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Market
Analysis and
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U.S. Information Services Industry-Specific Markets 1987-1992

Education Sector

INPUT®

1280 Villa Street, Mountain View, CA 94041 (415) 961-3300

DECEMBER 1987

U.S. INFORMATION SERVICES INDUSTRY-SPECIFIC MARKETS, 1987-1992

EDUCATION SECTOR

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Market Analysis and Planning Services (MAPS)

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

Issues, Trends, and Events

1

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.

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.

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.

II

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

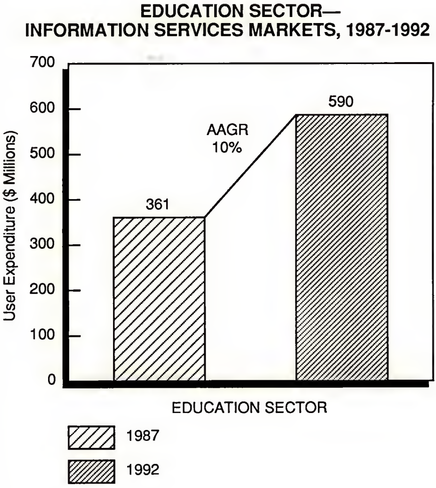
Processing Services

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.

EXHIBIT II-1



C

Applications Software

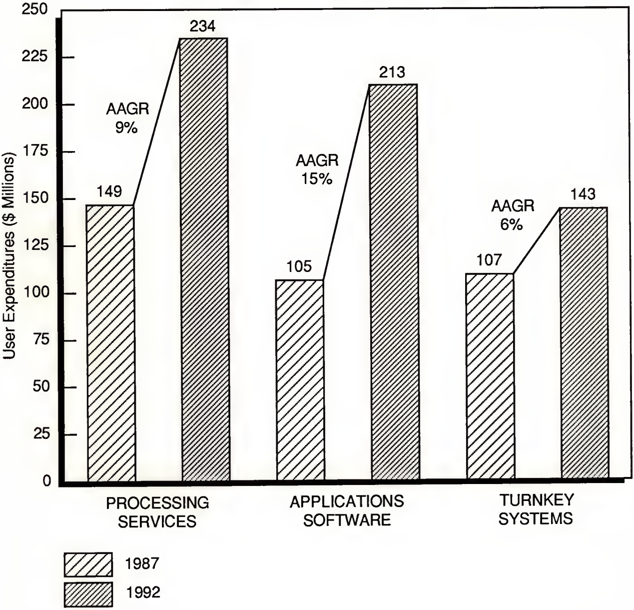
User expenditures for applications software will increase from $105 million in 1987 to $213 million in 1992 at an annual growth rate of 15%.

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.

III

Competitive Developments

III

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 microcomputer-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.

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.

IV

Information Systems Department Outlook

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-

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.

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.

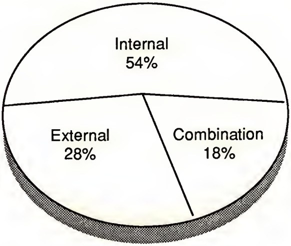
- Larger colleges and universities devote around 40% of software development staff to developing new applications.

- 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

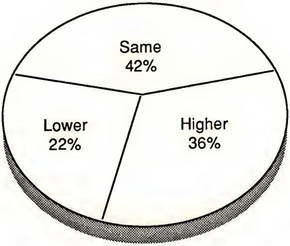
EDUCATION SECTOR—1987 BUDGET DISTRIBUTION AND 1987-1988 CHANGES

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

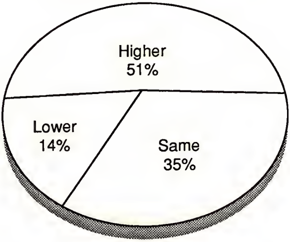
EXHIBIT IV-8

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.

V

New Opportunities

V

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.

VI

Conclusions and Recommendations

VI

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.

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

ED-B

Appendix: Forecast Reconciliation

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.

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

About INPUT

INPUT provides planning information, analysis and recommendations to managers and executives in the information processing industries. Through market research, technology forecasting, and competitive analysis, INPUT supports client management in making informed decisions. Continuing services are provided to users and vendors of computers, communications, and office products and services.

The company carries out continuous and in-depth research. Working closely with clients on important issues, INPUT's staff members analyze and interpret the research data, then develop recommendations and innovative ideas to meet clients' needs. Clients receive reports, presentations, access to data on which analyses are based, and continuous consulting.

Many of INPUT's professional staff members have nearly 20 years experience in their areas of specialization. Most have held senior management positions in operations, marketing, or planning. This expertise enables INPUT to supply practical solutions to complex business problems.

Formed in 1974, INPUT has become a leading international planning services firm. Clients include over 100 of the world's largest and most technically advanced companies.

Offices

NORTH AMERICA

Headquarters
1280 Villa Street
Mountain View, CA 94041
(415) 961-3300
Telex: 171407
Fax: (415) 961-3966

New York
Parsippany Place Corp. Center
Suite 201
959 Route 46 East
Parsippany, NJ 07054
(201) 299-6999
Telex: 134630
Fax: (201) 263-8341

Washington, D.C.
8298C, Old Courthouse Rd.
Vienna, VA 22180
(703) 847-6870
Fax: (703) 847-6872

EUROPE

United Kingdom
41 Dover Street
London W1X3RB
England
01-493-9335
Telex: 27113
Fax: 01-629-0179

ASIA

Japan
FKI
Future Knowledge Institute
Saida Building,
4-6, Kanda Sakuma-cho
Chiyoda-ku,
Tokyo 101,
Japan
03-864-4026
Fax: 011-03-864-4114

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Planning Services for Management