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(MAPS)















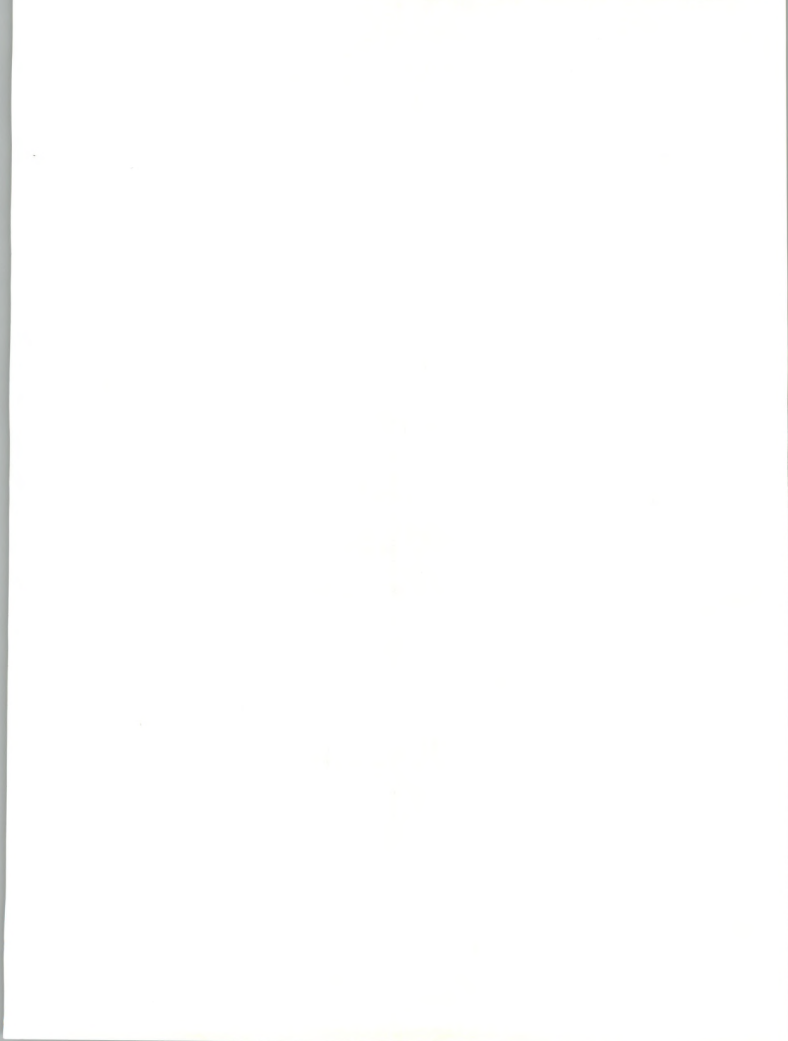
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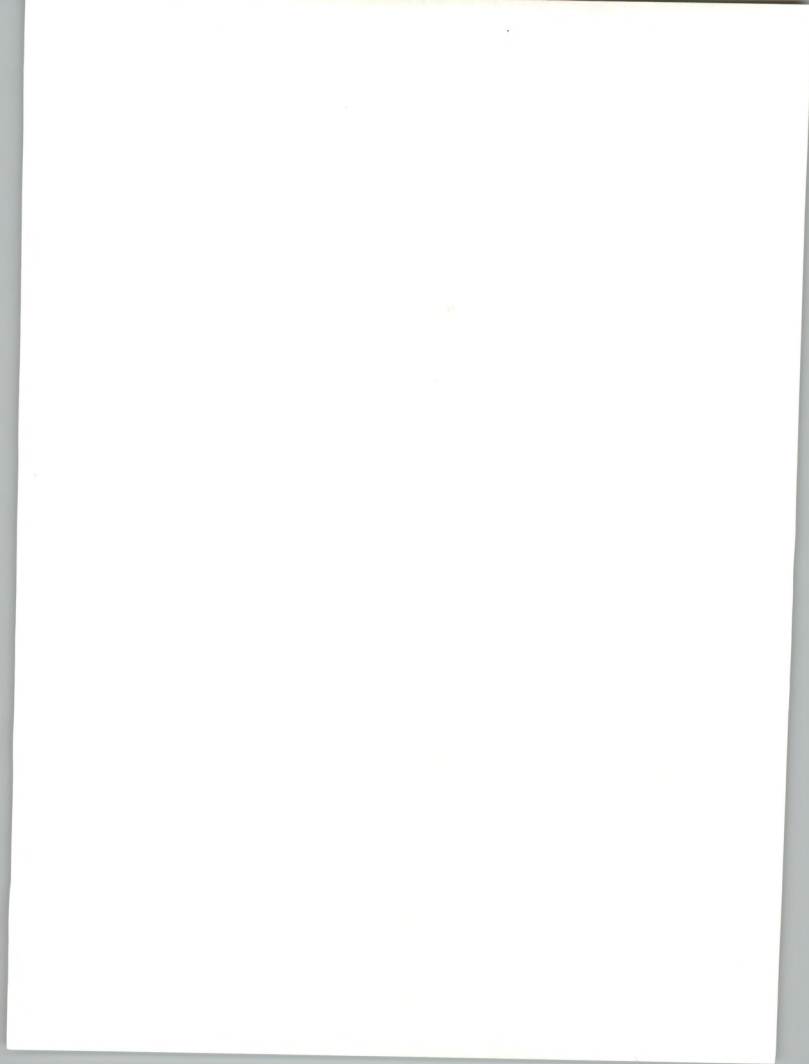
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U.S. INFORMATION SERVICES
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MARKETS, 1987-1992

EDUCATION
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**Market Analysis and Planning Services
(MAPS)**

*U.S. Information Services, Industry-Specific
Markets, 1987-1992—
Education*

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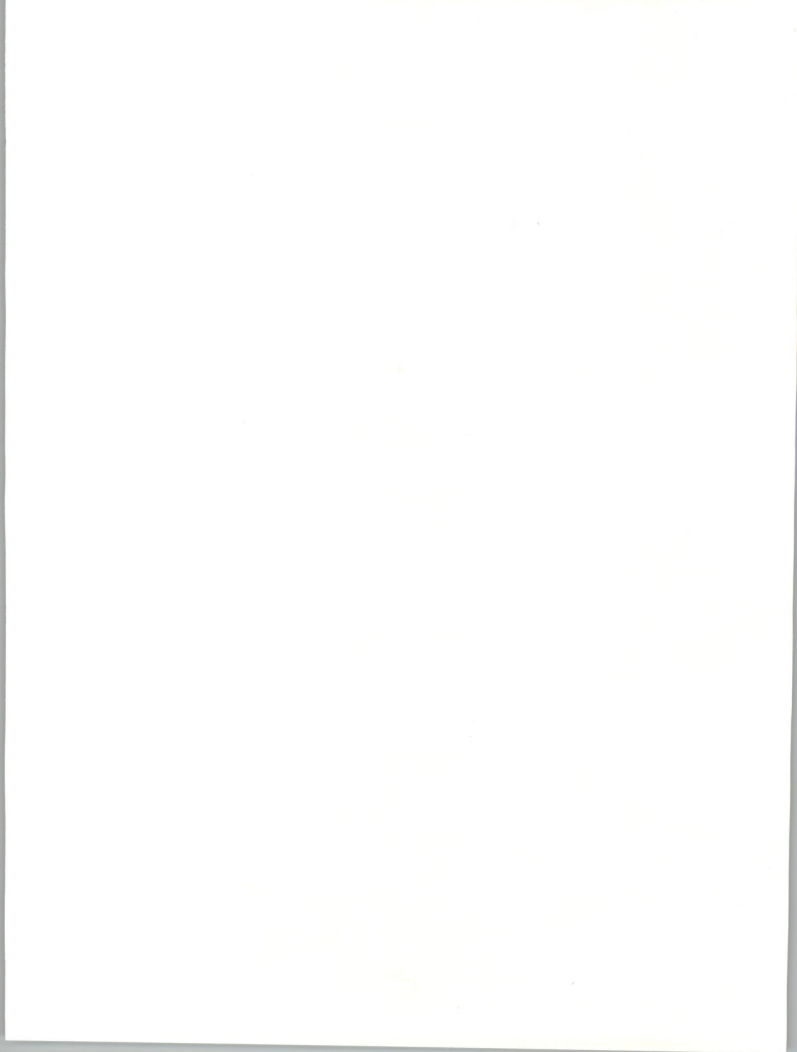


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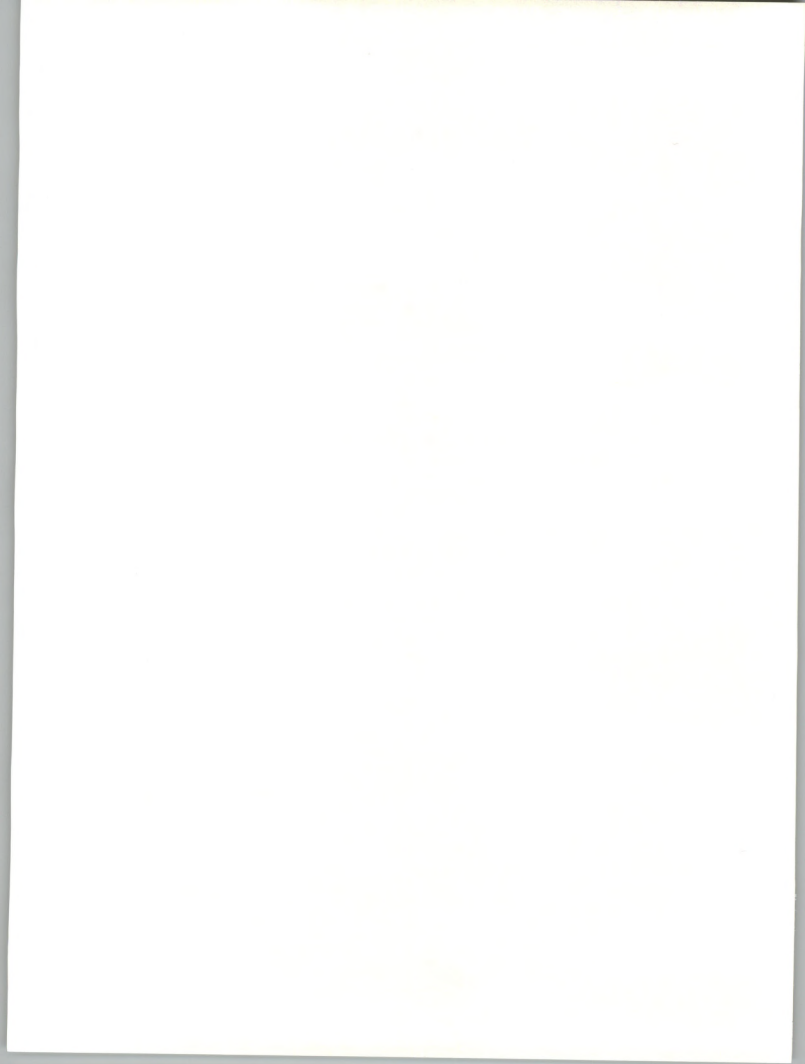
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the 1990s, the number of people in the UK who are aged 65 and over has increased by 1.5 million, and the number of people aged 75 and over has increased by 1.2 million (Office for National Statistics 1999). The number of people aged 85 and over has increased by 0.5 million.

There is a growing awareness of the need to develop services to meet the needs of the ageing population. The Department of Health (1999) has published a strategy for ageing, which sets out the government's commitment to improve the lives of older people. The strategy is based on the following principles: (1) older people should be able to live independently and actively; (2) older people should be able to access the services they need; (3) older people should be able to participate in the decisions that affect their lives; and (4) older people should be able to live in a safe and secure environment.

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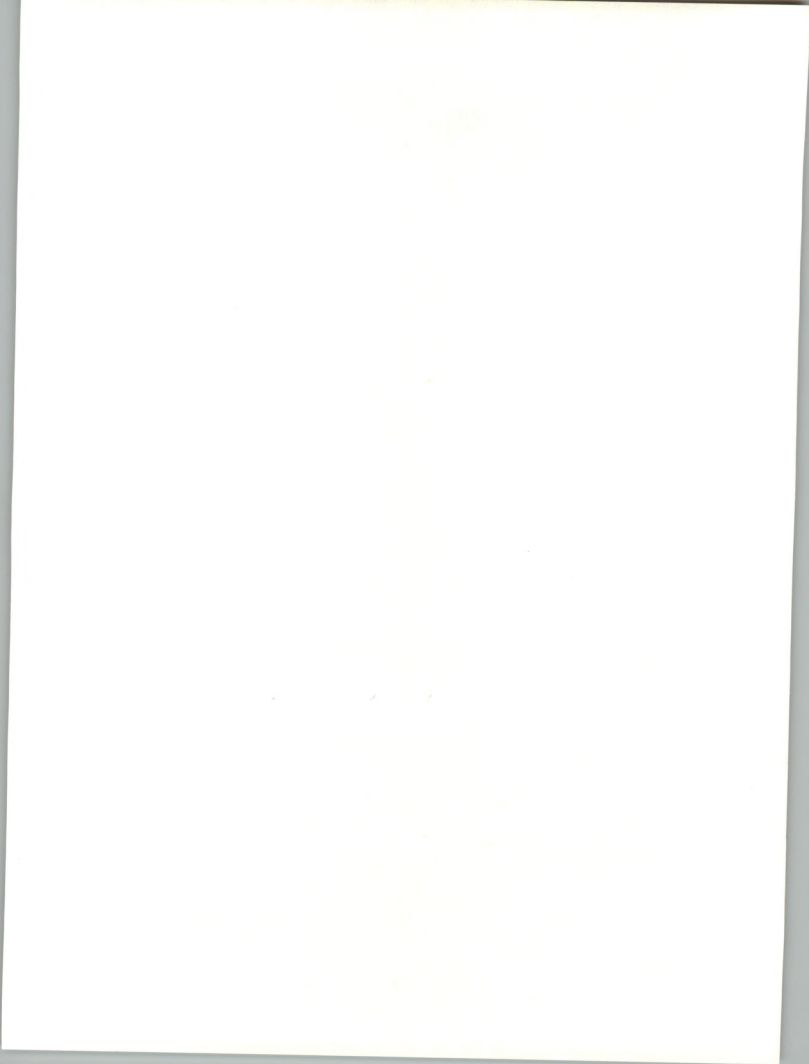
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Issues, Trends, and Events





I

Issues, Trends, and Events

A

Introduction

The education market is divided into three major segments:

- Administrative applications.
- Academic/research applications.
- Library applications.

Public primary and secondary schools, as well as colleges and universities, which are faced with declining enrollments and reduced federal support, are experiencing severe financial constraints. The limited funds available for computers will be balanced by the need for improved information for marketing at higher education institutions and improved asset management at all schools.

Academic software is sold to different purchasers than administrative software. Purchasing cycles for off-the-shelf administrative applications typically last between 11 and 18 months. Purchasing cycles for micro-based academic software are much shorter.

Networking is a bona-fide trend at all educational institutions. Colleges and universities want to link entire campuses; primary and secondary schools want to connect microcomputers via local-area networks. IS managers have moved from the evaluation stage to planning and budgeting for local-area networks (LANs). 1988 may be the year that the educational computing community finally arrives at the LAN. With a network, the cost of peripherals can be spread over many computers, benefiting schools with tight budgets for computer equipment.

Microcomputer-based software is proliferating, with more publishers becoming involved in curriculum-based software, resulting in better quality software provided by large, well-financed vendors for IS departments. Full-line software and text book suppliers will make the purchase decision easier.



As more microcomputers are used in education, hardware service and software support will become increasingly important. Since IS managers cannot support a \$100 or \$200 software package in a cost-effective manner, vendor software support will be an important buying criterion.

Administrative software modules must be integrated; one keystroke should transfer the data entered to all system modules requiring that information. Dividing a large application into smaller modules also breaks a high-dollar-value scale into a series of smaller ticket sales, easing pressure on IS managers to build complete functionality overnight on a limited budget.

IS managers must look to recentralize control of micros. Someone outside the end-user department must monitor the purchase and use of micros.

To build market acceptance and encourage brand loyalty, microcomputer vendors have donated to schools approximately 15% of the PCs in use today. However, inexpensive software has not been developed at a pace matching the spread of microcomputer hardware.

Software preview centers are springing up across the country. There are about 750 centers across the U.S. helping schools and teachers sort through the myriad varieties of educational software on the market. Preview centers are usually part of a state institution or college and are designed to determine a list of approved products for purchase.

B

Definitions

Definitions used in the education market include specific terms for describing the grade level of pupils, namely:

- Primary school—kindergarten through grade five.
- Middle school—grades six through eight.
- Secondary school—grades nine through twelve.
- Post secondary—vocational school, two-year college, four-year college, four-year university, specialized professional school, technical institute.

Administrative computing applications encompass student scheduling, instructor scheduling, classroom scheduling, attendance monitoring and reporting, tuition, personnel administration, admission, alumni information, registration, alumni and corporate development, financial aid administration, accounting, investments, covenants and appeals, reports for state and federal agencies, work/study program administration, fellowship/internship accounting, student records, immunization tracking, grade reporting, aggregate test score evaluation, redistricting analysis, vehicle maintenance, ticketing for athletic and art/music events, and guidance counseling.

the 1990s, the number of people in the UK who are aged 65 and over has increased by 1.5 million, and the number of people aged 75 and over has increased by 1.2 million (Office for National Statistics 2000).

There is a growing awareness of the need to address the needs of older people, and the importance of the role of the health care system in this. The Department of Health (1999) has published a strategy for the care of older people, which sets out the government's commitment to improve the health and care of older people, and to ensure that they are able to live independently and with dignity.

The strategy is based on the following principles: (1) to ensure that older people are able to live independently and with dignity; (2) to ensure that older people are able to access the services they need; (3) to ensure that older people are able to participate in decisions about their care; (4) to ensure that older people are able to live in their own homes; (5) to ensure that older people are able to live in the community.

The strategy is a key document for the health care system, and it sets out the government's commitment to improve the health and care of older people. It is a document that should be read by all health care professionals, and it should be used to guide the development of services for older people.

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Academic/research computing modules address student instruction, test scoring, student test score interpretation, and professor- or department-specific research projects.

Library computerization software includes catalog maintenance and information retrieval, circulation control, loans and reservations, acquisitions, periodical control, indexing, text search and retrieval, financial management, overdue and reserve book handling, interbranch and interlibrary loan, and tracking periodicals being bound.

C

Trends in Primary and Secondary Schools

The current major trend is the move away from literacy to curriculum-based software. Computers are being used as tools for specific applications, such as art, music, and the "three Rs."

IBM microcomputers do not dominate the education market. In fact, the market leader is Apple, followed by Tandy/Radio Shack, and Commodore. Apple, Tandy/Radio Shack, and Commodore are successful due to:

- Strong discounts and equipment donations to schools.
- Availability of relatively high-quality software.

IBM micros, even with education market discounts, remained too expensive for budget-conscious schools.

More computer-based administrative systems for elementary and secondary schools are being made available through lower cost multiuser microcomputers and low-end minicomputers. School districts and individual schools can have in-house, cost-effective systems for administrative recordkeeping. As a result, use of processing/network services will decrease.

The availability of lower-priced hardware is not leading to proportionately higher sales of software due to the support costs associated with software for the education market. As the price of microcomputers declines, buyers expect the price of software to decline. This expectation is based on the ratio of software to hardware prices. It will be a challenge for software vendors to write and support high-quality courseware and meet the buyer's expectations for lower software prices. Relatively inexpensive, full-function, integrated software modules will appear as one solution to balance buyers' pricing expectations with the need for higher quality software.

Secondary schools are likewise using computers for such specific vocational applications as spreadsheets, information filing, and word processing. Other applications include biology/chemistry/social studies simulations, familiarity with the typewriter keyboard, English composition,



process analysis, developing problem-solving techniques, and programming.

D

Trends in Post-Secondary Institutions

As a result of demographics, competition among post-secondary schools has intensified for a decreasing number of college-age students.

- Most four-year colleges and universities must now adopt marketing techniques in order to attract good students and faculty. Post-secondary institutions are using data bases to merge software, lists of prospective students, demographic SAT/ACH test scores, athlete names, and sports to target prospective students. Other software helps follow up on letters and phone calls with students.
- The increasing competition for top students is not limited to the best colleges and universities; rather, this trend affects all institutions of higher learning.

Since many four-year colleges and universities are funded partly by state taxes and federal grants, and since reporting requirements have increased at all levels of government, more budget and financial software is required.

Since businesses prefer to hire graduates with some degree of computer literacy, colleges and universities are trying to broaden student exposure to computers beyond engineering and business administration graduates. However, the key impediments to widespread adoption are interrelated—not knowing how to effectively utilize computers in say, philosophy, and a lack of discipline-specific instructional software. Little is being done to address this opportunity.

In partnership with local businesses, two-year colleges and vocational schools are increasing the variety, content, and depth of vocational education courses, offering courses to train employees in the use of spreadsheets, data base management, and word processing programs.

A recent trend on college campuses is the use of programs developed by faculty members. These programs are often called courseware because they are used to teach specific courses and subjects. Many new programs are sophisticated simulation programs that allow students to visualize on a computer phenomena that would be difficult or expensive to experience outside the classroom. For example, chemistry students can mix chemicals without risk of explosion, physics students can see the path that electrons travel in response to different forces, and medical students can perform simulated operations.

the 1990s, the number of people in the UK who are aged 65 and over has increased by 1.5 million, and the number of people aged 75 and over has increased by 1.2 million (Office of National Statistics 1999).

There is a growing awareness of the need to address the needs of older people in the community. The Department of Health (1999) has published a strategy for older people, which sets out a vision for the future of older people's health and social care. The strategy is based on the following principles:

- Older people should be able to live independently in their own homes for as long as possible.
- Older people should be able to access the services and support they need to live well.
- Older people should be able to participate in decisions about their care and support.
- Older people should be able to live in a safe and secure environment.

The strategy also sets out a number of key objectives, including:

- To improve the health and well-being of older people.
- To ensure that older people have access to the services and support they need to live well.
- To ensure that older people are able to participate in decisions about their care and support.
- To ensure that older people live in a safe and secure environment.

The strategy is a key document for the development of older people's services in the UK. It provides a framework for the development of policies and services for older people, and sets out the key principles and objectives that should guide the development of these services.

The strategy also sets out a number of key actions that should be taken to achieve these objectives, including:

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- To ensure that older people live in a safe and secure environment.

E**Trends in
Computerization of
Academic Libraries**

Libraries are doing significantly more with computers, specifically:

- More libraries (academic, public, and specialized) are going on-line. Key applications include card catalogs and on-line data bases.
- Data base providers are designing easier access methods—including common software interfaces and easier-to-understand commands—to more data bases.
- More data bases, especially those that are industry or application specific as well as non-U.S. data bases, are constantly being added or upgraded through regional or national library consortia.

An industry leader, On-Line Computer Library Center (OCLC) has specified the Unix operating system in certain on-line applications. With the transportability of Unix files, OCLC lessens its dependence on computer hardware using proprietary operating systems.

OCLC research projects include:

- Easier access to electronic catalogs by patrons.
- Reducing overlap between abstracting and indexing services and central library computer files.
- Improvements to on-line Dewey Decimal System classifications and subject categories.
- On-line access to complete text and graphics in books.
- CD-ROM Retrieval System.
- Analyzing use of nonfiction books and current updates to catalogs of library holdings.

F**Factors Spurring
Growth**

Education textbook publishers now recognize the importance of "courseware" for microcomputers. Courseware comprises integrated software and workbooks for specific classroom modules. Improved courseware will accelerate the growth of application software for microcomputers.

Funding problems come and go as local politicians change and as parental (voter) pressure changes. The 1980s "baby boom" is likely to result in increased demands for better education since a greater proportion of these parents are college educated.



Despite more computer-literate instructors and administrators, the need for service and support continues to grow. Vendors should treat the requirement for increased support as an opportunity to "lock in" the buyer and sell additional products.

G

Factors Limiting Growth

Factors that have held back growth in the classroom educational software market include:

- Low levels of instructor computer literacy.
- Educational software that is limited in effectiveness.
- Limited financial resources of educational institutions.
- Lack of hardware standards to spur software development.

The growth of software sales has been limited also because of instructors' widespread "swapping" and "sharing" of software programs, which in some cases involve unauthorized copying. This practice limits the size of the market and, hence, limits the development efforts of software houses, which are concerned about making a profitable return on their investment. The pricing of software for the classroom will need to be changed in order to accommodate the interests of instructors and vendors. Some variation of corporate or site licensing programs may be appropriate for the education market segment.





Market Forecasts





II

Market Forecasts

A**Introduction**

The education market is diverse. The information requirements for administrative computing at colleges and universities is different from that at junior and senior high schools. Furthermore, community libraries differ from academic, professional, or industry-specific research libraries. User expenditures for industry-specific educational applications will grow 10% annually through 1992, increasing from \$361 million in 1987 to \$590 million in 1992, as shown in Exhibit II-1.

Forecasts for user expenditures by delivery mode are shown in Exhibit II-2. Application software will grow most rapidly, at a rate of 15%. Exhibit ED-A contains the forecast data base for each year between 1986 and 1992, by delivery mode.

B**Processing Services**

User expenditures for processing services will grow at a 9% annual rate increasing from \$149 million in 1987 to \$234 million in 1992. As more organizations convert to minicomputer- or microcomputer-based applications, processing services will grow at a slower rate compared to applications software.

Many public school districts and parochial schools, satisfied with the level and quality of processing services, are not willing to hire and manage staff and will maintain the status-quo relationship with processing services.

As processing services moves from batch to interactive processing, more schools will migrate to processing services, rather than compete for data processing, administrative, programming, and operations staff. The federal government, through the National Science Foundation (NSF), has funded six university computer centers for advanced research projects in scientific and technical disciplines. These computers can be accessed through existing campus telecommunications links.

the 1990s, the number of people in the UK with a long-term condition has increased by 50% (Department of Health 2000). The prevalence of long-term conditions is also increasing in other countries (e.g. Australia, Canada, France, Germany, Italy, Japan, the Netherlands, Norway, Sweden, Switzerland, Taiwan, the USA and the Netherlands) (World Health Organization 2002). The prevalence of long-term conditions is also increasing in other countries (e.g. Australia, Canada, France, Germany, Italy, Japan, the Netherlands, Norway, Sweden, Switzerland, Taiwan, the USA and the Netherlands) (World Health Organization 2002).

Long-term conditions are a major cause of disability and are a leading cause of death in the UK (Department of Health 2000). Long-term conditions are also a leading cause of hospital admission and are a major cause of health care costs (Department of Health 2000). Long-term conditions are also a leading cause of health care costs (Department of Health 2000). Long-term conditions are also a leading cause of health care costs (Department of Health 2000).

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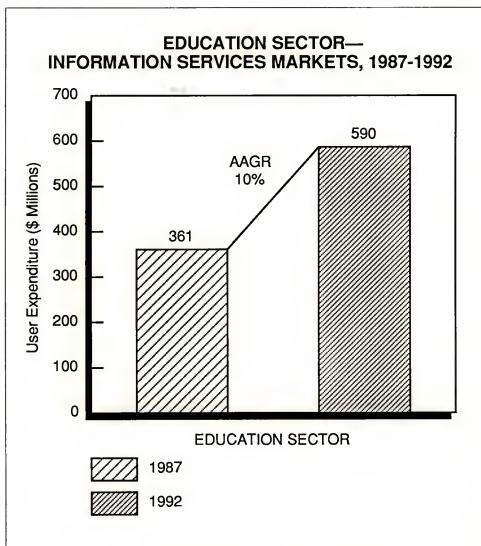
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EXHIBIT II-1

**C**

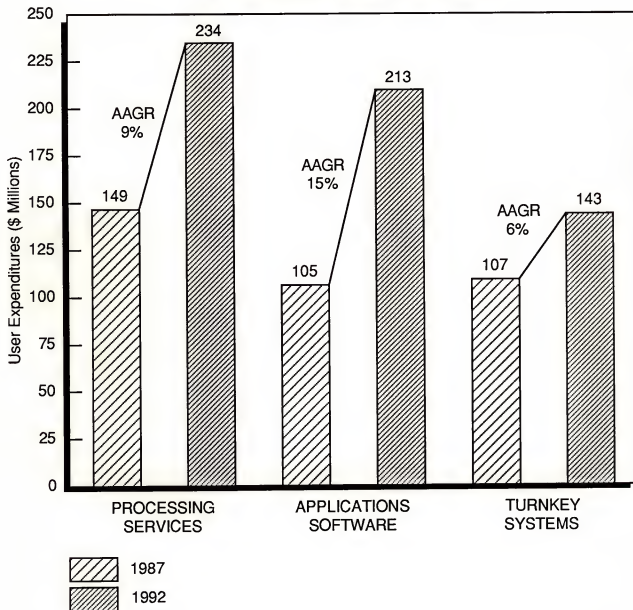
Applications Software User expenditures for applications software will increase from \$105 million in 1987 to \$213 million in 1992 at an annual growth rate of 15%.

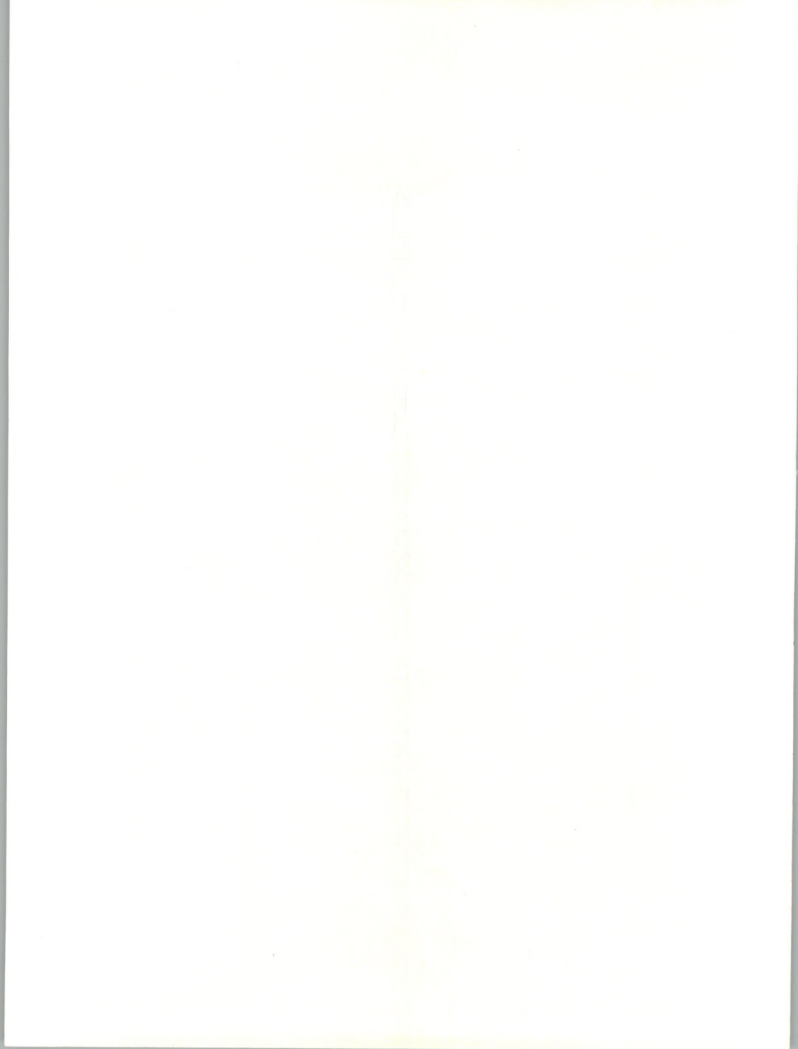
Factors influencing the growth of mainframe/minicomputer-based software include:

- Integrated software modules.
- Growth in school ownership of communication facilities.
- More state and local government reporting requirements.
- Increased Federal Government monitoring of school districts' personnel actions.
- Increased competition for high-quality students, faculty, and staff.

EXHIBIT II-2

**EDUCATION SECTOR—
INFORMATION SERVICES MARKETS
BY DELIVERY MODE, 1987-1992**





Factors slowing the growth in demand for mainframe/minicomputer-based applications software include:

- Continued buyer confusion about what hardware and software is actually necessary, hindered by the number of users on selection committees.
- Migration of current minicomputer applications to microcomputers.
- However, application migration down to microcomputers will be limited by the departmental or school-level (engineering, liberal arts, business) need for shared information.

Microcomputer-based applications software will grow fastest of all information services delivery modes, since more applications will initially be microcomputer-based.

D

Turnkey Systems

User expenditures for turnkey systems will grow the slowest among the delivery modes, at an annual rate of 6.1%, increasing from \$107 million in 1987 to \$143 million in 1992. Among the different systems, microcomputer-based systems will grow the fastest due to three reasons:

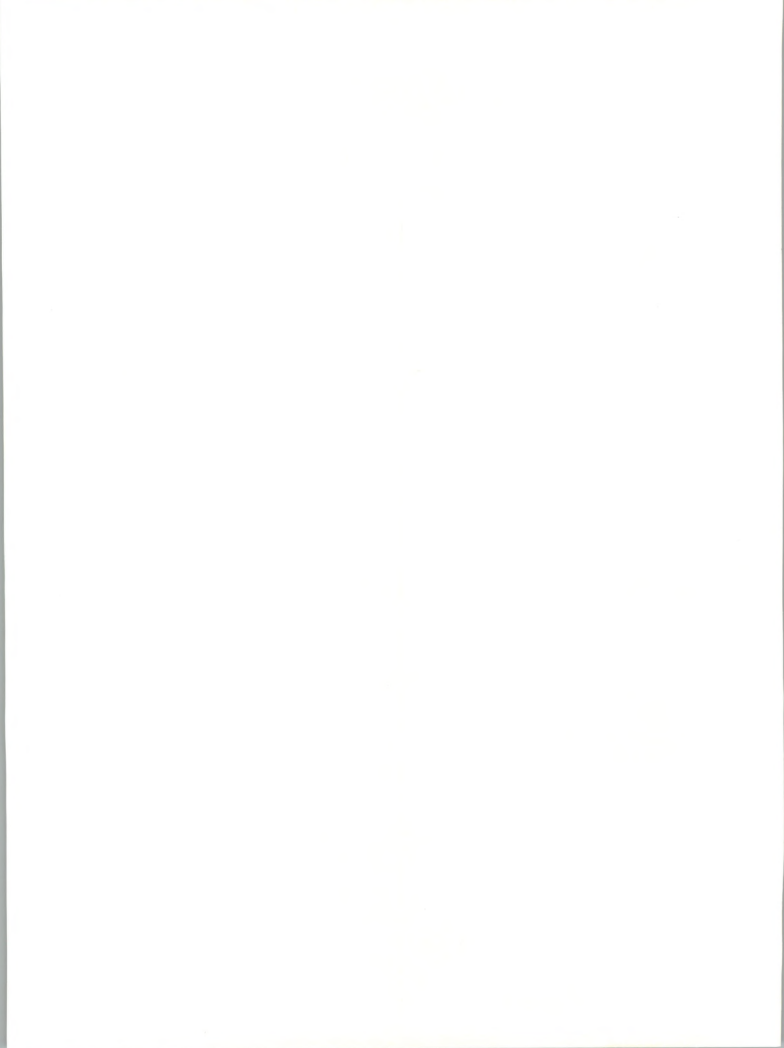
- Certain administrative functions, such as accounts payable or vehicle maintenance management and scheduling, can be implemented on a microcomputer.
- The greatest productivity gains will come from initial computerization. Cost-effective microcomputers, particularly IBM compatibles, will drive the purchase of microcomputers by numerous school districts.
- Existing microcomputer-based applications can be networked or set up to run on multiuser microcomputers or minicomputers.

New developments in the microcomputer arena, including Intel's 80386 microprocessor, IBM's PS/2 Series of computers, and Microsoft's OS/2 operating system will soon open up a new class of computers with superior price/performance characteristics. While new software must be developed to accommodate these machines, this provides an opportunity for improved applications software and courseware.



Competitive Developments







Competitive Developments

A

Introduction

The education information systems market is characterized by large vendors selling mainframe-based administrative software and numerous smaller vendors selling academic software.

The leaders in the administrative systems market segment are:

- Systems & Computer Technology Corporation.
- Information Associates.
- American Management Systems.

The leaders in the academic/research systems market segment are:

- National Computer Systems.
- Computer Curriculum Corporation.

Mergers and acquisitions activity was insignificant in 1987 indicating that:

- This is a relatively mature market dominated by a few large profitable companies.
- Second-tier companies have not introduced significant new products or applications that would make them attractive takeover targets.
- Internally generated cash has been sufficient to fund research and development, product marketing, and customer support activities.



B**Vendor Profiles**

1. Systems & Computer Technology Corporation (4 Country View Road, Malvern, PA 19355)
Revenue (FYE 9/30/87): \$42.0 million

a. Products/Services

Systems and Computer Technology Corporation (SCT) provides a broad range of systems integration and related services. These include applications software, information resource management services, telecommunications services, and custom software development.

b. Markets Served

SCT primarily serves educational institutions (colleges, universities, trade schools) and government jurisdictions (cities, counties).

c. Company Strategy

The resurgence in its core business has refocused SCT's attention on this area. The company plans to reduce its emphasis on new ventures and acquisitions that it had been exploring as business opportunities for over a year.

d. Recent Activities

In January 1987, SCT introduced a full line of telecommunications management and consulting services. These services encompass the design, implementation, and management of private telecommunications networks and the integration of data, voice, video, security, and environmental control into a total communications system.

In 1987, the company introduced two new software product lines - SYMMETRY Series and BANNER Series - both of which incorporate relational data base management systems. The SYMMETRY Series brings relational technology to IBM mainframe users, while the BANNER Series is aimed at mid-range IBM and DEC users.

e. Future Directions

In 1986 SCT announced a cash settlement to settle claims filed against the company between 1984 and 1986. The company has established a reserve fund in anticipation of legal expenses associated with continuing litigation against its former president. With new products and services introduced in 1987, and with a stronger financial position, SCT hopes to return to profitability and anticipates a better year for 1988.



2. American Management Systems, Inc. (1777 North Kent Street, Arlington, Virginia 22209)
Revenue (FYE 12/31/86): \$135.5 million

a. Products/Services

American Management Systems (AMS) provides applications software and professional services to financial services firms, federal government agencies, state and local governments, colleges and universities, energy companies, and telecommunication companies.

In the education area, AMS markets software products to colleges and universities, and local school districts. College and University Financial System (CUFS) is a financial management system that provides budgeting, accounting, reporting and other financial functions.

The Development Information System (DIS) supports alumni record keeping, fund raising, and gift-processing activities for universities and also for nonprofit organizations.

Local Education Agency Financial Systems (LEAFS) provides integrated applications for the financial management of local school districts.

b. Markets Served

AMS focuses on the large institutions and companies. In the education area the company's target market includes the 300 largest colleges and universities.

c. Company Strategy

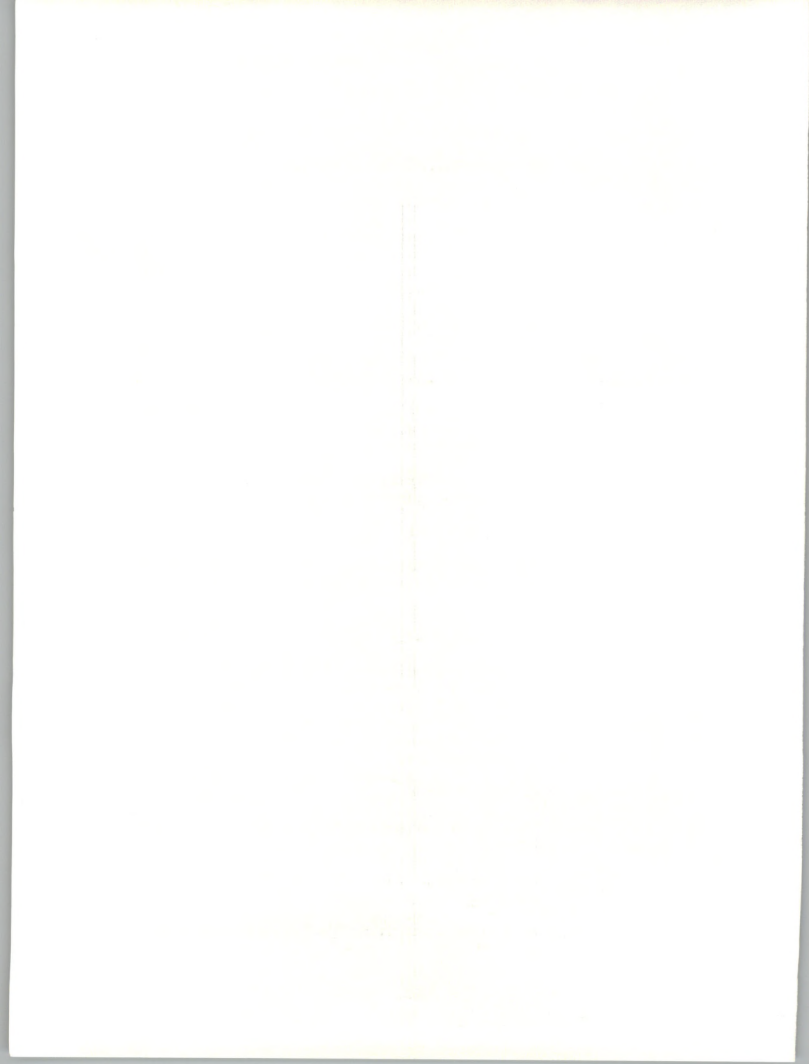
The company's goal is to be the leading national company in each of its largest market segments, and to focus on maintaining a long-term relationship with its clients. The company's strategy is to exploit its ability to develop and operate major management systems, its expertise in industry disciplines, and its range of software products to provide the best solution to its customers' needs.

d. Recent Activities

The company's fastest-growing business sector is the financial services industry.

In 1987, AMS was awarded several large multi-year contracts by federal, and state and local governments.

In the education sector, the company continues to enjoy robust sales.



e. Future Direction

Since 1982, AMS's marketing has focused on the larger companies and government agencies. There will be no radical new departures from this policy. The company will emphasize improving penetration in existing clients by expanding its range of products and services.

**3. National Computer Systems, Inc. (11000 Prairie Lakes Drive, Eden Prairie, Minnesota 55344)
Revenue (FYE 1/31/86): \$215.8 million**

a. Products/Services

National Computer Systems (NCS) manufactures and markets a broad variety of information management products and services used in data collection, information analysis and reporting. NCS has three major operating units: scanning systems and services, software systems, and leasing.

The company markets two lines of large scanning systems: the Sentry 70 and the Sentry 80 series and two small desk-top scanner lines: the Sentry 2050 and the Sentry 3000. NCS is a leading supplier of computer-based optical mark reading (OMR) systems. NCS also markets software, forms, and tests to drive its scanners. The company provides a service bureau for customers who do not want to purchase scanners.

b. Markets Served

National Computer Systems primarily markets its products to the education market and to a lesser extent the government and financial markets.

c. Company Strategy

The company has expanded its original focus on the education arena. Two newer markets are health care and human resources.

d. Recent Activities

In mid-1987 NCS acquired a large block of stock of DataCard Corporation, a subsidiary of Deluxe Check Printers, Inc. (St. Paul, MN) and a few months later sold the stock for a substantial gain.

e. Future Direction

NCS has grown from \$50 million in annual revenues in fiscal 1981 to \$216 million in annual revenues in fiscal 1985. The company hopes to reach \$500 million in annual revenues in the next five years. NCS plans to continue its emphasis on bringing applications and solutions to the



markets it serves. NCS also anticipates growth from the promising newer markets.

4. Information Associates (3000 Ridge Road East, Rochester, New York 14622)

a. Products/Services

Information Associates develops and markets packaged applications software, utilizing IBM mainframes and DEC VAX superminicomputers.

Information Associates' product line, Series Z, comprises the following modules: Financial Records System, Student Information System, Human Resource System, and Alumni/Development System.

b. Markets Served

Information Associates markets its application software products to the higher education market, principally colleges and universities.

c. Company Strategy

Information Associates provides integrated software modules for the most popular hardware platforms for multi-building or multi-campus colleges and universities.

d. Recent Activities

In 1986 Management Science America (Atlanta, GA) acquired Information Associates.

e. Future Direction

Information Associates will continue to invest in new modules and enhancements to its education-based applications software line.

Depending upon the degree of support from Management Science America, Information Associates could begin developing products for other vertical market segments.

**5. OCLC On-line Computer Library Center, Inc. (6565 Frantz Road, Dublin, Ohio 43017)
Revenue (FYE 6/30/87): \$84.3 million**

a. Products/Services

On-line Computer Library Center (OCLC) is a non-profit membership organization engaged in computer library service and research.



From its facility in Dublin, Ohio, OCLC operates an international computer network that libraries use to acquire and catalog books, arrange interlibrary loans, and gain access to other data bases.

OCLC provides decentralized computer systems and stand-alone micro-computer-based systems for individual libraries or clusters of libraries.

b. Markets Served

The primary users of OCLC's services and products are libraries, in educational and other institutions. More than 7,900 libraries contribute to and/or use information in the OCLC On-line Union Catalog, the world's largest data base of library bibliographic information. OCLC has participating libraries in over 20 countries.

c. Recent Activities

While no new products were announced in 1987, OCLC introduced enhanced versions of many of its on-line services and software products.

6. CLSI, Inc. (320 Nevada Street, Newtonville, Massachusetts 02160)

Revenue (1987): \$31.1 million

a. Products/Services

CLSI provides computer-based automation products to libraries. The company's LIBS 100 Systems automates acquisitions, circulation control, cataloging, provision of an on-line catalog for public access, and serials management. Other CLSI products include CL-CAT, CL-CIRC, CL-Perline, and CL-MedLine.

b. Markets Served

CLSI's customers are primarily libraries.

c. Company Strategy

CLSI is committed to continued development and delivery of superior library automation systems.

d. Recent Activities

In May 1985, CLSI was acquired by TBG (formerly Thyssen Bornemisza), an international corporation. In July 1986, CLSI became the core organization in a newly established library group within TBG's Systems and Technologies strategic unit.

the 1990s, the number of people in the UK who are aged 65 and over has increased by 1.5 million, and the number of people aged 75 and over has increased by 1.2 million (Office for National Statistics 2000). The number of people aged 85 and over has increased by 0.5 million.

There is a growing awareness of the need to develop services to meet the needs of the ageing population. The Department of Health (1999) has published a strategy for ageing, which sets out the government's commitment to improve the lives of older people. The strategy is based on three main principles: to promote independence, to support families and carers, and to improve the quality of life of older people.

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7. Cogito Data Systems (130 Sewaren Avenue, Sewaren, New Jersey 07077)

a. Products/Services

Cogito Data Systems develops and markets turnkey systems and processing services for school administration applications. The turnkey systems provide for student and instructor records, attendance, grade reporting, and instructor scheduling. The batch processing services handle attendance, scheduling, competency recordkeeping, grade reporting, guidance and master scheduling.

b. Markets Served

Cogito primarily serves the middle schools and secondary schools.

c. Company Strategy

Cogito is concentrating on the processing services for the educational and fleet maintenance markets, having sold the processing services business that handled petroleum industry applications.

Cogito is broadening the hardware platforms for its applications software and will look to IBM personal computers to reach new customers.

8. Pentamation Enterprises, Inc. (One Bethlehem Plaza, Bethlehem, Pennsylvania 18018)

a. Products/Services

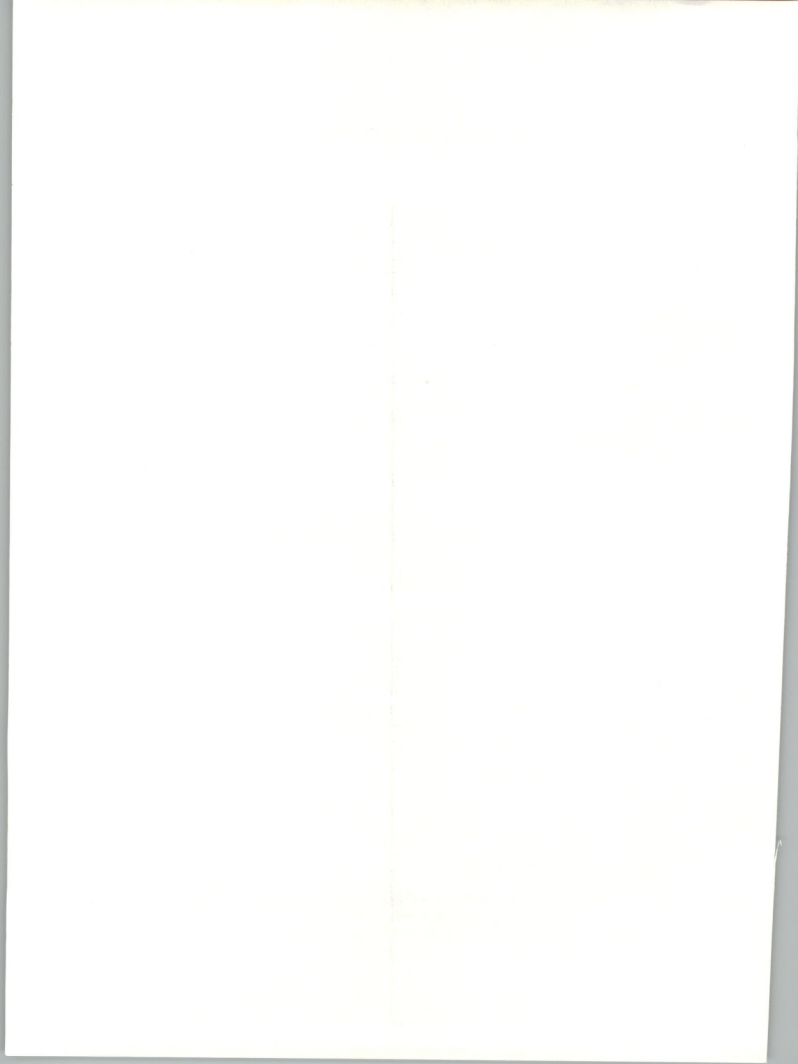
Pentamation Enterprises supplies turnkey systems and related services to a variety of industry markets. In the education area the company's "student" packages provide for student registration and scheduling, grade reporting, and class attendance accounting. The "business office" package includes personnel and payroll, budgeting, revenue and expenditure accounting, and general ledger.

b. Markets Served

Pentamation markets to businesses, educational institutions, physicians' groups, and municipal governments.

c. Company Strategy

The company plans to provide a full line of applications software products for school districts. Pentamation is likely to focus its marketing efforts on the larger school districts.



9. Infocel (5711 Six Forks Road, Raleigh, North Carolina 27609)**a. Products/Services**

Infocel develops and markets minicomputer- and microcomputer-based turnkey systems using the Pick operating system for vertical markets.

Infocel offers software modules for scheduling, student records, report cards, and instruction.

b. Markets Served

Infocel's turnkey systems are marketed to medium and large school districts, federal government, and state and local governments.

c. Company Strategy

Infocel plans to provide a full range of on-line, integrated, multi-user turnkey systems with installation, training, and on-going support aimed at its target markets.

d. Future Direction

The company plans to offer system integration services. Also, Infocel plans to offer systems based on hardware from several vendors to lessen dependence on a single vendor.

10. Computer Curriculum Corporation (700 Hansen Way, Palo Alto, California 94304)**a. Products/Services**

Computer Curriculum Corporation (CCC) develops and markets course materials as part of a system for computer-assisted instruction.

b. Markets Served

CCC primarily serves primary and secondary schools and also remedial education programs.

c. Company Strategy

The company's strategy is to provide a full line of single-user and multi-user systems, complete courseware for mathematics, language arts, reading, and career counseling, and statistical measurement and evaluation techniques for computer-aided instruction.



d. Recent Activities

In October 1987, CCC introduced two new products. Math Concepts and Skills develops the skills needed to solve problems, think critically, and make inferences. In Reader's Workshop, students develop reading comprehension and critical thinking skills by interpreting both writing and graphics such as charts and tables.

In November 1987, CCC released the results of twelve studies that assessed the effect of CCC courseware on standardized test scores in math, reading, and language arts. The results indicated average gains of up to 1.75 grade years in seven months of computer-assisted instruction.

e. Future Direction

CCC plans to develop additional courseware for the Atari and other low-cost microcomputers.



the 1990s, the number of people in the UK who are employed in the public sector has increased by 1.5 million, from 2.5 million in 1980 to 4 million in 1995 (Department of Health 1996).

There is a growing emphasis on the need to improve the efficiency of the public sector, and to ensure that the public sector is able to deliver the services that are required by the public. This has led to a number of initiatives, including the introduction of competition, the restructuring of public sector organisations, and the introduction of performance measures. The aim of these initiatives is to ensure that the public sector is able to deliver the services that are required by the public, in a cost-effective and efficient manner.

One of the key initiatives in the public sector is the introduction of competition. This has led to a number of public sector organisations being privatised, and to a number of public sector organisations being required to compete for contracts. This has led to a number of public sector organisations being required to improve their efficiency, and to reduce their costs. This has led to a number of public sector organisations being required to improve their services, and to ensure that they are able to deliver the services that are required by the public.

Another key initiative in the public sector is the restructuring of public sector organisations. This has led to a number of public sector organisations being merged, and to a number of public sector organisations being reorganised. This has led to a number of public sector organisations being required to improve their efficiency, and to reduce their costs. This has led to a number of public sector organisations being required to improve their services, and to ensure that they are able to deliver the services that are required by the public.

A third key initiative in the public sector is the introduction of performance measures. This has led to a number of public sector organisations being required to measure their performance, and to report on their performance. This has led to a number of public sector organisations being required to improve their efficiency, and to reduce their costs. This has led to a number of public sector organisations being required to improve their services, and to ensure that they are able to deliver the services that are required by the public.

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IV

Information Systems Department Outlook

the 1990s, the number of people in the UK who are employed in the public sector has increased by 1.5 million, from 2.5 million in 1980 to 4 million in 1998 (Department of Health 1999). The number of people in the public sector who are employed in health care has increased by 1.2 million, from 1.3 million in 1980 to 2.5 million in 1998 (Department of Health 1999).

There is a growing emphasis on the need to improve the quality of health care, and this has led to a number of initiatives to improve the quality of health care. The Department of Health has set up a number of committees to monitor and improve the quality of health care, and has introduced a number of measures to improve the quality of health care. The National Patient Safety Agency (NPSA) was set up in 1999 to monitor and improve the quality of health care, and has introduced a number of measures to improve the quality of health care. The Health Foundation was set up in 1999 to fund research into the quality of health care, and has funded a number of research projects to improve the quality of health care.

The Department of Health has also introduced a number of measures to improve the quality of health care. The Health Act 1999 introduced a number of measures to improve the quality of health care, and the Health Act 2000 introduced a number of measures to improve the quality of health care. The Health Act 2000 introduced a number of measures to improve the quality of health care, and the Health Act 2000 introduced a number of measures to improve the quality of health care. The Health Act 2000 introduced a number of measures to improve the quality of health care, and the Health Act 2000 introduced a number of measures to improve the quality of health care.

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IV

Information Systems Department Outlook

A

Major Issues

1. Driving Forces

Administrative applications are being bought to increase the efficiency of the business and administrative functions in the education sector. Schools are purchasing microcomputers to "front end" larger computer systems. New administrative applications should integrate with the basic financial systems.

Strategic planning is higher education's latest buzzword. Like businesses, schools need to do strategic planning. This need is fueled by declining birth rates, an orientation toward "vocational" or skills-based training, and specific employer needs.

Desktop publishing is hot! It is being used to produce a wide range of materials for schools of all sizes. In addition, with the proliferation of personal computers, IS departments are hiring separate staff or allocating part of existing staff for end-user support.

The education sector continues to deal with political pressures such as:

- Cost cutting. While IS can provide a means to improve productivity and information for decision making in key administrative departments, it, too, is under severe cost constraints.
- Changing administrative requirements. State and local governments frequently change administrative reporting requirements and budgeting procedures. Working within a shifting bureaucracy represents a real challenge.

Improved service to high school and post-secondary school students remains a priority. Service improvements include better information for student registration, and better management reporting about the registra-

the 1990s, the number of people in the UK who are employed in the public sector has increased by 1.5 million, from 2.5 million in 1980 to 4 million in 1995. The public sector has also become an important employer of women, with 55% of public sector employees being women in 1995, compared with 45% in 1980.

There are a number of reasons why the public sector has become an important employer of women. First, the public sector has a high proportion of female employees in a number of key areas, such as health care, education and social services. Second, the public sector has a high proportion of part-time employees, which is attractive to women who are looking for flexible working arrangements. Third, the public sector has a high proportion of employees who are working in the community, which is attractive to women who are looking for a job that is meaningful and rewarding.

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Third, the public sector has a high proportion of employees who are working in the community, which is attractive to women who are looking for a job that is meaningful and rewarding. Fourth, the public sector has a high proportion of employees who are working in the community, which is attractive to women who are looking for a job that is meaningful and rewarding.

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tion process. Declining birth rates in the 1960s have resulted in a smaller pool of applicants for post-secondary institutions, and this decline means colleges, universities, and technical and vocational schools must offer the right classes and services to students in order to grow.

Exhibit IV-1 lists the driving forces affecting IS departments in the education sector.

EXHIBIT IV-1

EDUCATION SECTOR—DRIVING FORCES

- Improve Education Administration
- Support Strategic Planning
- Begin Desktop Publishing
- Support End-User Computing
- Deal with Politics of Government and School Boards
- Improve Service to Students
- Appeal to a Decreasing Supply of Students for Post-Secondary Institutions

2. Issues and Objectives

IS must develop data-oriented as opposed to process-oriented information, representing a major change in the way educational institutions operate. Department-level fiefdoms are giving way to centrally managed resources with related growth in the information necessary to further the strategic planning efforts. A good example is the efforts of many institutional IS organizations to support the school's recruitment efforts; rather than strict cost reduction, IS must support post-secondary institutions' recruitment efforts. Such support consists of data base management programming and mail list management.

Another major issue is the establishment of centralized, integrated student information systems as the key means of providing better services to students. Better service is not simply a concept—it is a key differentiator among competing institutions.

the 1990s, the number of people with a mental health problem has increased by 50% (Mental Health Foundation 2000). The prevalence of mental health problems has increased in the general population, and the incidence of mental health problems has increased in the prison population.

There is a growing awareness of the need to address the mental health needs of prisoners. The Department of Health (2000) has published a strategy for mental health services, which includes a commitment to improve the mental health of prisoners. The Department of Health (2000) has also published a strategy for mental health services, which includes a commitment to improve the mental health of prisoners.

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Key IS objectives include:

- Resolving the paradox of providing more support to a broader range of users with tighter budgets.
- Waiting for technological advances or industry standards that will enable communication between incompatible hardware.
- Providing the necessary data to support an increased level of strategic planning by post-secondary schools.

Exhibits IV-2 and IV-3 summarize the issues and objectives identified by education sector survey respondents.

EXHIBIT IV-2

EDUCATION SECTOR—ISSUES

- Develop Data-Oriented Information
- Support Recruiting Activities
- Improve Student Information Systems

EXHIBIT IV-3

EDUCATION SECTOR—OBJECTIVES

- Resolve Less Budget/More Support Paradox
- Resolve Incompatibility Among Computers and Networks
- Develop Necessary Data to Support Strategic Planning



3. Management Perception and Organizational Issues

With the growing importance of strategic planning, schools' senior management is relying heavily on IS directors to define and implement the necessary information. IS is now directly supporting senior management at post-secondary institutions in two key areas—financial information and the long-range planning process.

- Financial information must be gathered and consolidated in a meaningful way for use by senior management.
- No longer can university presidents run a fully decentralized operation. Deans and department heads are being made accountable for head counts, capital budgets, and operating budgets to support long-range objectives.

Since they do not directly represent a particular department or academic discipline, IS directors are seen as a "neutral" party to gather and present necessary information; hence, their importance is increasing. Furthermore, technological advances in networking, data base software, and integrated voice/data communications are forcing recognition of the skills and knowledge of the IS director.

Retaining technical staff is becoming a critical success factor. Some schools have experienced incredible turnover during the past year, with staff lured by better salaries and growth opportunities in other industries. As a result of key staff shortages, IS management cannot implement departmental plans.

4. Impact of Technology

The impact of technology in the education sector is shown in Exhibit IV-4.

New technology has fostered a faster document turnaround to meet the demands for faster-paced administrative processing. Also, networks enable colleges and universities to link geographically separate offices/branches for file transfer and administrative purposes.

INPUT also observed that universities are taking advantage of the fact that replacing old with newer technology will permit growth in processing capability and storage capacity while maintaining a flat budget. And, new technology has enabled IS to promote a "buy-in" by senior management of computerization through daily use of computers as a tool. Major administrative functions include: electronic mail, calendars, data manipulation, and report writing.

EXHIBIT IV-4

EDUCATION SECTOR—IMPACT OF TECHNOLOGY

- Improved Response Times
- Improved Communication
- Improved Efficiency of Computer Equipment
- Heightened Computer Awareness by Senior Management
- Better and Faster Compliance with Changes in Laws

Finally, new technology has enabled schools to better comply with changes in state and federal laws and related reporting requirements as well as changes in auditing procedures.

B**New Applications**

Colleges and universities support a wide range of business activities, resulting in a diverse base of applications software. Primary applications include: accounting and finance, admission, financial aid, development/fund raising, registration, bookstore, and administrative offices of the president and various deans. Exhibit IV-5 details new applications identified by INPUT survey respondents.

EXHIBIT IV-5

**EDUCATION SECTOR—
NEW APPLICATIONS IN 1987**

- Applications Based on Data Base Management Systems
- Voice/Data Networks
- Desktop Publishing



Post-secondary and secondary institutions are implementing more applications based on data base management systems, including:

- Registrar files.
- On-line library catalog systems.
- On-line registration.
- On-line student fee collection systems.
- Budgeting systems.
- Installation tracking of microcomputer hardware and software.
- Purchasing.

Campuswide voice/data networks, while not strictly application software based, are becoming more widespread. The past two years' planning efforts are becoming reality.

The hottest new application is microcomputer-based desktop publishing. Between 1986 and 1987, desktop publishing appeared across a diverse user base of educational institutions. INPUT believes this represents a significant trend, not a one-time temporary aberration.

The education sector has a few IS needs that respondents believe are not well served by vendors. Specifically, schools want:

- A network version of Lotus 1-2-3.
- Micro-to-mainframe links, especially those compatible with IBM mainframe operating systems.
- Software to integrate existing workstations.
- CPU to CPU communication between different vendors' products.
- More software for primary and secondary school districts' applications, especially payroll, personnel, and finance, running on non-DEC and non-IBM computers.

The education sector is divided in its approach to software development. Larger colleges and universities tend to develop new applications in-house while smaller colleges and universities generally rely on third-party software for new applications. In either case, maintenance and enhancement of existing applications take a far greater share of the resources than developing new applications.

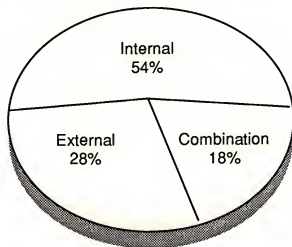
- Larger colleges and universities devote around 40% of software development staff to developing new applications.
- Smaller schools devote less than 25% of their software development staff to developing new applications.



Exhibit IV-6 shows educational institutions' sources for new applications software. Internally developed software continues to be the most prevalent. However, off-the-shelf applications software is used more than is a combination of third-party software with either internal development or outside professional services.

EXHIBIT IV-6

**EDUCATION SECTOR—NEW SOURCES
OF APPLICATION DEVELOPMENT
(For Major New Applications)**

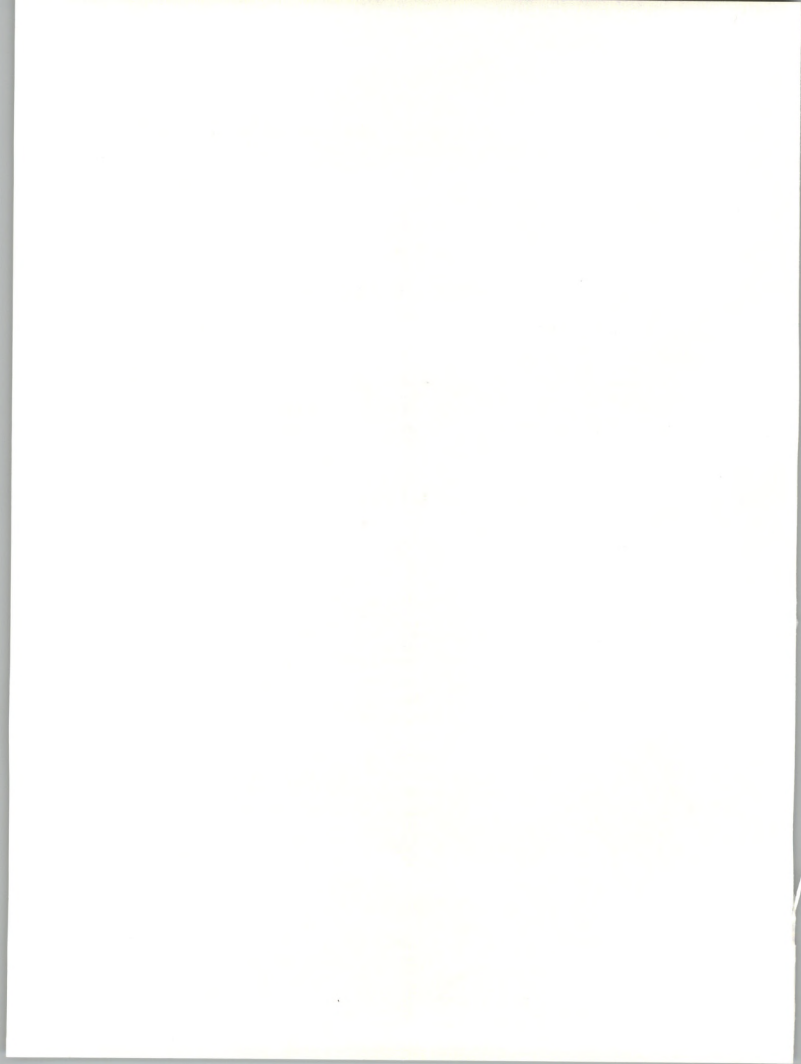


Cost Range of New Applications Software:

- Mainframe-Based: \$30,000 - \$1,000,000
- Minicomputer-Based: \$15,000 - \$800,000
- Microcomputer-Based: \$125 - \$16,000

Average Cost of New Applications Software:

- Mainframe-Based: \$450,000
- Minicomputer-Based: \$205,000
- Microcomputer-Based: \$975



- Driven by legislative and accounting requirements, more schools are now updating their 1970s-vintage, in-house-developed software.
- The relatively low salaries paid to programmers and systems analysts in the education sector may provide economic justification for continuing in-house applications software development.
- While it may be necessary for more schools to eventually shift to third-party integrated applications software, many schools continue to do in-house work, reflecting a "not invented here" attitude.
- However, there are not sufficient in-house programmers to both maintain and enhance existing applications and develop new applications. The increase in external software development indicates IS management is moving in the right direction.

C

Budget Analysis

In 1987, respondents experienced limited growth in their IS budgets, due primarily to increases in salaries, fringe benefits, and applications software.

- IS spending in 1988 is projected to increase 3-5% because of inflation, salaries, and benefits.
- Exhibit IV-7 shows the 1987 budget distribution and projects the growth in specific budget categories in 1988.

In general, private secondary and post-secondary schools' budgets are growing at a faster pace than those of public secondary and post-secondary schools. IS spending in unified primary and secondary school districts is increasing at a slower rate than in nonunified school districts.

Nearly 80% of the respondents project their IS budgets will increase or remain the same in 1988 as compared to 1987. More than 50% of respondents believe the 1988 growth rates will be greater than in 1987 (see Exhibit IV-8).

- Factors contributing to increases in the IS budget include (in order of most frequently mentioned factors):
 - Hardware maintenance.
 - Software maintenance.
 - Personnel expenses.
 - New applications software purchases.
 - New hardware purchases.
 - Telecommunications cost increases.



EXHIBIT IV-7

**EDUCATION SECTOR—1987 BUDGET
DISTRIBUTION AND 1987-1988 CHANGES**

BUDGET CATEGORY	1987 I.S. BUDGET (Percent)	1987-1988 Expected Budget Growth (Percent)
PERSONNEL (Salaries & Fringe Benefits)	48.2	2.6
HARDWARE		
Mainframes	6.7	2.1
Minicomputers	6.7	3.5
Microcomputers	5.3	3.9
Mass Storage Devices	4.2	2.0
Other Hardware	0.6	1.1
TOTAL HARDWARE	23.5	2.8
Data & Voice Communications	3.7	5.2
External Software	7.3	12.6
Professional Services	0.3	(0.7)
Turnkey Systems	0.1	0.3
Software Maintenance	2.4	1.9
Hardware Maintenance	8.3	4.5
Outside Processing Services	0.2	(2.0)
Supplies	5.1	2.5
Travel, Subscriptions, Etc.	0.9	1.1
TOTAL	100.0	3.6

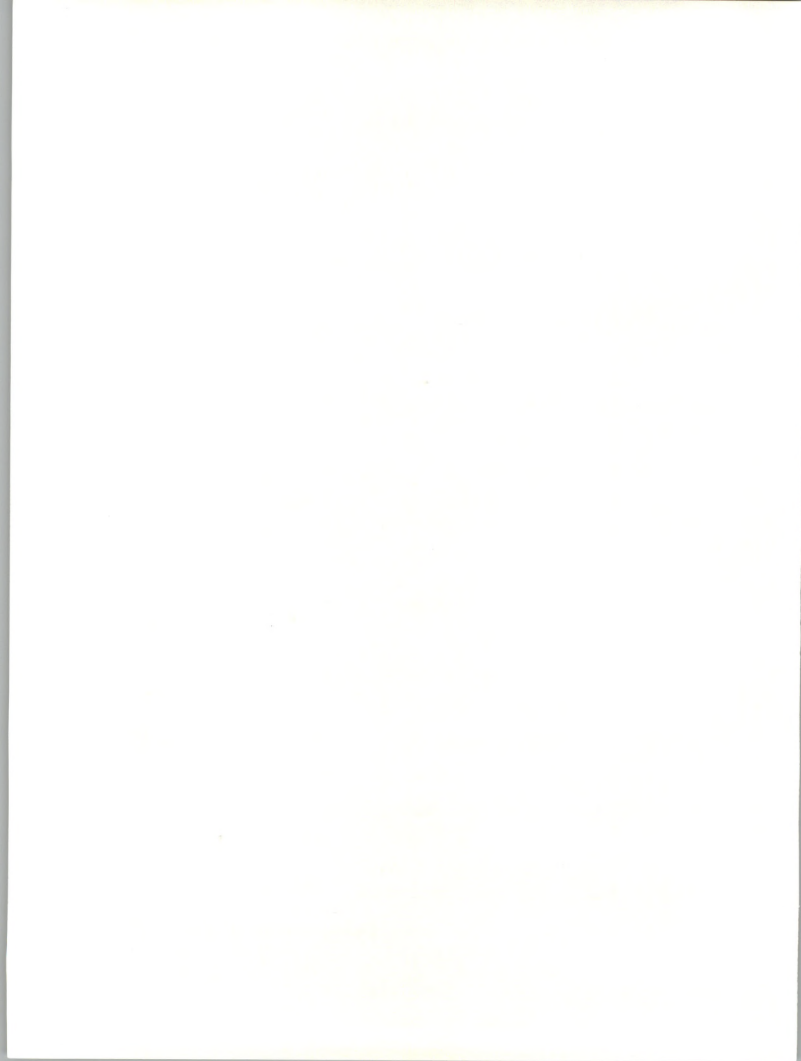
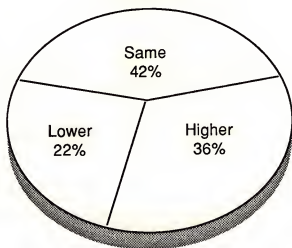


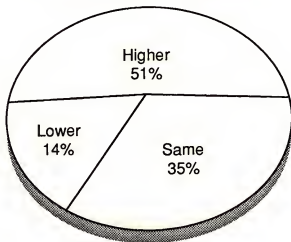
EXHIBIT IV-8

**EDUCATION SECTOR—
MOST BUDGETS ARE INCREASING
AT A FASTER RATE**

Comparison of
1988 and 1987
I.S. Budget



Comparison of
Changes in Growth Rates of
1987 and 1988 I.S. Budgets



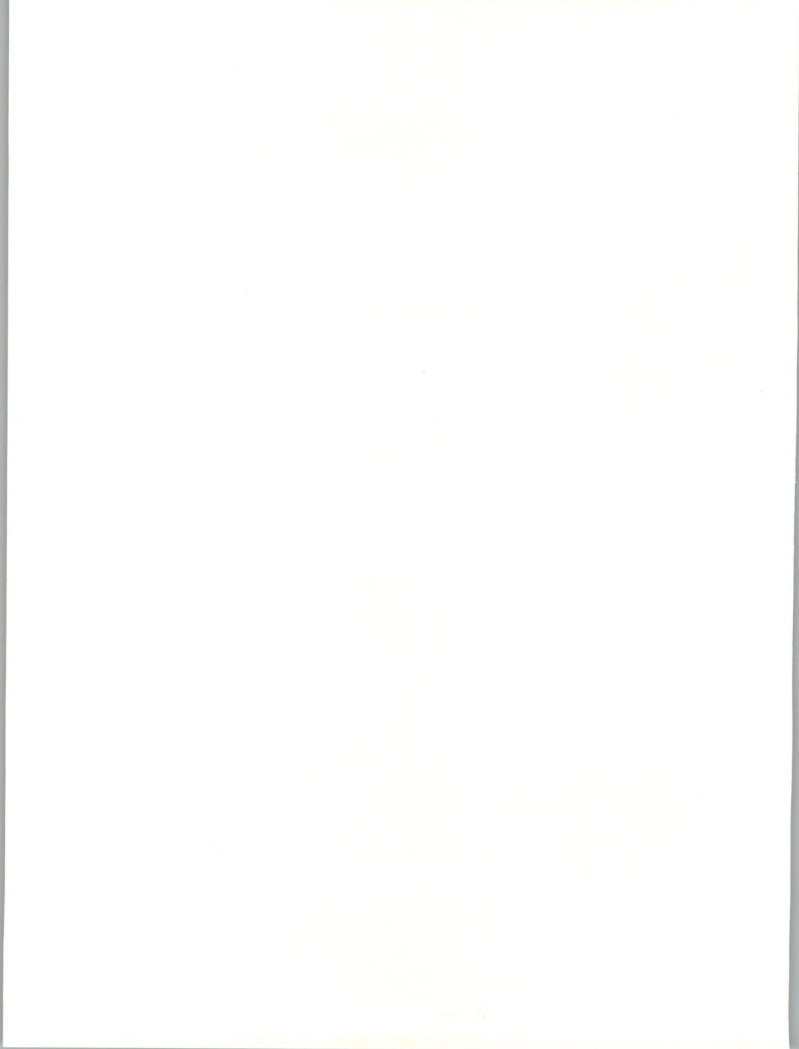


- One factor was listed as the major contributing factor to decreases in the IS budget, namely declining state/local economies (which lead to decreases in funding from the legislature).

Head count from 1986 to 1987 within education sector IS departments changed, but without a significant pattern.

- Twenty-three percent indicated the head count increased.
- Forty-four percent indicated the head count remained the same.
- Thirty-three percent indicated the head count decreased.

The head count increased in institutions implementing new, expensive applications. Generally, head counts in junior colleges and secondary school districts were the same as last year.







New Opportunities





New Opportunities

A

Education Market Sector

Software integration is more important to users than the widely touted hardware integration for two reasons:

- Software equals functionality; hardware means capacity.
- Excess hardware capacity exists in the education market sector as a result of demands by user committees for applications that were never implemented.

Software and professional services in support of local-area networks represent a growing area. Software must retain its functionality on the network; professional services such as consulting with the LAN vendor may be necessary to sell more software and ensure the software actually works.

B

Administrative Market Segment

The institutional development, or fund-raising, function will become more important. Schools must garner more funding from alumni and corporations to help keep pace with rising costs.

- Only 10-50% of university alumni contribute to their alma maters; thus, tremendous potential exists for software in the university development department.
- Currently, software helps track donations. In the future, it can be used to help tailor and administer all aspects of university development campaigns, including prospecting letters, telephone solicitation results, annual contributions, special requests, and followup.

As variable funding forces educational institutions to operate more as profit centers, the need for asset management software will increase. Key school assets include buildings, vehicles, and the computer system.

Just as the top three factors for success in real estate investing are "location, location, and location," the key factors for success in the nation's educational institutions are rapidly becoming "marketing, marketing, and marketing." Relational data base software for analyzing and tracking target students, staff, and faculty is imperative for post-secondary institutions.

C**Academic Market Segment**

Microcomputer software can be divided into smaller segments, each offering increased functionality, as a means to providing "better" products and improved market penetration. Courseware can likewise be packaged into smaller modules.

As the academic software market matures, key company differentiators will shift from products to service and support. Customer education and training, consulting, maintenance, site analysis, and the like will play a much greater role in the software sales process. Now is the time to begin developing and marketing these services.

Although software is used in elementary and secondary schools, most is used for administration and teaching students computer literacy and basic skills like writing and math. What is needed is software that teaches higher-level thinking skills like problem solving and collaborative projects.

Schools seek programs that can be integrated into day-to-day teaching. Educators want flexible programs or open-ended programs that will allow them to enter their own data and their own questions. Also, educators are interested in solutions that include hardware, software, and management reports that specify how students progress on various tasks.

D**Library Market Segment**

The nation's public, college, and university libraries represent a large, well-defined market niche with the following software requirements:

- Business and financial administration.
- Personnel administration.
- Checkout of books, magazines, and other periodicals.
- Interlibrary and intralibrary loan.
- Tracking books and periodicals at the bindery.
- Card catalog administration.
- Reference information.

Microcomputer-based turnkey systems that allow the staff at smaller libraries to access diverse storage media (microfiche, newspapers, magazines, books, on-line databases, etc.) would be useful. While the research at the On-Line Computer Library Center may lead to a large-scale solu-

tion, small- and medium-size organizations may not need the "full blown" solution and would be satisfied with a solution offering reduced functionality at a much lower price.

the 1990s, the number of people in the UK who are employed in the public sector has increased by 1.5 million, from 2.5 million in 1980 to 4 million in 1995. The public sector has become a major employer in the UK, and its growth has been a major factor in the overall growth of the economy.

The public sector has also become a major employer of women. In 1980, women made up 40% of the public sector workforce, and by 1995, this figure had risen to 50%. This increase in the number of women in the public sector has been a major factor in the overall increase in the number of women in the workforce. The public sector has also become a major employer of young people. In 1980, young people made up 10% of the public sector workforce, and by 1995, this figure had risen to 20%. This increase in the number of young people in the public sector has been a major factor in the overall increase in the number of young people in the workforce.

The public sector has also become a major employer of people with disabilities. In 1980, people with disabilities made up 5% of the public sector workforce, and by 1995, this figure had risen to 10%. This increase in the number of people with disabilities in the public sector has been a major factor in the overall increase in the number of people with disabilities in the workforce. The public sector has also become a major employer of people from ethnic minorities. In 1980, people from ethnic minorities made up 5% of the public sector workforce, and by 1995, this figure had risen to 10%. This increase in the number of people from ethnic minorities in the public sector has been a major factor in the overall increase in the number of people from ethnic minorities in the workforce.

The public sector has also become a major employer of people who are over 50 years of age. In 1980, people over 50 years of age made up 10% of the public sector workforce, and by 1995, this figure had risen to 20%. This increase in the number of people over 50 years of age in the public sector has been a major factor in the overall increase in the number of people over 50 years of age in the workforce. The public sector has also become a major employer of people who are under 20 years of age. In 1980, people under 20 years of age made up 5% of the public sector workforce, and by 1995, this figure had risen to 10%. This increase in the number of people under 20 years of age in the public sector has been a major factor in the overall increase in the number of people under 20 years of age in the workforce.

The public sector has also become a major employer of people who are over 65 years of age. In 1980, people over 65 years of age made up 5% of the public sector workforce, and by 1995, this figure had risen to 10%. This increase in the number of people over 65 years of age in the public sector has been a major factor in the overall increase in the number of people over 65 years of age in the workforce. The public sector has also become a major employer of people who are under 16 years of age. In 1980, people under 16 years of age made up 5% of the public sector workforce, and by 1995, this figure had risen to 10%. This increase in the number of people under 16 years of age in the public sector has been a major factor in the overall increase in the number of people under 16 years of age in the workforce.

The public sector has also become a major employer of people who are over 75 years of age. In 1980, people over 75 years of age made up 5% of the public sector workforce, and by 1995, this figure had risen to 10%. This increase in the number of people over 75 years of age in the public sector has been a major factor in the overall increase in the number of people over 75 years of age in the workforce. The public sector has also become a major employer of people who are under 12 years of age. In 1980, people under 12 years of age made up 5% of the public sector workforce, and by 1995, this figure had risen to 10%. This increase in the number of people under 12 years of age in the public sector has been a major factor in the overall increase in the number of people under 12 years of age in the workforce.

The public sector has also become a major employer of people who are over 85 years of age. In 1980, people over 85 years of age made up 5% of the public sector workforce, and by 1995, this figure had risen to 10%. This increase in the number of people over 85 years of age in the public sector has been a major factor in the overall increase in the number of people over 85 years of age in the workforce. The public sector has also become a major employer of people who are under 8 years of age. In 1980, people under 8 years of age made up 5% of the public sector workforce, and by 1995, this figure had risen to 10%. This increase in the number of people under 8 years of age in the public sector has been a major factor in the overall increase in the number of people under 8 years of age in the workforce.

The public sector has also become a major employer of people who are over 90 years of age. In 1980, people over 90 years of age made up 5% of the public sector workforce, and by 1995, this figure had risen to 10%. This increase in the number of people over 90 years of age in the public sector has been a major factor in the overall increase in the number of people over 90 years of age in the workforce. The public sector has also become a major employer of people who are under 5 years of age. In 1980, people under 5 years of age made up 5% of the public sector workforce, and by 1995, this figure had risen to 10%. This increase in the number of people under 5 years of age in the public sector has been a major factor in the overall increase in the number of people under 5 years of age in the workforce.

the 1990s, the number of people in the UK who are employed in the public sector has increased by 1.5 million, from 2.5 million in 1980 to 4 million in 1995 (Department of Health 1996).

There is a growing emphasis on the need to improve the quality of care in the public sector. The Department of Health (1996) has set out a number of key objectives for the public sector, including the need to improve the quality of care, to reduce waiting times, to improve the efficiency of the system, and to improve the financial performance of the system. The Department of Health (1996) has also set out a number of key objectives for the private sector, including the need to improve the quality of care, to reduce waiting times, to improve the efficiency of the system, and to improve the financial performance of the system.

The Department of Health (1996) has also set out a number of key objectives for the voluntary sector, including the need to improve the quality of care, to reduce waiting times, to improve the efficiency of the system, and to improve the financial performance of the system. The Department of Health (1996) has also set out a number of key objectives for the independent sector, including the need to improve the quality of care, to reduce waiting times, to improve the efficiency of the system, and to improve the financial performance of the system.

The Department of Health (1996) has also set out a number of key objectives for the public sector, including the need to improve the quality of care, to reduce waiting times, to improve the efficiency of the system, and to improve the financial performance of the system. The Department of Health (1996) has also set out a number of key objectives for the private sector, including the need to improve the quality of care, to reduce waiting times, to improve the efficiency of the system, and to improve the financial performance of the system.

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VI

Conclusions and Recommendations





Conclusions and Recommendations

The combination of changing demographics and variable year-to-year government funding is forcing educational institutions to emphasize marketing.

Successful vendors will balance the conflicting needs for increased software functionality and extensive support at a reduced price.

The most promising products and services will improve asset management, fund raising, student selection and retention, and library administration.

the 1990s, the number of people in the UK who are employed in the public sector has increased by 1.5 million, from 2.5 million in 1980 to 4 million in 1995 (Department of Health 1996).

There is a growing emphasis on the need to improve the efficiency of the public sector, and to ensure that the public sector is able to deliver the services that are required by the public. This has led to a number of initiatives, including the introduction of competition, the restructuring of public sector organisations, and the introduction of new management practices.

One of the key challenges facing the public sector is the need to improve the quality of the services that it provides. This is a challenge that is being met by a number of initiatives, including the introduction of new management practices, the restructuring of public sector organisations, and the introduction of competition.

Another key challenge facing the public sector is the need to improve the efficiency of the services that it provides. This is a challenge that is being met by a number of initiatives, including the introduction of new management practices, the restructuring of public sector organisations, and the introduction of competition.

A third key challenge facing the public sector is the need to improve the financial performance of the services that it provides. This is a challenge that is being met by a number of initiatives, including the introduction of new management practices, the restructuring of public sector organisations, and the introduction of competition.

Finally, a fourth key challenge facing the public sector is the need to improve the public's perception of the services that it provides. This is a challenge that is being met by a number of initiatives, including the introduction of new management practices, the restructuring of public sector organisations, and the introduction of competition.

In conclusion, the public sector is facing a number of challenges, including the need to improve the quality of the services that it provides, the need to improve the efficiency of the services that it provides, the need to improve the financial performance of the services that it provides, and the need to improve the public's perception of the services that it provides. These challenges are being met by a number of initiatives, including the introduction of new management practices, the restructuring of public sector organisations, and the introduction of competition.

the 1990s, the number of people in the UK who are employed in the public sector has increased by 1.5 million, from 2.5 million in 1980 to 4 million in 1995. The public sector has become a major employer in the UK, and its growth has been a major factor in the overall growth of the economy.

The public sector has also become a major employer of women. In 1980, women made up 40% of the public sector workforce, and by 1995, this figure had risen to 50%. This increase in the number of women in the public sector has been a major factor in the overall increase in the number of women in the workforce.

The public sector has also become a major employer of people with disabilities. In 1980, people with disabilities made up 1% of the public sector workforce, and by 1995, this figure had risen to 5%. This increase in the number of people with disabilities in the public sector has been a major factor in the overall increase in the number of people with disabilities in the workforce.

The public sector has also become a major employer of people from ethnic minorities. In 1980, people from ethnic minorities made up 1% of the public sector workforce, and by 1995, this figure had risen to 5%. This increase in the number of people from ethnic minorities in the public sector has been a major factor in the overall increase in the number of people from ethnic minorities in the workforce.

The public sector has also become a major employer of people who are over 50 years of age. In 1980, people over 50 years of age made up 1% of the public sector workforce, and by 1995, this figure had risen to 5%. This increase in the number of people over 50 years of age in the public sector has been a major factor in the overall increase in the number of people over 50 years of age in the workforce.

The public sector has also become a major employer of people who are under 25 years of age. In 1980, people under 25 years of age made up 1% of the public sector workforce, and by 1995, this figure had risen to 5%. This increase in the number of people under 25 years of age in the public sector has been a major factor in the overall increase in the number of people under 25 years of age in the workforce.

The public sector has also become a major employer of people who are over 65 years of age. In 1980, people over 65 years of age made up 1% of the public sector workforce, and by 1995, this figure had risen to 5%. This increase in the number of people over 65 years of age in the public sector has been a major factor in the overall increase in the number of people over 65 years of age in the workforce.

The public sector has also become a major employer of people who are under 16 years of age. In 1980, people under 16 years of age made up 1% of the public sector workforce, and by 1995, this figure had risen to 5%. This increase in the number of people under 16 years of age in the public sector has been a major factor in the overall increase in the number of people under 16 years of age in the workforce.

The public sector has also become a major employer of people who are over 75 years of age. In 1980, people over 75 years of age made up 1% of the public sector workforce, and by 1995, this figure had risen to 5%. This increase in the number of people over 75 years of age in the public sector has been a major factor in the overall increase in the number of people over 75 years of age in the workforce.

ED-A

Appendix: Forecast Data Base

ED-A

Appendix: Forecast Data Base

This appendix contains the following financial forecast information, as shown in Exhibit ED-A-1.

- Market size by delivery mode for each year, 1986-1992.
- Market growth rates for 1986-1987.
- Average annual growth rate (AAGR for each delivery mode for the five-year period 1987-1992).

EXHIBIT ED-A-1

**EDUCATION SECTOR—
INDUSTRY-SPECIFIC USER EXPENDITURE FORECAST
1987-1992**

SEGMENTATION BY DELIVERY MODE	(\$M) 1986	86-87 GROWTH (%)	(\$M) 1987	(\$M) 1988	(\$M) 1989	(\$M) 1990	(\$M) 1991	(\$M) 1992	AAGR 87-92 (%)
Processing/Network Services									
- Remote Comp/Batch	114	12	128	142	158	175	193	212	11
- Facility Management	20	5	21	21	21	22	22	22	1
Total Processing Services	134	11	149	163	179	197	215	234	9
Application Software									
- Mainframe/Mini	30	17	35	40	46	52	59	66	14
- Micro	57	23	70	84	99	115	131	147	16
Total Application Software	87	21	105	124	145	167	190	213	15
Turnkey Systems	96	11	107	117	124	130	138	143	6
Sector Total	317	14	361	404	448	494	543	590	10

the 1990s, the number of people in the UK who are aged 65 and over has increased by 1.5 million, and the number of people aged 75 and over has increased by 1.2 million (Office of National Statistics 2000).

There is a growing awareness of the need to address the needs of older people in the community. The Department of Health (2000) has published a strategy for older people, which sets out a vision for the future of older people's health and care. The strategy is based on the following principles:

- Older people should be able to live independently and actively in the community.
- Older people should be able to access the services and support they need to live well.
- Older people should be able to participate in decisions about their care and support.
- Older people should be able to live in a safe and secure environment.

The strategy also sets out a number of key objectives for the future, including:

- To reduce the number of older people who are in long-term care.
- To improve the quality of life for older people.
- To ensure that older people have access to the services and support they need.
- To ensure that older people are able to participate in decisions about their care and support.

The strategy is a key document for the future of older people's health and care in the UK. It sets out a vision for the future and provides a framework for the development of policies and services for older people.

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- To reduce the number of older people who are in long-term care.
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- To ensure that older people are able to participate in decisions about their care and support.

The strategy is a key document for the future of older people's health and care in the UK. It sets out a vision for the future and provides a framework for the development of policies and services for older people.

ED-B

Appendix: Forecast Reconciliation

the 1990s, the number of people in the UK who are employed in the public sector has increased by 1.5 million, from 2.5 million in 1980 to 4 million in 1999. The public sector has grown from 10% of the economy to 17% of the economy.

There is a growing emphasis on the need to improve the efficiency of the public sector. This has led to a number of initiatives, including the introduction of competition, the restructuring of public services, and the introduction of performance targets. The aim of these initiatives is to reduce the cost of public services and to improve the quality of the services provided.

One of the main challenges facing the public sector is the need to reduce the cost of public services. This is a difficult task, as public services are often provided at a loss. However, there are a number of ways in which the cost of public services can be reduced, including the introduction of competition, the restructuring of public services, and the introduction of performance targets.

Another challenge facing the public sector is the need to improve the quality of the services provided. This is a difficult task, as public services are often provided at a loss. However, there are a number of ways in which the quality of public services can be improved, including the introduction of competition, the restructuring of public services, and the introduction of performance targets.

The public sector is a complex and challenging environment. It is a sector that is constantly changing and evolving. It is a sector that is facing a number of challenges, including the need to reduce the cost of public services and the need to improve the quality of the services provided.

However, there are a number of ways in which the public sector can be improved. By introducing competition, restructuring public services, and introducing performance targets, the public sector can become more efficient and more effective. This will lead to a reduction in the cost of public services and an improvement in the quality of the services provided.

The public sector is a vital part of the economy. It provides a number of essential services, including health care, education, and social security. It is a sector that is constantly changing and evolving. It is a sector that is facing a number of challenges, including the need to reduce the cost of public services and the need to improve the quality of the services provided.

However, there are a number of ways in which the public sector can be improved. By introducing competition, restructuring public services, and introducing performance targets, the public sector can become more efficient and more effective. This will lead to a reduction in the cost of public services and an improvement in the quality of the services provided.

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ED-B

Appendix: Forecast Reconciliation

This appendix contains the following information:

- Exhibit ED-B-1, which includes the changes made in this year's forecast as compared to last year's.
- An explanation of any significant changes that were made to the forecasts.

INPUT has reduced the five-year growth rate (AAGR) for turnkey systems from 14% to 6%. The education sector is exhibiting a preference for industry-standard hardware and software from different vendors rather than turnkey systems from a single vendor, as this offers customers greater choice and flexibility in assembling systems. As a result, the forecast for the 1991 market for turnkey systems made in 1987 is 46% lower compared to the corresponding forecast made in 1986.

Table 1. The number of subjects in each age group and the number of subjects who were included in the analysis of each age group

Age group (years)	Number of subjects	Number of subjects included in analysis
10-11	10	10
12-13	10	10
14-15	10	10
16-17	10	10
18-19	10	10
20-21	10	10
22-23	10	10
24-25	10	10
26-27	10	10
28-29	10	10
30-31	10	10
32-33	10	10
34-35	10	10
36-37	10	10
38-39	10	10
40-41	10	10
42-43	10	10
44-45	10	10
46-47	10	10
48-49	10	10
50-51	10	10
52-53	10	10
54-55	10	10
56-57	10	10
58-59	10	10
60-61	10	10
62-63	10	10
64-65	10	10
66-67	10	10
68-69	10	10
70-71	10	10
72-73	10	10
74-75	10	10
76-77	10	10
78-79	10	10
80-81	10	10
82-83	10	10
84-85	10	10
86-87	10	10
88-89	10	10
90-91	10	10
92-93	10	10
94-95	10	10
96-97	10	10
98-99	10	10
100-101	10	10
102-103	10	10
104-105	10	10
106-107	10	10
108-109	10	10
110-111	10	10
112-113	10	10
114-115	10	10
116-117	10	10
118-119	10	10
120-121	10	10
122-123	10	10
124-125	10	10
126-127	10	10
128-129	10	10
130-131	10	10
132-133	10	10
134-135	10	10
136-137	10	10
138-139	10	10
140-141	10	10
142-143	10	10
144-145	10	10
146-147	10	10
148-149	10	10
150-151	10	10
152-153	10	10
154-155	10	10
156-157	10	10
158-159	10	10
160-161	10	10
162-163	10	10
164-165	10	10
166-167	10	10
168-169	10	10
170-171	10	10
172-173	10	10
174-175	10	10
176-177	10	10
178-179	10	10
180-181	10	10
182-183	10	10
184-185	10	10
186-187	10	10
188-189	10	10
190-191	10	10
192-193	10	10
194-195	10	10
196-197	10	10
198-199	10	10
200-201	10	10
202-203	10	10
204-205	10	10
206-207	10	10
208-209	10	10
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212-213	10	10
214-215	10	10
216-217	10	10
218-219	10	10
220-221	10	10
222-223	10	10
224-225	10	10
226-227	10	10
228-229	10	10
230-231	10	10
232-233	10	10
234-235	10	10
236-237	10	10
238-239	10	10
240-241	10	10
242-243	10	10
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246-247	10	10
248-249	10	10
250-251	10	10
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254-255	10	10
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294-295	10	10
296-297	10	10
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304-305	10	10
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358-359	10	10
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364-365	10	10
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376-377	10	10
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404-405	10	10
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466-467	10	10
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578-579	10	10
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582-583	10	10
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588-589	10	10
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618-619	10	10
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622-623	10	10
624-625	10	10
626-627	10	10
628-629	10	10
630-631	10	10
632-633	10	10
634-635	10	10
636-637	10	10
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662-663	10	10
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666-667	10	10
668-669	10	10
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672-673	10	10
674-675	10	10
676-677	10	10
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680-681	10	10
682-683	10	10
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690-691	10	10
692-693	10	10
694-695	10	10
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698-699	10	10
700-701	10	10
702-703	10	10
704-705	10	10
706-707	10	10
708-709	10	10
710-711	10	10
712-713	10	10
714-715	10	10
716-717	10	10
718-719	10	10
720-721	10	10
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724-725	10	10
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728-729	10	10
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736-737	10	10
738-739	10	10
740-741	10	10
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744-745	10	10
746-747	10	10
748-749	10	10
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756-757	10	10
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760-761	10	10
762-763	10	10
764-765	10	10
766-767	10	10
768-769	10	10
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774-775	10	10
776-777	10	10
778-779	10	10
780-781	10	10
782-783	10	10
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786-787	10	10
788-789	10	10
790-791	10	10
792-793	10	10
794-795	10	10
796-797	10	10
798-799	10	10
800-801	10	10
802-803	10	10
804-805	10	10
806-807	10	10
808-809	10	10
810-811	10	10
812-813	10	10
814-815	10	10
816-817	10	10
818-819	10	10
820-821	10	10
822-823	10	10
824-825	10	10
826-827	10	10
828-829		

EXHIBIT ED-B-1

**EDUCATION SECTOR—
DATA BASE RECONCILIATION OF MARKET FORECAST—
INDUSTRY-SPECIFIC BY DELIVERY MODE**

DELIVERY MODE	1986 MARKET			1991 MARKET			86-91 AAGR FCST IN '86 RPT (%)	87-92 AAGR FCST IN '87 RPT (%)
	1986 FCST (\$M)	1987 RPT (\$M)	VARIANCE AS % OF '87 RPT	1986 FCST (\$M)	1987 RPT (\$M)	VARIANCE AS % OF '87 FCST		
Processing Services								
- Remote Comp/Batch	112	114	-2	188	193	-3	11	11
- Facility Management	20	20	0	25	22	14	5	1
Total Processing Services	132	134	-1	213	215	-1	10	9
Application Software	81	87	-7	178	190	-6	17	15
Turnkey Systems	103	96	7	201	138	46	14	6
Industry-Specific Segment Total	316	317	0	592	543	9	13	10



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