: Do you have any anecdotes about use, problems, or surprises you would care to share?

Answer: Several comments are worth making:
  a. The kids are very fond of microcomputers, which they view as "superpersons." They attribute to computers an almost omnipotent character.
  b. There is a real need for more hard drives and additional staff.
  c. There is a great need to have rules about the treatment of computers. The kids are amenable to such rules. They

see the use of microcomputers as a great privilege.

    d. An unfortunate surprise in setting up the library occurred when the furniture burned on the factory loading dock. Everyone was supportive and made do for a while. It was quite a sight to see 108 computers stacked in half the library space.

Question 6: What advice do you have for those just beginning to incorporate microcomputers?

Answer: It is very important to plan carefully with administration and computer people. It is also imperative to have one person available and committed to troubleshooting the equipment. And the planning should recognize that every child can use thirty minutes/day, although this is difficult to accomplish.

CONCLUSION

Judging by the data presented herein, it would seem that the decade of the nineties will bring imaginative and multifaceted use of microcomputers into public schools and public school libraries. That occurrence is an absolute necessity when one considers the preparation of students for life and work in a world which is increasingly dependent on effective and efficient use of computer technology.

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