M-SPA Letter for
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Section V Band C

February 4, 1987

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Dear
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:

Please find enclosed the following for your Information Services Industry-Specific and Cross-Industry Markets binder from INPUT's Market Analysis and Planning Service (MAPS).

1. Revised Table of Contents - insert in Volume I following the title page.
2. Section II: Executive Overview, tab and text.
3. Section III: Education - tab and text.
4. Section III: Transportation - tab and text.
5. Section III: Utilities - tab and text.
6. Section V - Appendix B.
7. Section V - Appendix C.

If you have any questions or comments concerning the MAPS program, please let us know.

Sincerely,

Graham S. Kemp
Vice President

GSK:ml

Enclosures

U.S. INFORMATION SERVICES
VERTICAL MARKETS, 1986-1991
EDUCATION SECTOR

DECEMBER 1986

U.S. INFORMATION SERVICES
VERTICAL MARKETS, 1986-1991
EDUCATION SECTOR

CONTENTS

U.S. INFORMATION SERVICES
VERTICAL MARKETS, 1986-1991
EDUCATION SECTOR

EXHIBITS

I ISSUES, TRENDS, AND EVENTS

- 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.

- 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 books 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 criteria.

- 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 sale into a series of smaller ticket sales, easing pressure on IS managers to build complete functionality overnight on a limited budget.

- Sales of microcomputers to the education market continue to grow. In 1985, approximately 700,000 microcomputers were sold to schools; in 1986, schools purchased more than 800,000 units.

  - There are now more than 1.5 million micros installed on college campuses.

  - More than 1.4 million micros have been installed in primary and secondary schools.

- IS managers must look to recentralize control of mircos. 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.

A. DEFINITIONS

- Definitions used in the education market include specific terms for describing the grade level of pupils, namely:
  - Primary school--kindergarten through grade 5.
  - Middle school--grades 6 through 8.
  - Secondary school--grades 9 through 12.
  - 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.
- Guidance counseling.

- Academic/research computing modules address:
  - Student instruction.
  - Test scoring.
  - Student test score interpretation.
  - 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.
  - Tracking periodicals being bound.

B. TRENDS IN PRIMARY AND SECONDARY SCHOOLS

- According to a survey by Johns Hopkins University (Baltimore, MD), the number of primary and secondary schools using computers from 1984 to 1985 has doubled. Of the 2,300 schools surveyed at the K-12 (kindergarten through high school) level:

  - Forty-two percent of high schools (grades 10-12) use programming software.

  - Forty-two percent of junior high schools (grades 7-9) use computer-assisted instruction (CAI).

  - At the grade school (K-6) level 40-50% of classrooms had computers.

- The current major trend is the move away from computer 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, Commodore, IBM, AT&T, and Zenith. Apple, Tandy/Radio Shack, and Commodore are successful due to:

  - Strong discounts and equipment donations to schools.

  - Availability of relatively high quality educational 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.

C. 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, and athlete

names and sports to target prospective students. Other software helps followup 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 offered, offering courses to train employees in the use of spreadsheets, data base management, and word processing programs.

D. 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) (Dublin, OH), has specified the UNIX operating system in certain on-line applications. With the transportability of UNIX-based files, OCLC lessens its dependence on computer hardware using proprietary operating systems.

- In 1984, OCLC began utilizing microcomputers as part of its services.

  - Modified IBM PCs are loaned to member libraries where local card catalog information is entered and stored on 5.25-inch diskettes. The diskettes are then sent to OCLC and off-loaded into mainframe files.

  - OCLC offers an entry level, IBM PC-based system for small libraries' initial computerization. Users can upgrade to more powerful minicomputer-based 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.

E. 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 standard to spur software development.

- The growth of software sales has been limited also because of the widespread "swapping" and "sharing" of software programs on the part of instructors, which in some cases involves 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 both instructors and vendors. Some variation of corporate or site licensing programs may be appropriate for the education market segment.

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 growth of application software for microcomputers.

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

- In elementary and secondary schools, hardware selection has been limited to Apple, Commodore, and Tandy/Radio Shack microcomputers with a combined market share of 85% as of June 1986. The relatively expensive IBM PC has not made significant inroads in this market. INPUT believes the growth in sales of less expensive IBM PCs will not affect the education market segment significantly; too much software has already been written for Apple, Commodore, and Tandy/Radio Shack micros.

- 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.

II MARKET FORECASTS

A. INTRODUCTION

- INPUT divides the education market into three segments:
  - Administration.
  - Academic and research.
  - Libraries.
- The SIC (Standard Industrial Classification) for this market sector is 82 (821-829), which includes:
  - Primary and secondary schools.
  - Colleges, universities, and professional schools.
  - Junior colleges and technical institutes.
  - Libraries and information centers.
  - Correspondence schools and vocational schools.
  - Other schools.

- 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. Academic computing requirements are equally diverse. Furthermore, community libraries differ from academic, professional, or industry-specific research libraries.

- Demand for industry-specific educational applications will grow 13% annually through 1991, increasing from $278 million to $592 million. User expenditures are shown in Exhibit II-1.

B. DEMOGRAPHIC FORECAST, 1986-1991

- For the next two to three years, the number of elementary, middle, and high schools will continue to decrease as a result of both consolidating the number of school buildings and larger class sizes.

- Due to the expected increase in the number of school-age children in the 1990s, the number of schools will then increase slightly. Rather than construct new schools, school officials will revamp older buildings or purchase/lease temporary trailers.

- The number of schools is, as shown in Exhibits II-2 and II-3, expected to increase by 1% to 123,900 by 1991, due to more primary and secondary schools, which offset the decline in the number of nearly all other types of academic institutions.

- The increase in institutions does not apply across all segments of the education sector.

  - The number of two-year and four-year colleges and universities is expected to remain at approximately 3,350.

EXHIBIT II-1

INDUSTRY-SPECIFIC USER EXPENDITURE FORECAST
1986-1991
EDUCATION SECTOR

SEGMENTATION BY DELIVERY MODE	($M) 1985	85-86 GROWTH	($M) 1986	($M) 1987	($M) 1988	($M) 1989	($M) 1990	($M) 1991	AAGR 86-91
PROCESSING SERVICES									
REMOTE COMP/BATCH	101	11%	112	124	138	153	169	188	11%
FACILITY MANAGEMENT	19	5%	20	21	22	23	24	25	5%
TOTAL PROCESSING SERVICES	120	10%	132	145	160	176	193	213	10%
APPLICATION SOFTWARE									
MAINFRAME/MINI	25	12%	28	32	36	41	46	52	13%
MICRO	43	23%	53	65	78	93	109	126	19%
TOTAL APPLICATION SOFTWARE	68	19%	81	97	114	134	155	178	17%
TURNKEY SYSTEMS	90	14%	103	119	137	160	181	201	14%
SECTOR TOTAL	278	14%	316	361	411	470	529	592	13%

EXHIBIT II-2

DEMOGRAPHIC INFORMATION
EDUCATION SECTOR

2-YEAR AND 4-YEAR COLLEGES AND UNIVERSITIES (1985)

CATEGORY	PUBLIC	PRIVATE	TOTAL
2-Year Colleges	931	380	1,311
4-Year Colleges and Universities	566	1,463	2,029
Total	1,497	1,843	3,340

POST-SECONDARY INSTITUTIONS WITH OCCUPATIONAL PROGRAMS 1985 = 7,603

ELEMENTARY AND SECONDARY SCHOOLS (1983)

CATEGORY	PUBLIC	PRIVATE	TOTAL
Elementary	59,082	20,842	79,924
Secondary	23,947	7,862	31,809
Total	83,029	28,704	111,733

EXHIBIT II-3

DEMOGRAPHIC FORECAST, 1991
EDUCATION SECTOR

2-YEAR AND 4-YEAR COLLEGES AND UNIVERSITIES

CATEGORY	PUBLIC	PRIVATE	TOTAL
2-Year Colleges	925	370	1,295
4-Year Colleges and Universities	565	1,450	2,015
Total	1,490	1,820	3,310

POST-SECONDARY INSTITUTIONS WITH OCCUPATIONAL PROGRAMS 1991 = 7,425

ELEMENTARY AND SECONDARY SCHOOLS (1991)

CATEGORY	PUBLIC	PRIVATE	TOTAL
Elementary	60,099	20,975	81,074
Secondary	24,117	7,974	32,091
Total	84,216	28,949	113,165

- The number of post-secondary institutions offering vocational training has declined from 9,200 in 1982 to 7,600 in 1985, resulting from both industry consolidation and bankruptcies of financially unstable vocational schools. Consolidation and bankruptcy will continue into the 1990s, although at a reduced rate.

- The more than 3,300 college and university libraries and 14,963 main and branch public libraries represent a large potential market. The 14,963 libraries are divided as follows:

  - Main public libraries - 8,833.

  - Branch public libraries - 6,130.

C. PRIMARY AND SECONDARY SCHOOLS

- The educational microcomputer software market is segmented very narrowly; it is fragmented by function and age, offering math packages for grades five and six, for example. This inherent constraint will limit the profit potential of the market.

- Administrative software is increasingly being purchased at the district, rather than school, level--a purchasing pattern prevalent in southern states.

D. POST-SECONDARY INSTITUTIONS

- While population demographics indicate a slightly growing workforce, today's employers increasingly require specific technical or vocational training.

Junior (two-year) colleges and vocational/technical schools are together meeting this demand. This trend bodes well for hardware vendors and software suppliers offering integrated administrative and academic computing solutions. Junior colleges and "vo/tech" schools will require at least replacement or upgrade hardware and software to keep pace with this growth.

- The four-year college and university market, spurred by requirements to recruit top quality faculty and students, will remain a viable market segment. Faculty is scarce in business administration, engineering, and, to a lesser extent, the natural sciences. Software and computer services sold to this market will represent 60-65% of sector expenditures.

E. LIBRARIES

- Library expenditures will grow from 8-10% of sector expenditures in 1986 to 12-18% of sector expenditures in 1991.

- The growth will come from the local and regional level as additional libraries join consortia such as OCLC or purchase microcomputers or micro-based turnkey systems.

F. PROCESSING SERVICES

- In 1986, about 14,000 school districts used processing services for administrative, rather than instructional, applications.

- As more organizations convert to minicomputer- or microcomputer-based solutions, processing services will grow at a slower rate than overall computer services in the education market.

- Note, however, that INPUT's forecast does not indicate a decrease. Rather it indicates slower-than-average growth.

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

- As processing services move from batch to interactive processing and install the expensive, full function software required to completely manage a school, more schools will migrate to processing services, rather than compete for data processing administrative, programming, and operations staffs.

- The federal government, through the National Science Foundation, has funded five supercomputer centers (Illinois, University of California - San Diego, Princeton, Cornell, and the University of Pittsburgh) for advanced research projects in scientific and technical disciplines. These computers can be accessed through existing campus telecommunications links.

G. TURNKEY SYSTEMS

- Turnkey systems, especially microcomputer-based systems, will grow faster than the overall market for 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 come from the initial computerization, whether to a mainframe, mini, or micro. Cost effective micros, especially, the IBM clones, will drive the purchase of micros by numerous school districts.

- Existing micro-based applications can be networked or set up to run on multiuser micros or minicomputers. Turnkey systems, with single supplier accountability, represent a competitive alternative.

- The new 80386 microprocessor will soon open up a new class of computers offering highly competitive price/performance. While new software must be written to accommodate these machines, this is an opportunity for improved operating systems, better user interfaces and, most importantly, improved application software or courseware.

H. APPLICATION SOFTWARE

- Mainframe and minicomputer-based application software will grow at the same rate (13%) as overall user expenditures for all education-related computer services. The factors influencing the growth of the market are more important than those factors impeding market growth.

- Factors influencing the growth of mainframe/mini-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.

- Factors slowing the growth in demand for mainframe/mini-based application 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 micros will be limited by departmental or school-level (engineering, liberal arts, business) need for shared information.

- Microcomputer-based application software will grow fastest of all computer services delivery modes, since more detailed subapplications will initially be micro-based. Vehicle management, which includes vehicle maintenance and operation scheduling, could initially be implemented on a micro rather than an integrated module as part of the schools' administrative mainframe or minicomputer. The growth in the number of IBM PC/XT/ATs and "look alikes" underlie this tremendous demand.

I. PROFESSIONAL SERVICES

- Systems integration in the education segment will not be a major opportunity for vendors because:

- Only a limited number of establishments (1,000) can effectively utilize system integration services.

- The larger the campus, the greater the likelihood that the organization believes it has the necessary personnel and other resources in-house to handle complex projects.

- Educational institutions can purchase the hardware at much lower prices than systems integrators, thereby setting unrealistic expectations about low prices of technology-based goods and services.

- Communications requirements on campus are likely to be limited to the use of local area networks (LANs) for linking departmental computers. As an initial step, some eastern colleges have established LANs between dormitories.

- The largest local system integration projects will be based on mainframe data bases used in administrative, not research or instructional, computing. Smaller local data bases will be used in government-sponsored research.

III COMPETITIVE DEVELOPMENTS

A. INTRODUCTION

- The education information systems market is characterized by:
  - Large vendors selling mainframe-based administrative software.
  - Numerous smaller vendors selling academic software.
- The market shares of leading vendors in the education sector are shown in Exhibit III-1.
- The leaders in the administration 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.

EXHIBIT III-1

VENDOR SHARES OF INDUSTRY-SPECIFIC INFORMATION SERVICES IN 1985 EDUCATION SECTOR

VENDOR NAME	Processing	Application Software	Turnkey Systems	Professional Services	Total	Percent Share of Total Education Information Services 1985
On-Line Computer Library Center	$ 53		$ 10	$ 15	$ 78	28%
Academic Financial Services Association	32				32	12%
Systems & Computer Technology Corporation		$ 2		26	28	10%
National Computer Systems	15		3		18	7%
Datatel		7	9	1	17	6%
Infromation Associates		16			16	6%
American Management Systems		15			15	5%
Computer Curriculum Corporation			14	1	15	5%
INFOCEL			14	1	15	5%
UNIPAC	15				15	5%
TOTAL	$ 115	$ 40	$ 50	$ 44	$249	90%

B. ACQUISITIONS

- Few mergers took place in the education market segment in 1985 and 1986, indicating that:
  - This is a relatively mature market dominated by a few large profitable firms.
  - 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.
- In the education market segment for 1985 and 1986, INPUT identified a total of three acquistions, only one of which was significant.
  - Britannica Learning Corporation, a subsidiary of Encyclopaedia Britannica, acquired software publishers Design-Ware, Inc. and Edu-Ware Services, Inc. from Management Science America, Inc. This transaction was completed in January 1986.
  - In July 1986, Lifeboat Associates and Scarborough Systems, Inc. merged. Scarborough, based in Tarrytown (NY), publishes educational software.
  - In May 1986, Management Science America, Inc. acquired Information Associates, Inc. (IA) (Rochester, NY) for $15 million in cash. IA markets IBM mainframe and DEC VAX based administrative application software to colleges and universities. Since 1982, MSA has acquired software firms with expertise in: manufacturing, distribution, health care, and higher education.

C. EDUCATION MARKET "DROPOUTS"

- Large, well financed firms are not always entering the education market sector. In fact, during 1985 and 1986 three key players either abandoned this market or shifted corporate emphasis away from education.

  - In December 1986, a joint venture of Control Data Corporation (Minneapolis, MN) and Wicat Systems (Orem, UT) will be disbanded. The venture, called Plato-Wicat Systems, bundled multi-user systems manufactured by Wicat with CDC's Plato educational software for use in elementary, middle, and high schools. Each company will pursue the K-12 education market independently.

  - Systems & Computer Technology Corporation (Malvern, PA) is gradually lessening its dependence on the education market sector.

  - Electronic Data Systems (Dallas, TX) tried in 1984, before its acquisition by General Motors, to penetrate the education market with application software. In 1986, EDS, possibly beset with internal GM system integration problems, announced its intention to leave the education market.

D. VENDOR PROFILES

1. COGITO DATA SYSTEMS, INC. (101 State Road, Princeton, NJ 08540 (609) 924-7200)

a. Products/Services

- Cogito, a $12 million company, sells turnkey systems and processing services for school administration, namely:

  - Cogito's XXI turnkey system modules include: student and instructor records, attendance, grade reporting, and instructor scheduling.

  - Batch processing services handle attendance, scheduling, competency recordkeeping, grade reporting, guidance, and master scheduling.

b. Markets Served

- Middle schools and secondary schools.

- The education market represented an estimated 20% of Cogito's fiscal 1985 revenues.

c. Company Strategy

- Cogito is concentrating resources on processing services for the educational and fleet maintenance markets.

d. Recent Activities

- Cogito sold its remote computing service for the petroleum industry in late fiscal 1985 to ICC, Inc. of Cedar Knolls (NJ).

- In fiscal 1985 Cogito became a value-added reseller for Burroughs Corporation. The XXI school administration system is now available on Burroughs, IBM PC/AT, and Convergent Technologies hardware.

e. Future Direction

- Cogito is concentrating resources on processing services for the educational and fleet maintenance markets, having sold the processing service business targeted at the petroleum industry.

- Cogito is broadening the hardware platforms for its application software and, specifically, will look to the IBM PC/AT based system to reach new customers.

2. SYSTEMS & COMPUTER TECHNOLOGY CORPORATION (Great Valley Corporate Center, 4 Country View Road, Malvern, PA 19355, (215) 647-5930)

a. Products/Services

- Systems & Computer Technology Corporation (SCT) provides application software, custom software, and telecommunication planning and implementation services.

- Integrated application software packages include:

  - Integrated Financial Information System (IFIS).

  - Human Resources Information System (HRIS).

  - Integrated Student Information System (ISIS).

  - Alumni & Donor Development System (ADD).

- SCT's software packages are available for IBM, Sperry-Univac, and Honeywell mainframes.

b. Markets Served

- SCT's software and services target the higher education market, with most installations at two-year and four-year institutions.

- The higher education market represents approximately 60% of fiscal 1985 revenues.

c. Company Strategy

- SCT will continue to target state and local governments; the federal government; educational, trade, and business associations; and various industries with a full line of application software products.

- SCT emphasizes its facility management and technical consulting services.

d. Recent Activities

- As a result of errors in fiscal 1983 and 1984 financial statements, SCT changed its senior management team, adding a new president and chief financial officer.

e. Future Direction

- SCT will deemphasize the education market and concentrate on state/local/federal governments and associations.

3. AMERICAN MANAGEMENT SYSTEMS, INC. (1777 North Kent Street, Alexandria, VA 22209, (703) 841-6000)

a. Products/Services

- American Management Systems (AMS) provides professional services, application software products, facilities management, and micrographics services to many businesses and levels of government.

- AMS provides professional services and application software products to the education market segment.

- Relevant software products include:

  - College and University Financial System (CUFS).

  - Alumni Development Information System (ADIS).

  - Alumni records.

  - Fund raising.

  - Gift processing.

b. Markets Served

- Within the education market segment, AMS' products and services are targeted to colleges and universities.

- Sales to higher education institutions represent approximately 10% of total corporate revenues or $15 million.

c. Company Strategy

- AMS avoids the crowded manufacturing market; it concentrates on providing a full range of software and computer services to service industries and governments.

d. Recent Activities

- The company completed new application modules in the government, energy, utility, and telecommunications businesses. AMS did not announce any product enhancements in the education segment.

e. Future Direction

- As a result of reduced fiscal 1985 revenues from the education market segment, AMS is deemphasizing the higher education market and is concentrating on the energy and government markets.

4. INFORMATION ASSOCIATES, INC. (3000 Ridge Road East, Rochester, NY 14622, (716) 467-7740)

a. Products/Services

- Information Associates (IA) develops and markets packaged application software, utilizing IBM mainframes and DEC VAX superminicomputers.

- IA's product line, Series Z, comprises the following modules:

  - Financial Records System.

  - Student Information System.

  - Human Resource System.

  - Alumni/Development System.

b. Markets Served

- IA sells its application software products to the higher education market, principally colleges and universities.

c. Company Strategy

- IA provides integrated software modules for the most popular hardware platforms for multibuilding or multicampus colleges and universities.

d. Recent Activities

- In May 1986, MSA (Atlanta, GA) agreed in principle to acquire IA for $15 million, subject to signing a definitive agreement.

e. Future Direction

- IA will continue to invest in new modules and enhancements to its education-based application software line.

- Depending on the degree of support from MSA, IA could begin developing products for other vertical market segments.

5. ONLINE COMPUTER LIBRARY CENTER (6565 Frantz Road, Dublin, OH 43017, (614) 764-6000)

a. Products/Services

- The Online Computer Library Center (OCLC), a nonprofit membership organization, provides a worldwide network of on-line library services.

- OCLC maintains the Online Union Catalog, the world's largest data base of bibliographic information.

b. Markets Served

- OCLC members include academic institutions, research organizations, public libraries, state and local government libraries, corporate libraries, community/junior college libraries, and legal/medical libraries.

- Libraries from academic institutions represent 32.9% of OCLC participating libraries.

c. Company Strategy

- OCLC positions itself as the premier organization for on-line information cataloging and retrieval.

d. Recent Activities

- Microfilming, resource sharing with other libraries, new collections (notably, those of the New York Public Library), statewide coordinating databases (in North Carolina and California), and evaluating the strategic role of libraries and information centers were addressed in fiscal 1986, which ended June 30.

e. Future Direction

- OCLC, through in-house and cooperative research efforts, is investigating on-line scanning of book contents and information retrieval from data bases stored on optical disks.

- OCLC is offering its services in more countries, including Denmark, the Federal Republic of Germany, France, Great Britain, the Netherlands, Sweden, and Taiwan.

6. INFOCEL, INC. (3204 Monroe Street, Rockville, MD 20852, (301) 984-6363)

a. Products/Services

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

- Provide a full range of on-line, integrated, multiuser turnkey systems with installation, training, and on-going support aimed at its target markets.

d. Recent Activities

- In January 1986, Infocel introduced its Schoolplus system, based on Prime minicomputers.

e. Future Direction

- Offer systems based on other manufacturers' hardware to lessen dependence on a single minicomputer or microcomputer vendor.
- Offer system integration services.

7. COMPUTER CURRICULUM CORPORATION (1070 Arastradero Road, Palo Alto, CA 94304, (415) 494-8450)

a. Products/Services

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

b. Markets Served

- CCC serves primary and secondary schools and remedial education programs.

c. Company Strategy

- Provide a full line of single-user and multiuser 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 1986, CCC integrated the Atari ST microcomputer with its MICROHOST computer-aided instruction software to take advantage of the Atari's graphics, power, and color monitor.

e. Future Direction

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

8. CL SYSTEMS, INC. (1220 Washington Street West, Newton, MA 02165 (617) 965-6310)

a. Products/Services

- CL Systems, Inc. (CLSI) develops and markets standalone and on-line library information systems. Its 1985 revenues were $6 million.

- CLSI's products include:

  - PAC/II, an on-line public access catalog.

  - LIBS 100, a turnkey library automation system.

b. Markets Served

- CLSI serves primarily public libraries in U.S. and United Kingdom cities with less than 100,000 residents.

c. Company Strategy

- CL Systems serves small- and medium-size libraries with integrated, modular turnkey systems and on-line processing services. The company emphasizes completeness of software, well-written documentation, and full post-sale support.

d. Recent Activities

- In 1986, the company introduced its PAC/II public access catalog designed for use by college and university faculty, staff, and students.

e. Future Direction

- CLSI will add more powerful DEC VAX superminicomputers as hardware platforms for its turnkey system.

- The company is expected to add more sales and service offices in western states and the United Kingdom.

9. PENTAMATION ENTERPRISES, INC. (SYSTEMS ELEVEN Division, One Paumeraug Office Park, Southbury, CT 06488, (203) 262-6266)

a. Products/Services

- Pentamation Enterprises provides remote computing and facilities management processing services, software products, and turnkey systems.

- The company sells proprietary software and DEC VAX-based hardware to school districts for the administration of financial and student data processing centers.

- The company's 1985 revenues were $9 million.

- The company's Student Services package includes 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 the educational, medical, governmental, and general business communities.

- The education market represents approximately 20% of Pentamation's fiscal 1985 revenue.

c. Company Strategy

- Provide a complete line of application software through multiple delivery modes to its target markets.

d. Recent Activities

- In January 1986, Pentamation introduced its SYSTEMS ELEVEN turnkey system. The software modules are described under Products/Services.

e. Future Direction

- Pentamation is likely to target its marketing efforts toward larger school districts.

10. DATATEL (3700 Mount Vernon Avenue, Alexandria, VA 22305, (703) 549-4300)

a. Products/Services

- Datatel develops and markets application software and turnkey systems for higher education administration, management of nonprofit organizations, and local governments.

b. Markets Served

- Datatel markets to higher education institutions, nonprofit organizations, and local governments.

c. Company Strategy

- Provide a full range of integrated, on-line application software modules leveraging the company's role as an authorized distributor for Prime minicomputers.

d. Recent Activities

- Datatel broadened its scope beyond the higher education market with its 1986 introductions of application software for fund raising and local government administration.

e. Future Direction

- The company will introduce additional application software modules for the higher education market.

IV INFORMATION SYSTEMS DEPARTMENT OUTLOOK

A. MAJOR ISSUES

1. DRIVING FORCES

- Administrative applications are being used to increase the efficiency of the business and administrative functions in the education sector.

- Wide area networks will be developed extensively to link universities internally and may be developed to link externally with other institutions around the country.

- Primary and secondary schools as well as post-secondary institutions, are increasingly using micros and general purpose workstations as tools in the educational process.

- The education sector is always under severe political pressure to cut costs. IS' challenge is to produce beneficial systems while operating under tight budgetary constraints.

- Declining birth rates in the 1960s have resulted in a smaller pool of applicants for post-secondary institutions. Colleges, universities, and technical and vocational schools must offer more services to students and adopt consumer marketing techniques. However, birth rates in the late 1970s and 1980s have increased. A resurgence in school enrollments is expected in the 1990s.

2. ISSUES AND OBJECTIVES

- The major issues and objectives addressed by the education sector include:
  - Reduce costs.
  - Improve and expand data communications.
  - Improve staff productivity, especially in student services applications.
  - Establish centralized, integrated student information systems to provide better services to students. These systems help manage registration, health care, student organizations, and cultural and sports events.

3. MANAGEMENT PERCEPTION AND ORGANIZATIONAL ISSUES

- Management views IS as an important resource, but its main emphasis is on IS as a cost controlling source.
- In the past two years, school IS directors have seen their management visibility improve and their user base expand.
- IS plays a significant role in the planning process. The need for administrative systems places IS in a major planning role in larger educational institutions.

4. IMPACT OF TECHNOLOGY

- Departmental processing is being actively studied, but many institutions believe that micro-to-mainframe applications will be used instead of departmental processing.

- Distributed systems development (DSD) is not now being used. Plans to use DSD extend beyond two years.

- There is limited activity in the use of relational data bases other than using relational-like data bases with fourth generation languages.

- Many users believe it is technologically premature to consider merging voice and data communications. In 1986, larger universities have begun studies for implementation in the two- to five-year timeframe.

- There is some localized use of LANs on campuses, but the lack of standards has inhibited their widespread use.

5. END-USER COMPUTING

- Schools have allocated a substantial portion of their IS resources to end-user computing. This has spurred growth in IS and shifted personnel from data processing operations to end-user training and support.

- End-user computing primarily centers on micro support and micro-to-mainframe applications and accounts for about 40% of expenditures in large institutions.

- In most cases, IS has established a formal training group to support end users. It conducts classes, controls purchases of micros, publishes newsletters, and establishes workshops. IS does most of the end-user training in medium and large organizations.

B. NEW APPLICATIONS

- As the basis for offering student services in a competitive educational environment, integrated student systems is the dominant new application. Converting data base information to relational data bases is now a reality.

- Other new applications include:

  - Human resource management.

  - Property control system.

  - Library catalogue system.

- Student information systems and student records are now the most expensive new education applications. The cost of each mainframe-based application exceeds $1 million and will be implemented over two to three years. The implementation combines the purchase of off-the-shelf software with in-house customization.

C. BUDGET ANALYSIS

- In 1986, the education sector experienced limited growth in IS budgets. This was due primarily to increases in salaries and fringe benefits in some schools balanced by mandatory cost reductions in other schools. 1987 is projected to have slower growth as new applications started in 1986 are implemented and end-user DFP groups maintain current staff levels.

  - Exhibit IV-1 shows the 1986 user budget distribution and projects the growth of budget categories for 1987.

EXHIBIT IV-1

1986 BUDGET DISTRIBUTION AND 1986/1987 CHANGES IN THE EDUCATION SECTOR

BUDGET CATEGORY	1986 PERCENT OF I.S. BUDGET	1986-1987 EXPECTED BUDGET GROWTH
Personnel Salaries and Fringes	47.2%	3.8%
Mainframe Processors	10.6%	(4.8%)
Minicomputers	6.2%	(2.8%)
Microcomputers	5.8%	3.2%
Mass Storage Devices	4.9%	2.1%
Other Hardware	3.0%	(15.3%)
Total Hardware	30.5%	(0.9%)
Data Communications	5.2%	5.8%
External Software	5.7%	11.2%
Professional Services	1.2%	(0.9%)
Turnkey Systems	0.1%	2.3%
Software Maintenance	4.6%	6.2%
Hardware Maintenance	5.3%	8.4%
Outside Processing Services	0.1%	(2.3%)
Other	0.1%	3.5%
Total	100.0%	2.5%

- Three-fourths of schools believe their IS budgets will increase or remain the same in 1987, but one-fourth believe the growth rate will be lower than 1986 (see Exhibit IV-2).

- Factors contributing to increases in the IS budget include:

  - Personnel.

  - Hardware.

  - Supplies and outside services.

- Reduced government funding contributed to decreases in the 1987 IS budget.

- Nearly 65% of users indicated increased headcount in the MIS department in 1986 from 1985. The remainder indicated 1986 headcount remained the same.

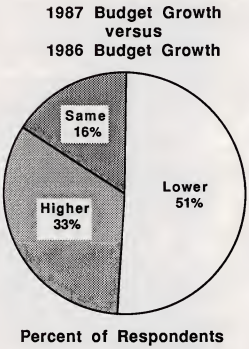
- The IS budget in the education sector is dependent on government appropriations. Since most of this sector is controlled by public agencies, IS management must spend a considerable portion of their time "lobbying" for whatever funding they can get. As a result, IS organizations usually lag in the use of new technology and systems.

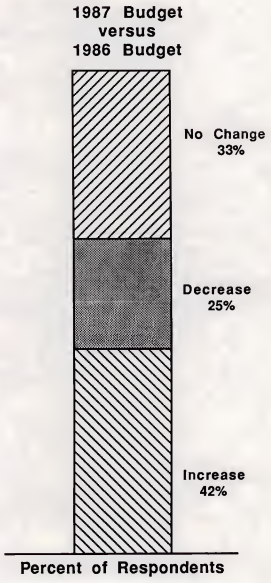
  - However, the leading universities are often selected as development partners or beta sites, for new hardware.

  - A few universities are exceptions to the limited budget rule; in fact, universities with prominent computer science or electrical engineering departments have extensive budgets to maintain on-going research and attract and retain top-notch faculty and students.

EXHIBIT IV-2

EDUCATION
MOST BUDGETS ARE INCREASING AT A LOWER RATE





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 (LANs) 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 both "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 product 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.

D. LIBRARY MARKET SEGMENT

- The nation's 14,963 public and 3,200 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 which 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 Online Computer Library Center may lead to a large-scale solution, 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

- 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 manangement, fund raising, student and faculty selection and retention, and library administration.

APPENDIX ED: FORECAST RECONCILIATION

- This appendix contains the following information:
  - Exhibit ED-1 which indicates the changes made in this year's forecast as compared to last year's.
  - An explanation of any changes that were made to the forecast.
- INPUT reevaluated the library segment of the education sector. The disparity in remote computing/batch services can be traced to additional revenues received by vendors for providing these services to college, university, and public libraries.

EXHIBIT ED-I

DATA BASE RECONCILIATION OF MARKET FORECAST BY DELIVERY MODE EDUCATION SECTOR

DELIVERY MODE	1985 MARKET			1990 MARKET			85-90 AAGR FORECAST IN '85 REPORT (%)	86-91 AAGR FORECAST IN '86 REPORT (%)
	1985 FORECAST ($M)	1986 REPORT ($M)	VARIANCE AS % OF '86 RPRT	1985 FORECAST ($M)	1986 FORECAST ($M)	VARIANCE AS % OF '86 FCST		
PROCESSING SERVICES								
REMOTE COMPUTING/BATCH SERV.	53	101	-48%	90	169	-47%	11%	11%
FACILITY MANAGEMENT	19	19	0%	24	24	0%	5%	5%
TOTAL PROCESSING SERVICES	72	120	-40%	114	193	-41%	10%	10%
APPLICATION SOFTWARE	58	68	-15%	205	155	32%	29%	17%
TURNKEY SYSTEMS	91	90	1%	215	181	19%	19%	14%