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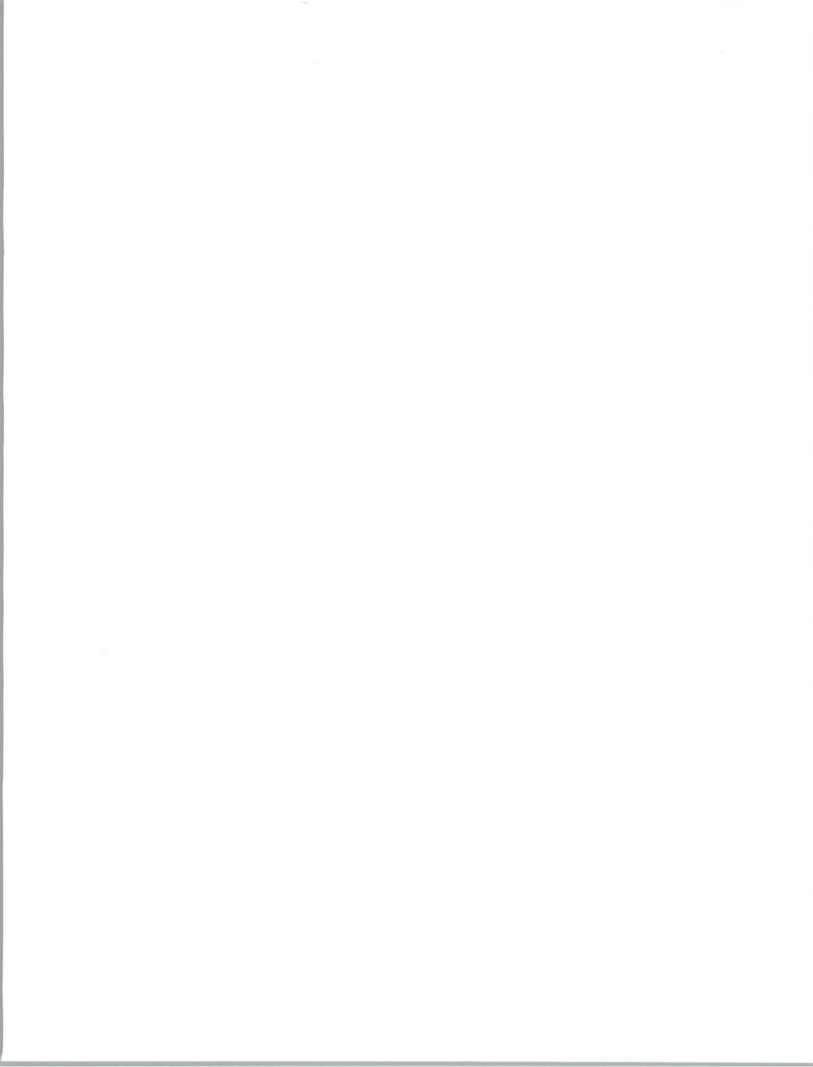
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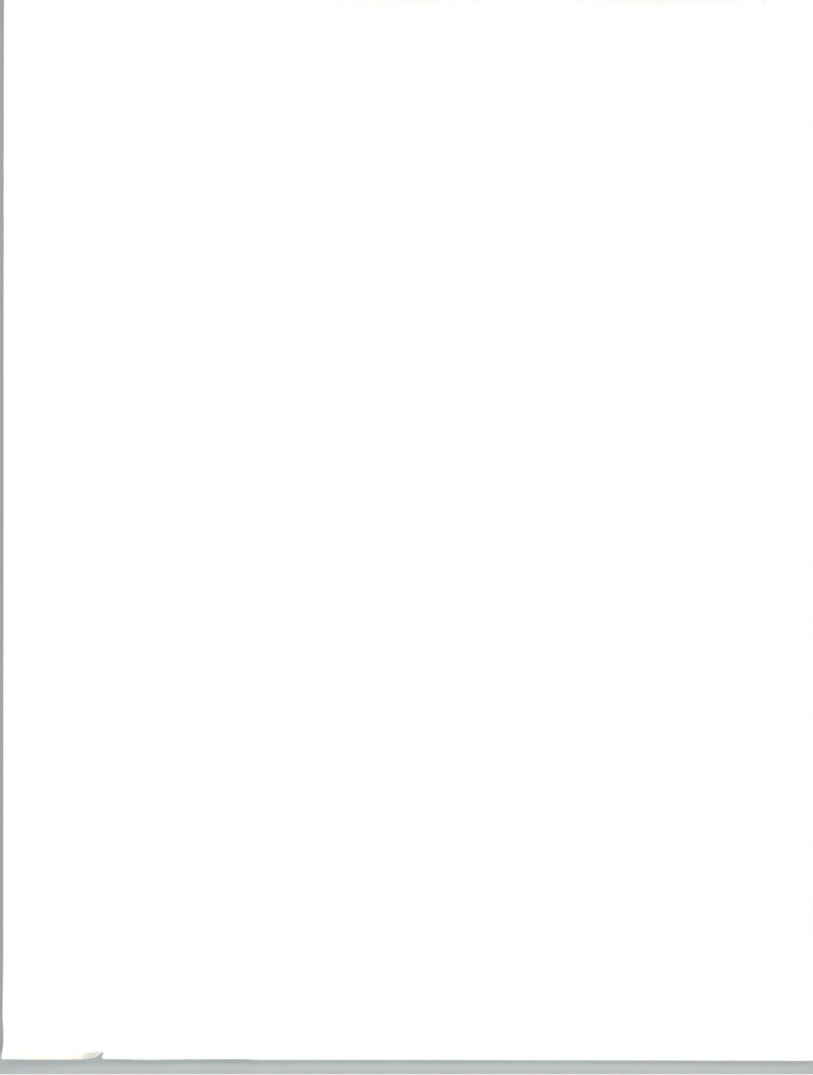
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May 7, 1993

Dear Colleague:

Attached is the Information Services Market Analysis Program's latest industry sector forecast update for the cross-industry *Training and Education Market*. It provides a current assessment of the events and issues driving the training and education marketplace, and offers INPUT's forecast of the market size for information services for the period 1993-1998.

This report should be filed with INPUT's other U.S. Information Services Market Analysis Program reports, behind the tab marked *Training and Education*. Your INPUT program binders, together with the delivery mode reports, provide a total assessment of the United States market for information services.

Market Analysis Program industry sector reports are prepared annually, and may be in one of two forms. The expanded report will contain a detailed industry analysis and supporting forecast data. It will typically be 40-50 pages in length. The forecast update will be a short report, providing a new forecast and summary data to support forecast assumptions. It will generally be 15-20 pages in length. Normally, full reports will be produced every other year, with summary reports prepared in the intervening years. The intent of this new format is to recognize the value of our clients' time, and provide concise statements of industry activity, supported by rigorous business, technical and competitive analysis, and a five-year industry forecast. I believe you will conclude that these new report formats are brief and very informative.

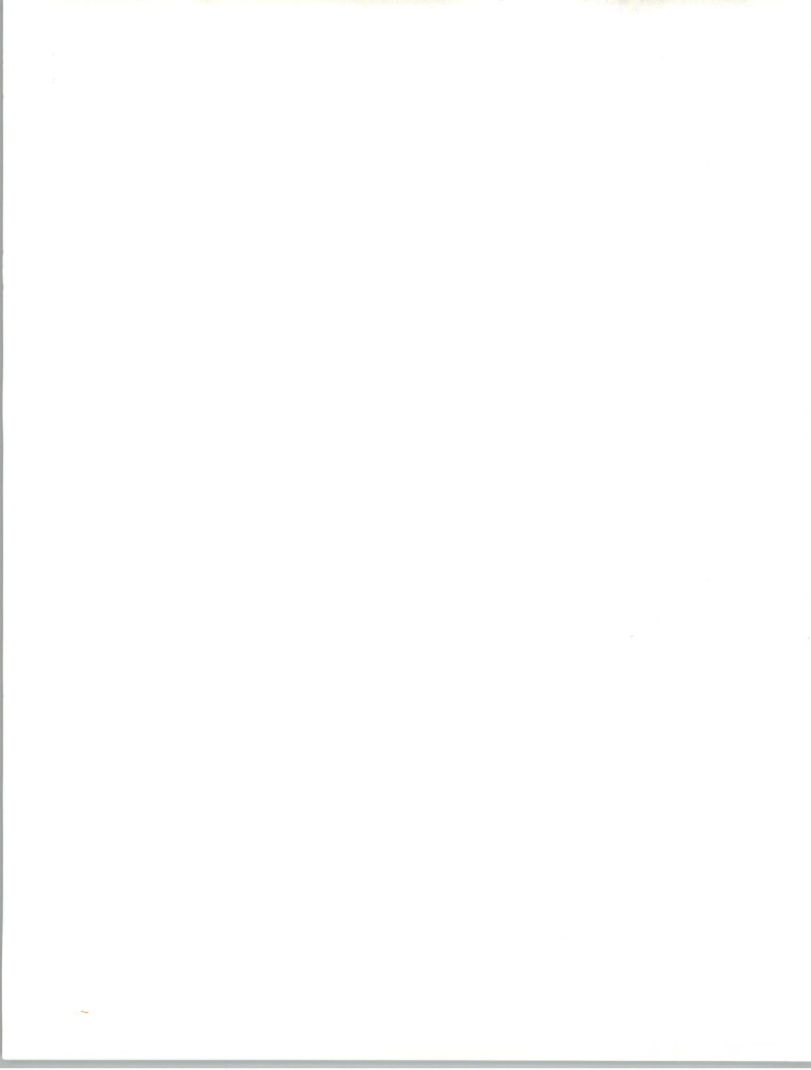
I am certain that you will find the *Training and Education* report to be edifying and helpful. I welcome any comments that you have on this document, or any of INPUT's publications.

Sincerely,

A handwritten signature in dark ink, appearing to read "Bob Goodwin", written in a cursive, flowing style.

Robert L. Goodwin

Manager, Information Services Market Analysis Program



CROSS-INDUSTRY
MARKET ANALYSIS

EDUCATION
AND TRAINING
1993-1998

**U.S. Information Services
Market Analysis Program**

A P R I L 1 9 9 3

EDUCATION AND TRAINING

INFORMATION SERVICES OPPORTUNITIES IN CROSS-INDUSTRY MARKETS

1993-1998
FORECAST UPDATE

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**Information Services Market Analysis Program
(MAP)**

Education and Training

***Information Services Opportunities in Cross-
Industry Markets, 1993-1998 Forecast Update***

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Introduction

A

Purpose

1. Marketplace

This report has been developed for vendors interested in business opportunities related to the use of information services for education and training.

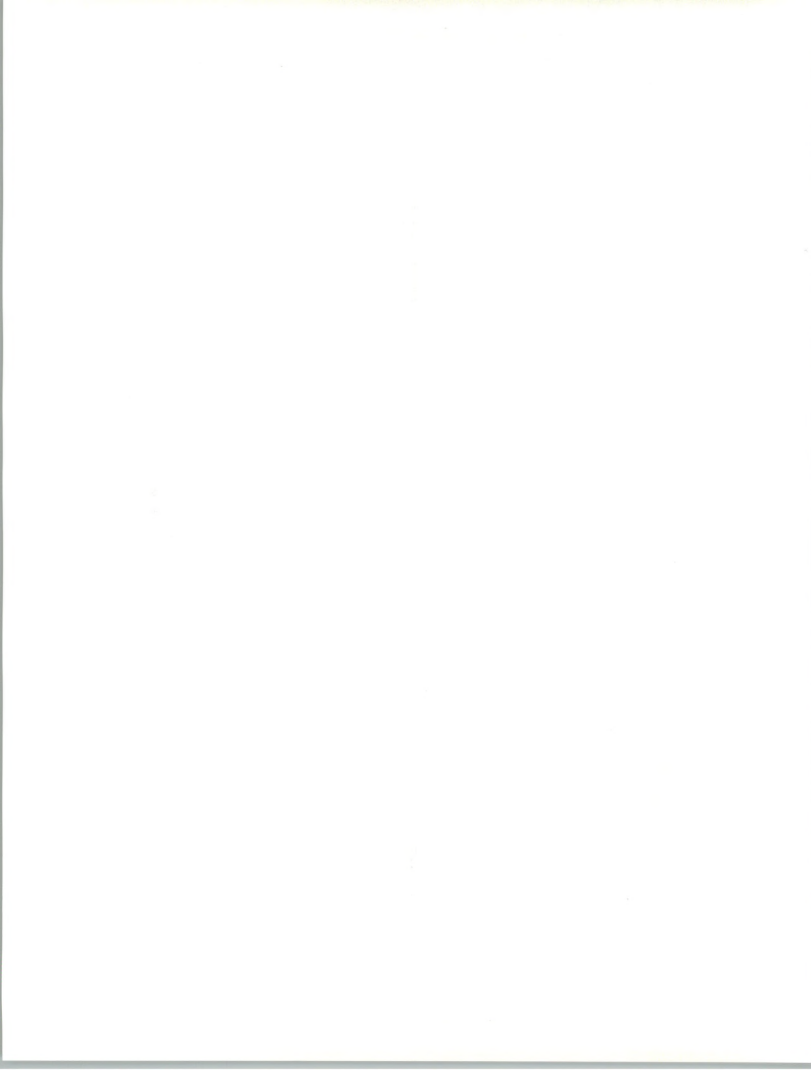
- Opportunities that will be discussed in the report include newer software products and approaches to CBT (computer-based training) that utilize hypertext and expert systems.
- Opportunities also include participating in certain types of training activities.

The report focuses upon information services that are provided to support cross-industry education and training. It also reviews the full range of activities that information services vendors take as a way to profit from opportunities related to education and training. Furthermore, the report discusses education and training opportunities of which some information services vendors are not aware.

INPUT provides analyses of information services in support of 7 cross-industry markets:

- Engineering and Scientific
- Accounting
- Human Resources
- Planning and Analysis
- Education and Training
- Office Systems
- Other Cross Industry

These reports are provided on a continuing basis as components of INPUT's Market Analysis Program (MAP), for information services vendors.



- As a part of that program, this report explores the use of information services to support cross-industry education and training, and forecasts the demand for those services.
- The report also addresses larger issues for information services vendors in relation to education and training.

INPUT defines the cross-industry market to consist of the private technical, trade and business schools that provide education and training, such as courses in secretarial and office skills, human resources, accounting, information systems (IS) and other subjects that can be used in multiple vertical markets.

- This market is divided into two segments in this report, IS-related education and training, and other training. This gives special attention to cross-industry, IS-related education and training.
- The second segment of cross-industry work by private trade and technical schools covers education and training not related to IS.

Information services vendors supply products and services in support of IS or non IS cross-industry courses, as indicated by the services labeled "B" in Exhibit I-1. Information services vendors can also use their knowledge of products that support training to develop and present IS or non IS cross-industry courses, which are labeled "A" in Exhibit I-1.

Exhibit I-1 also indicates that there are additional segments of education and training activities in each vertical market (C), which information services vendors can support. Although this report focuses on "B," which will amount to \$380 million in user expenditures in 1993, total opportunities related to education and training including support as well as actual teaching (A, B, C and D in Exhibit I-1) will amount to over \$4 billion in 1993.

The additional types of vertical market education and training (C), which information services vendors can support include:

- Courses at business, technical training schools and within companies
- Courses at academic institutions

The educational offerings of academic institutions including universities, colleges, secondary and elementary schools and libraries are not included in cross-industry education and training because these institutions are part of the educational sector, and treated in a vertical market report devoted to that particular sector.

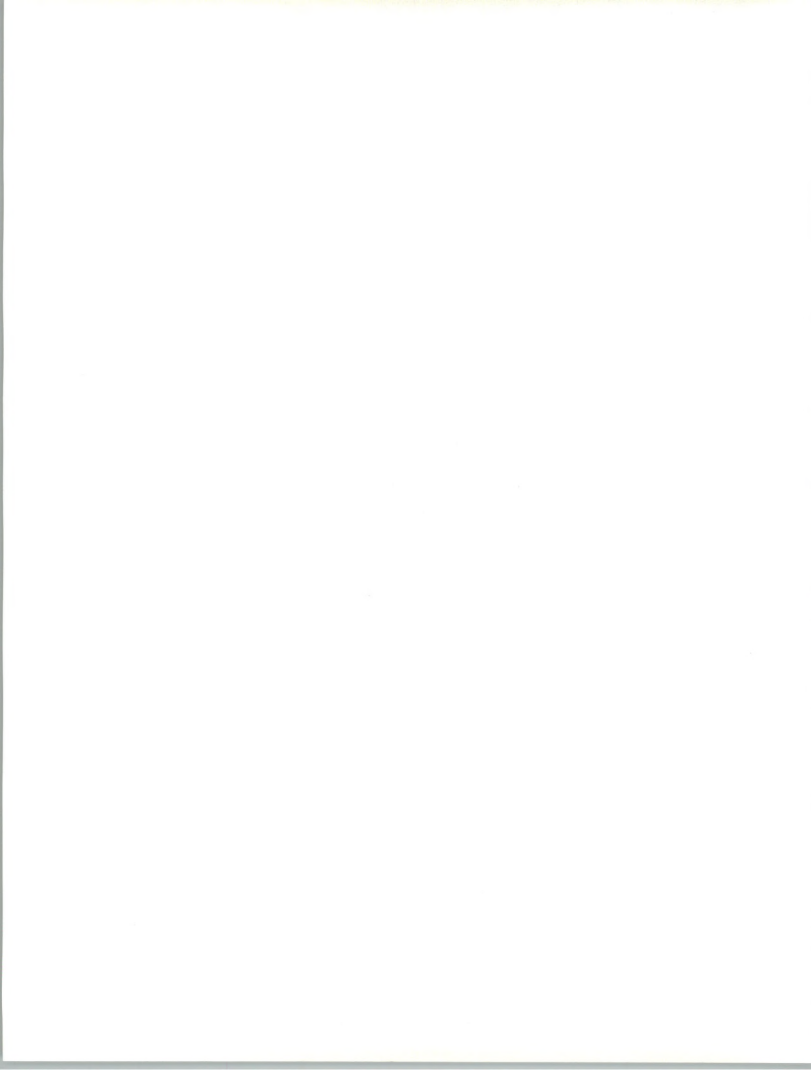
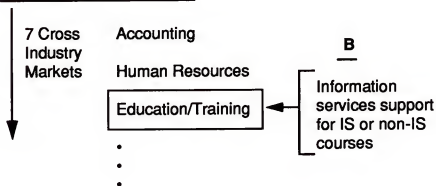
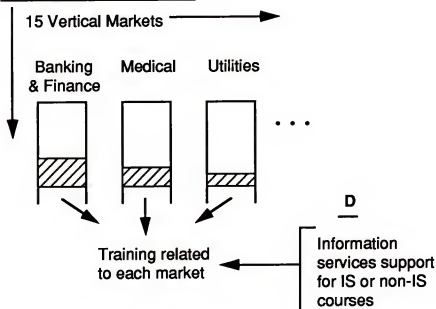


EXHIBIT I-1

Education and Training Related Opportunities**A In Cross-Industry Market:****C In Vertical Market:****2. Report Objective**

This report analyzes the information services, and business and technological issues driving its use, within the cross-industry education and training sector. The possible uses of information services will also be reviewed within other areas of opportunity.

- The total use of information services to support the cross-industry market will be developed for the 1992 calendar year.
- Forecasts of information services usage for the period of 1993 to 1998 will be estimated.

The specific information services that are defined as supporting cross-industry markets are software and turnkey products and processing services. Other services, such as systems integration or outsourcing, are performed for companies in specific markets, such as education or manufacturing, where educational programs can support the use of new automated systems, or train personnel on information technology.

The information services products thought of most often in support of cross-industry education and training are software products.

- Computer-based training or CBT software products can be run to teach IS courses, and they can also teach technical courses such as accounting or human resources.
- Other products that can support training include software products that support multimedia use on workstations, communication, or products that aid instructors to illustrate ideas or add material to training courses.

One category of CBT that is considered a newer type of product is the educational software development of Broderbund, Learning Co., Davidson & Associates and Impact Research, Inc., which can be used at home or in classrooms to teach through games.

In addition to software products, turnkey systems and processing services are also included in the cross-industry education market because they can run software products. Turnkey systems can also provide multimedia capabilities to aid in training by incorporating CD ROM or sound and film strip displays.

In addition to discussing technological and business factors that can influence the use of information services in support of training, the competitive environment for the vendors who provide these services will also be analyzed.

The report will also provide information on recent changes in the market such as the rapid growth of some IS-related education and training services and on changes in the use of information services including:

- The use of newer software technology in developing training products, particularly hypertext and expert systems capabilities.
- The use of vendors to help develop video conferencing and multimedia messaging products that can be used to support cross-industry training.

- The sale of cross-industry training courses in business and technical subjects, as well as in the area of IS training.

The report will also discuss new markets and opportunities for vendors who engage in or support cross-industry education and training.

B

Organization

The report is organized in the following manner:

- Chapter I, "Introduction," provides an introduction to the report and defines the sector to be studied. A list of related reports of possible interest to the reader is also included.
- Chapter II, "Trends, Events and Issues," discusses the changes taking place in the market with business and technological issues that can impact the current and future use of information services.
- Chapter III, "Information Services Market Forecast," presents an analysis of expenditures for information services by delivery mode and submode for the U.S. cross-industry education and training market. A discussion of the size of other markets that have opportunities related to education and training will also be included.
- Appendix A, which contains the forecast data base, presents a detailed forecast by information services delivery mode and selected submodes for the cross-industry education and training sector. A reconciliation to the previous forecast is also provided.

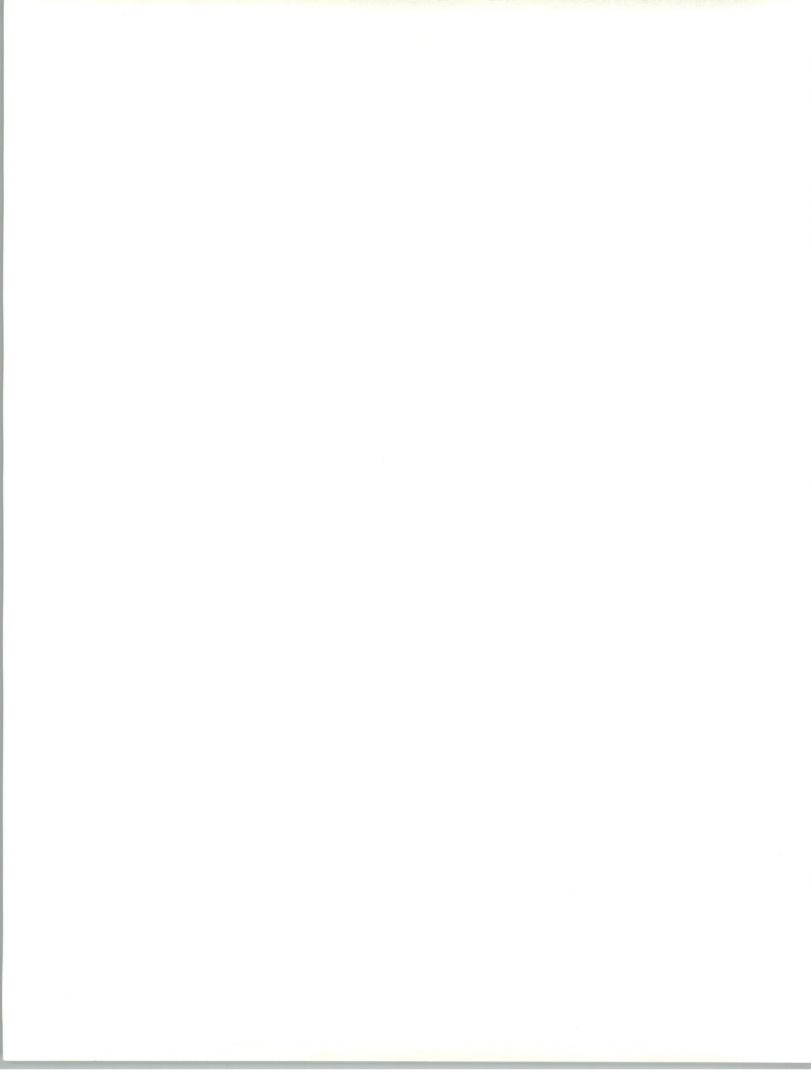
A separate report on vendors serving the cross-industry training and education market will be prepared separately. It will contain more information about the competitive climate and competitive positioning.

C

Related Reports

Related reports of interest to the reader include:

- *U.S. Industry Sector Report on Education*
- *Professional Service Report, 1992-1997*
- Cross-industry market reports on all 7 cross-industry markets



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Trends, Events and Issues

A

Overview

Trends, events and issues of note will be examined for both segments of the cross-industry education and training sector:

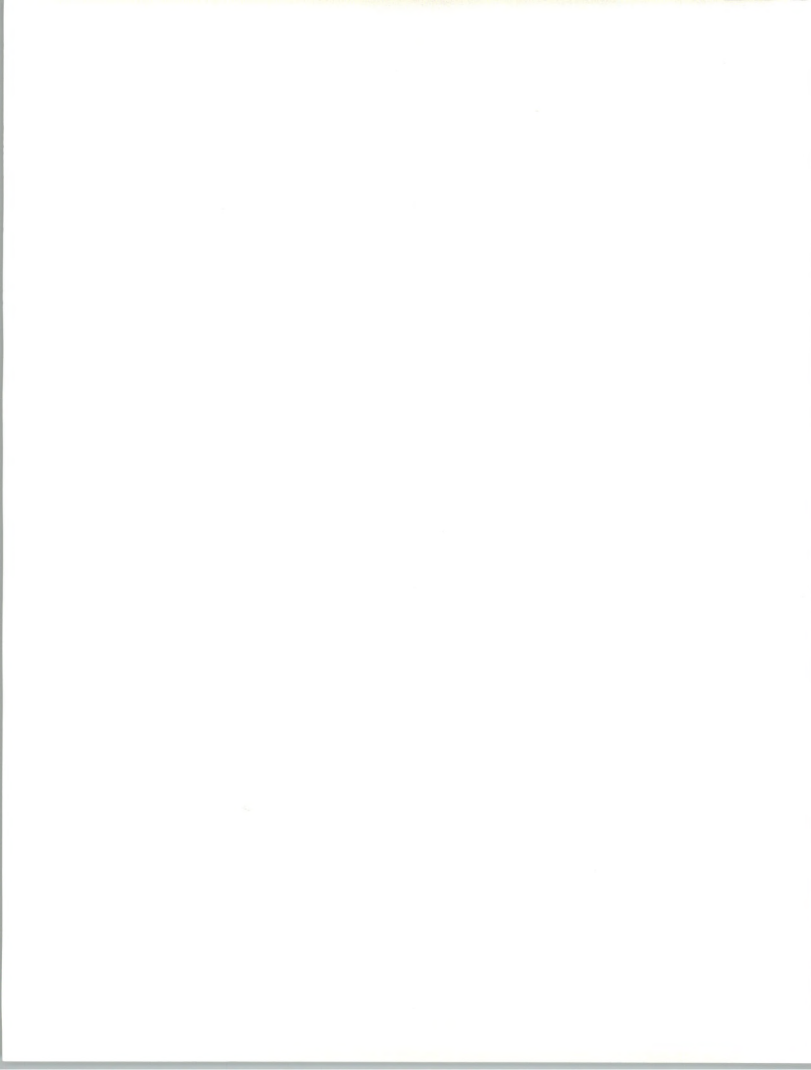
- Information Systems-(IS) related education and training
- Other privately provided cross-industry technical, business and trade training

As noted before, private and public universities and colleges, and secondary and elementary schools are covered in the Education Market report. However, their needs are of interest to vendors who supply information services to cross-industry education and training firms for two reasons:

- These institutions may offer IS courses that could be improved by making use of vendor products.
- Some of these institutions offer competition to cross-industry trainers in IS and other subjects. They may also use the aid of information services vendors to teach these subjects.

A number of colleges offer cross-industry courses in IS (and other subjects) at university, client or private facilities, apart from their academic courses on the subject.

- Columbia University advertises these courses on public radio stations and other media. New York University also advertises courses of this type.
- A two year college in New Jersey utilizes software products, lecture rooms and personnel from a vendor of information services. A number of academic institutions are moving in this direction.

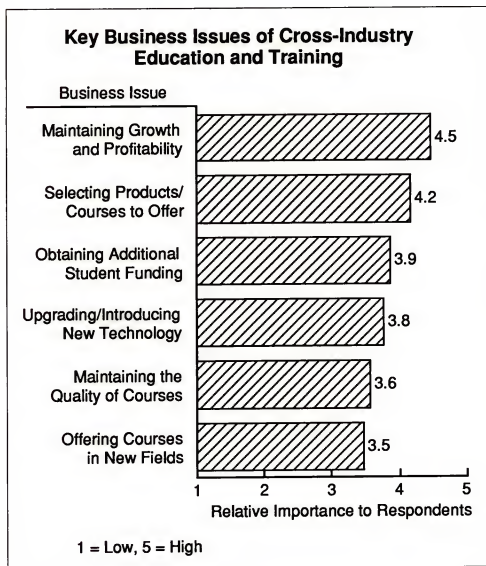


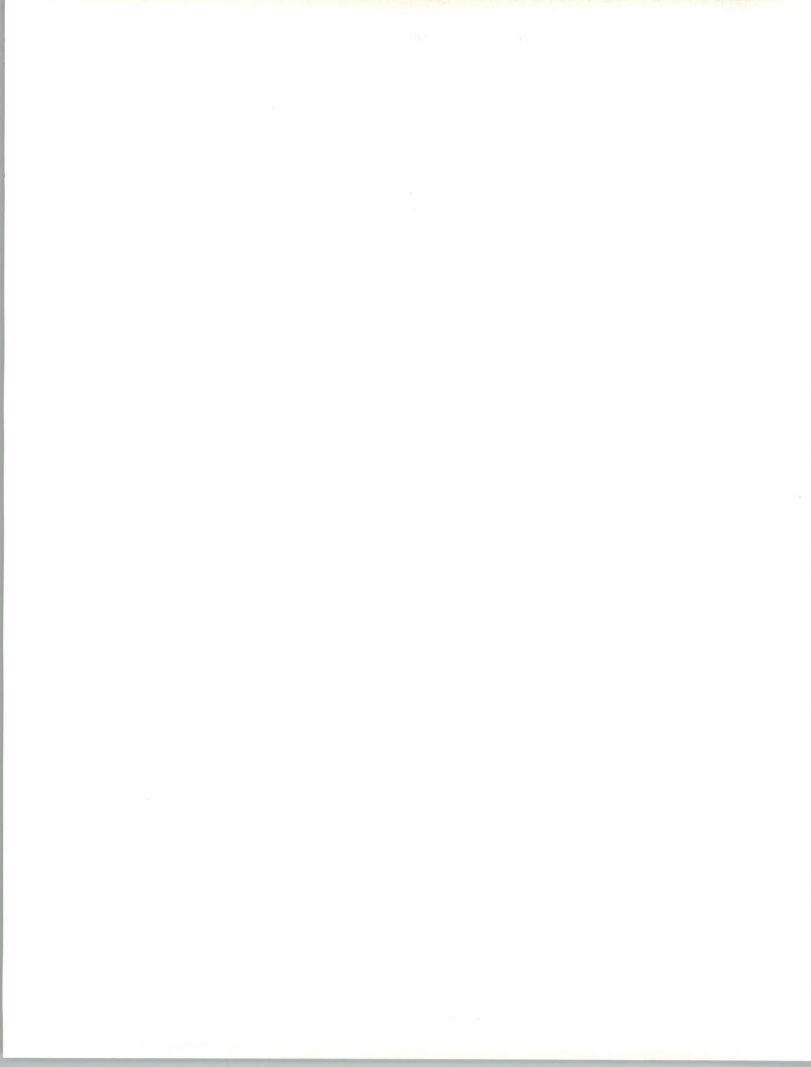
Vendors of cross-industry training (including some academic institutions) feel that a significant issue lies in the government's interest in industry-oriented training that can improve the quality of available workers.

- These organizations hope that the positive outlook of the Clinton administration on investment in training may lead to additional funding for students.
- It is also felt that needs for retraining are growing rapidly due to the cutbacks in personnel at large companies and military facilities.

A compilation of key business issues reported by respondents from the cross-industry education and training market are summarized below in Exhibit II-1.

EXHIBIT II-1





B**IS Related Training and Education**

This segment of the cross-industry education and training market is of interest to many information services vendors because the training firms utilize information services and offer IS training.

- Some information services vendors have noticed the success of newer training firms such as ExecuTrain, Comsell or the training subsidiary of AMRIS. They have also noted that information services firms can use training to gain more revenue, such as Andersen Consulting has done with client/server technology.
- A number of these information services vendors have also noticed the opportunities for expanding training services into additional fields.

The cross-industry IS training segment reported revenues of about \$ 2.9 billion in 1992. Although there are many vendors who supply training, the number of vendors with revenues above \$30 million annually are limited.

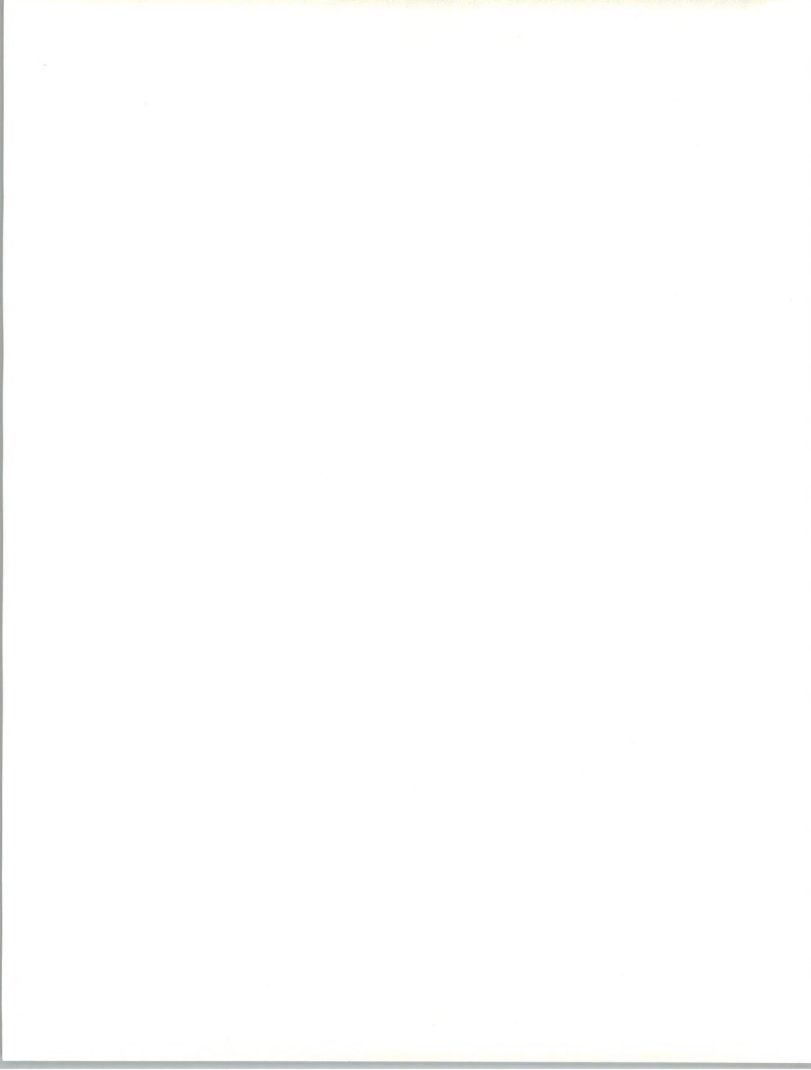
They include the following companies:

<i>Skill Dynamics</i>	A subsidiary of IBM
<i>NETG</i>	An independent IS training vendor
<i>EDS</i>	A major information services firm
<i>CSC</i>	A major information services firm
<i>Andersen Consulting</i>	A component of Big 6 firm
<i>SRA/Crwth</i>	A subsidiary of McGraw Hill
<i>AMRIS</i>	A subsidiary of AMR (American Airlines)
<i>ATT</i>	A communications and IS businesses
<i>DEC</i>	An IT hardware information services vendor
<i>Unisys</i>	An IT hardware and information services vendor
<i>ExecuTrain</i>	An IS training vendor

As the foregoing list illustrates, there are a wide range of companies involved in offering IS training and education.

This segment of the market makes use of instructor-led training (ILT), cassette courses, text or manuals, computer-based training (CBT), video, interactive video, multimedia, and Electronic Performance Support Systems (EPSS).

One of the major business issues in this segment concerns the selection of services to offer. ILT can provide a continuing stream of revenue if inspiring teachers and interesting methods of presentation are used, but many vendors have been reluctant to rely solely on this service.



- The Learning Group has been one of the few vendors that has relied heavily upon this type of training. This company pays close attention to the level of quality provided in its courses.
- The franchise type of operation provided by ExecuTrain (which is now featured in television advertisements in some cities) has generated rapid growth from ILT services; but the impetus from franchise owners and the use of support manuals and services to aid in training may be playing a large part in this growth.

The largest vendors in the industry rely on other types of training, or on a mix of courses including ILT. Many education and training vendors offer a combination of ILT and other services such as IVT (interactive video training) and/or CBT. CBT has tended to replace ILT because it does not require a live trainer, and can provide more engrossing training according to vendors.

- NETG, the largest independent vendor in the industry, uses CBT as its major product, but also offers ILT.
- Skills Dynamics, an IBM subsidiary that has the largest annual revenue in this area, offers a mix of courses including ILT and Distance Education.
- McGraw Hill (SRI/Crwh) offers a variety of courses on media, other than ILT, including CBT, cassette and printed text.

There has been a feeling during the past few years that CBT has not realized its potential. However, a number of vendors have been improving their CBT offerings and increasing their revenues.

- DPEC has received attention for the use of graphics and color in CBT offerings.
- Comsell has provided new features with CBT, such as the ability to exit from a course presentation, try out what has just been learned, and then re-enter the course.

A further development of CBT, EPSS (Electronic Performance Support Systems) has been sold during the past few years by firms such as AMRIS.

- EPSS provides the means for someone to review instruction during the actual performance of a job.
- In addition to gaining revenue from CBT and EPSS, AMRIS uses these offerings to promote and sell its instructor-led education and training capabilities.



Education and training firms can develop their own CBT or EPSS products by using internal or authoring tools offered by Goal (now part of Legend), Authorware Professional, or The Cobre Group.

New types of software products can also be developed for CBT or EPSS systems such as hypertext or A.I., or embedded exercises that aid in the learning process.

- Several education and training vendors, including DPEC, have utilized foreign firms during the last few years to develop advanced software products for courses.
- Major education and training firms have also made arrangements with professional services firms to develop training products.

In one domestic development, AT&T plans to offer some open systems educational products of DPEC. Another small domestic training vendor, Cobre, has developed courses that utilize hypertext capabilities for Computer Associates and Systematics. These courses could be used for classroom CBT training or EPSS.

CBT and EPSS training are taking advantage of the growth of workstation capabilities, including screen quality, crisp images and graphics and color selections. Other technological advances are developments in AI and hypertext software, as well as improvements in telecommunications, particularly those aiding distance education.

Another development in cross-industry IS training is the use of distance education that involves delivering education courses over a communication link to a distant point.

- Taped material including question and answer sessions or graphics can be combined with an instructor's presentation.
- This type of education has been helped by teleconferencing vendors.

In addition to deciding what combination of courses to offer, other issues in cross-industry IS education and training include:

- Maintaining profitability and growth
- Maintaining quality of educational offerings
- Using new technology to deliver training
- Expanding offerings into general business or industry topics that can assist in personnel improvement

- Using alliances to help market or develop offerings

These issues are shown in Exhibit II-1.

C

Other Technical, Business and Trade Training

One segment of cross-industry education and training embraces subjects other than IS. These subjects include accounting and financial skills, secretarial and office skills, language and writing skills, human resources and a number of other business subjects.

Firms that offer these courses such as Katherine Gibbs and Worldwide Business Schools, can usually expand their training to many more locations than the firms that specialize in a specific industry.

When education and training are aimed at a specific vertical market, such as training for airline flight attendants, the work is classified as industry specific. Many business schools teach both cross-industry subjects and industry specific subjects.

This report focuses on the use of information services to support firms in cross-industry education and training. However, information services vendors have found that developments in IT technology can be used to support education and training firms in both cross-industry and industry specific education.

- The developments in IT technology that are effective in supporting cross-industry and industry specific training include CBT, EPSS, hypertext and expert system software products and new workstation technology.
- Developments in teleconferencing, and multimedia workstations and communication have also been used to support educational programs.

Information services firms do not only support firms active in cross-industry and industry specific training, some information services vendors utilize this technology to offer their own business and trade courses.

- Comsell offers training in police and court work.
- DPEC, NETG and other vendors of IS education and training have courses that provide general improvement in business skills.
- TI has engineering courses available in its curriculum.

- Skill Dynamics is developing plans for introducing a number of educational offerings in a group of business subjects.

Consequently, one of the issues of cross-industry and industry specific training firms is competition from information services vendors who can use the advantages of new information technology to enter new areas of business training.

Other issues reported by these firms are means of helping students to obtain funding to attend courses, identifying and contacting more potential students, improving course quality and increasing earnings. Exhibit II-1 integrates these issues with the issues of cross-industry IS training firms.

D

Key Technology Trends

One of the key technology trends mentioned by respondents in market segments is the expanding use of workstations. Not only do a growing number of CBT and EPSS products make use of workstations, but many vendors of IS and business training make use of workstations as vehicles for practicing what has been learned.

New technology mentioned by respondents also entailed the use of multimedia, including attached CD ROM units that are now used or are introduced in IS and industry training.

- A development manager at DEC reported using integrated image and text capabilities for medical training, and research personnel at Lotus reported the integration of voice, video and text in experimental industrial training.
- Contacts also mentioned several training courses in the pharmaceutical and other industries that utilized expert systems and multimedia. Though diagrams are displayed that illustrate the action of drugs, their names and side effects are read aloud by workstations.
- Several years ago, NETG had demonstrated the use of sound and video in training courses for IS and business subjects.

A review of information obtained from respondents in the cross-industry training and education market, which is shown in Exhibit II-2, indicates that the use of workstation technology is highly important as a technology trend. Its importance is also reflected in the ratings given to software products used with it.

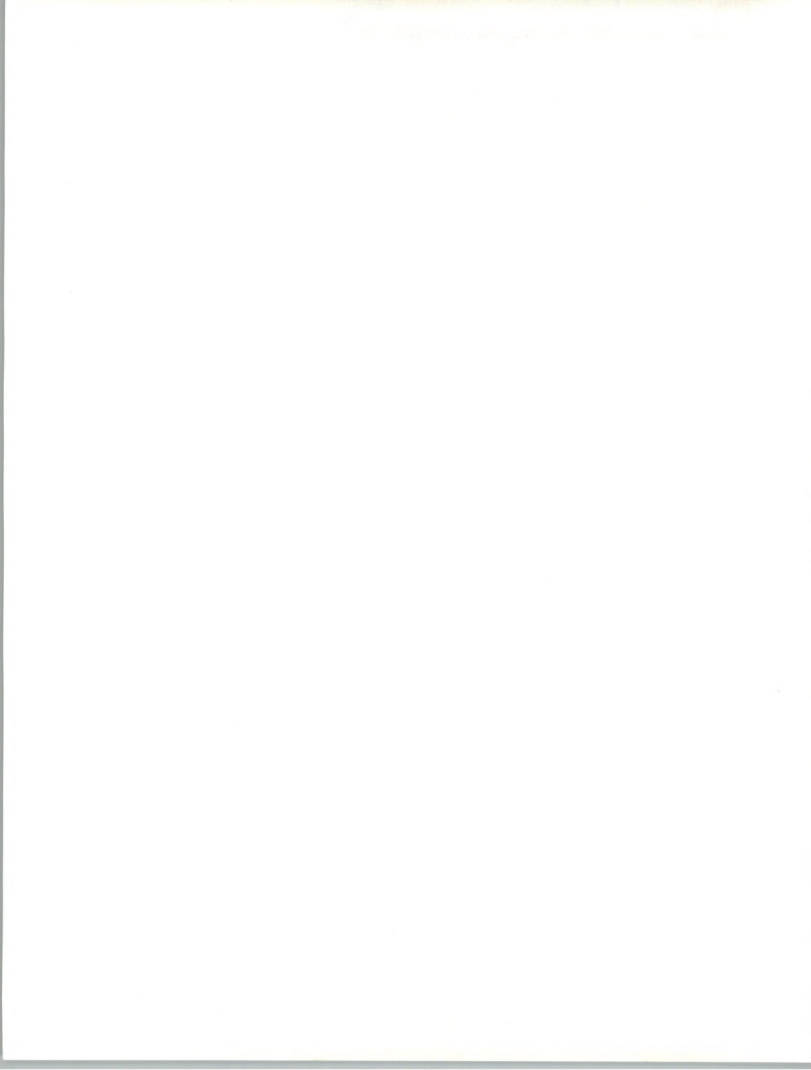
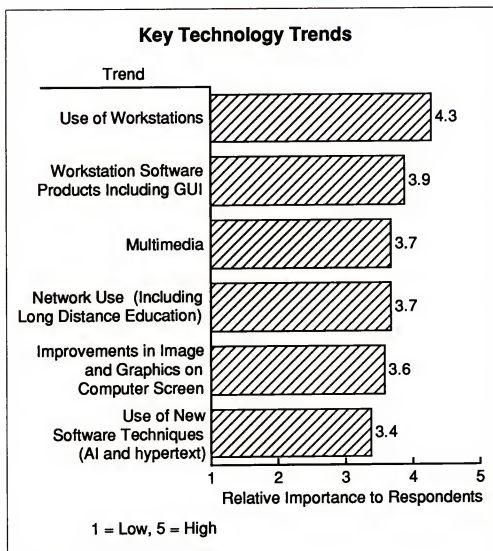
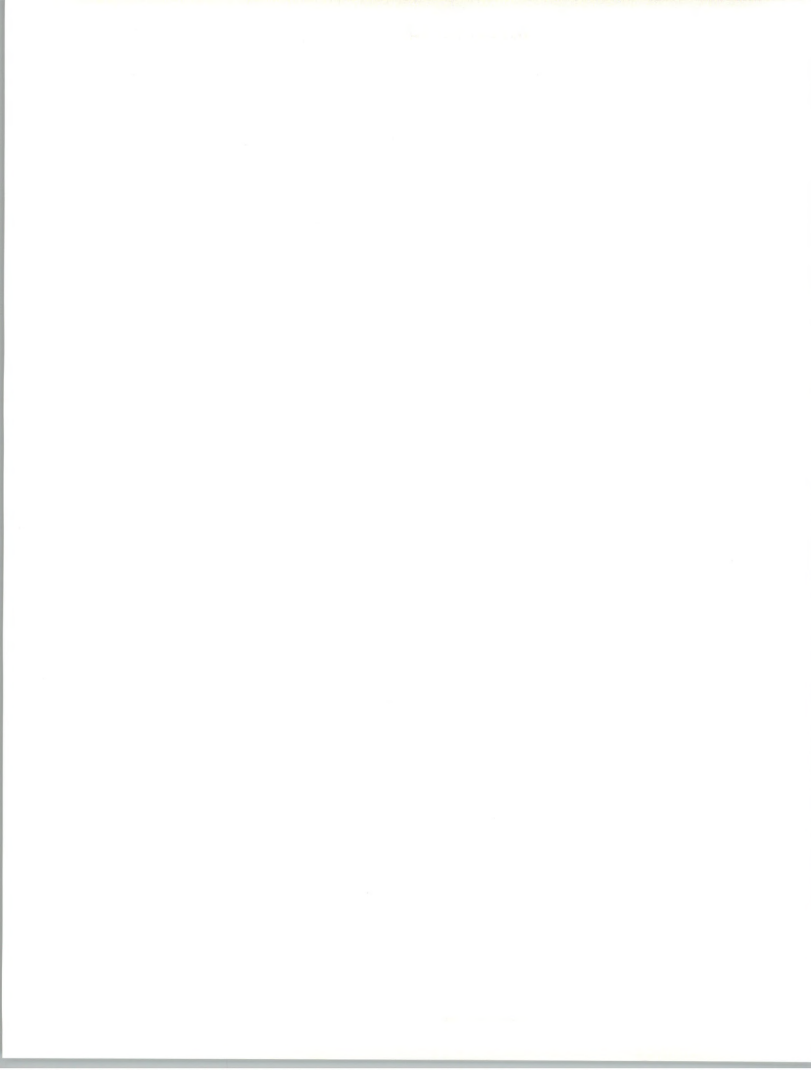


EXHIBIT II-2





III

Information Services Market Forecast

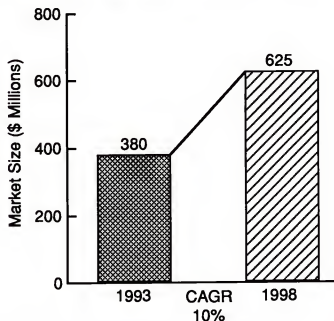
A

Total Market Forecast, 1992-1998

Information services expenditures in the U.S. cross-industry education and training market picked up in the second half of 1992 bringing the growth rate for the year to 8%, which was 2% above the rate of growth originally forecast.

EXHIBIT III-1

Education and Training Cross-Industry Sector Information Services Market, 1993-1998



- These expenditures will grow at a noticeably higher compound annual growth rate (CAGR) of 10% between 1993 and 1998.

- Expenditures will be at a rate of 10% in 1993, and increase to a rate of 11% in 1993 and 1994 as the economy improves and activities intensify to improve or retrain workers. Growth will taper off and increase slightly less rapidly in 1995 through 1998, at a CAGR of 10%, as training objectives are addressed.
- Expenditures will advance from \$351 million in 1992 to \$380 million in 1993, and then climb to \$625 million in 1998.

Two factors will affect the increase in growth of information services in the cross-industry education and training sector:

- The increasing attention being given to the need for training or retraining by the federal government.
- The increasing demand for training by users who become involved in downsizing and client/server systems.

In addition to benefiting from increases in information services expenditures in the cross-industry education and training sector, many vendors will obtain revenues from other education and training related initiatives.

- Some vendors with knowledge of education and training such as AMRIS and EDS have become significant vendors of training services because this market is attractive. It consisted of \$2.9 billion of user expenditures in 1992, and is growing at an 11% CAGR as shown in Exhibit III-2. This market is further discussed in the 1992-1997 Professional Services Report.
- Other vendors such as Goal and DPEC provide information services to firms that offer training and IS education.
- Vendors of information services and training also supplied non-IS training for cross-industry and industry specific markets, as was noted in section II.
- In addition, information services vendors provide services in support of education and training and other activities of academic institutions (see the Education Market report).

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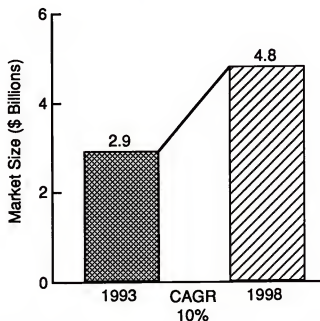
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EXHIBIT III-2

**Professional Services Market
Education and Training Submode, 1993-1998**

Information services vendors with capabilities or interests in education and training should consider all the opportunities noted above.

B**Forecast by Delivery Modes**

The 1993-1998 forecast of user expenditures by delivery mode in the cross-industry education and training sector are shown in Exhibit III-3. Discussions of the individual forecasts for delivery modes follows this exhibit.

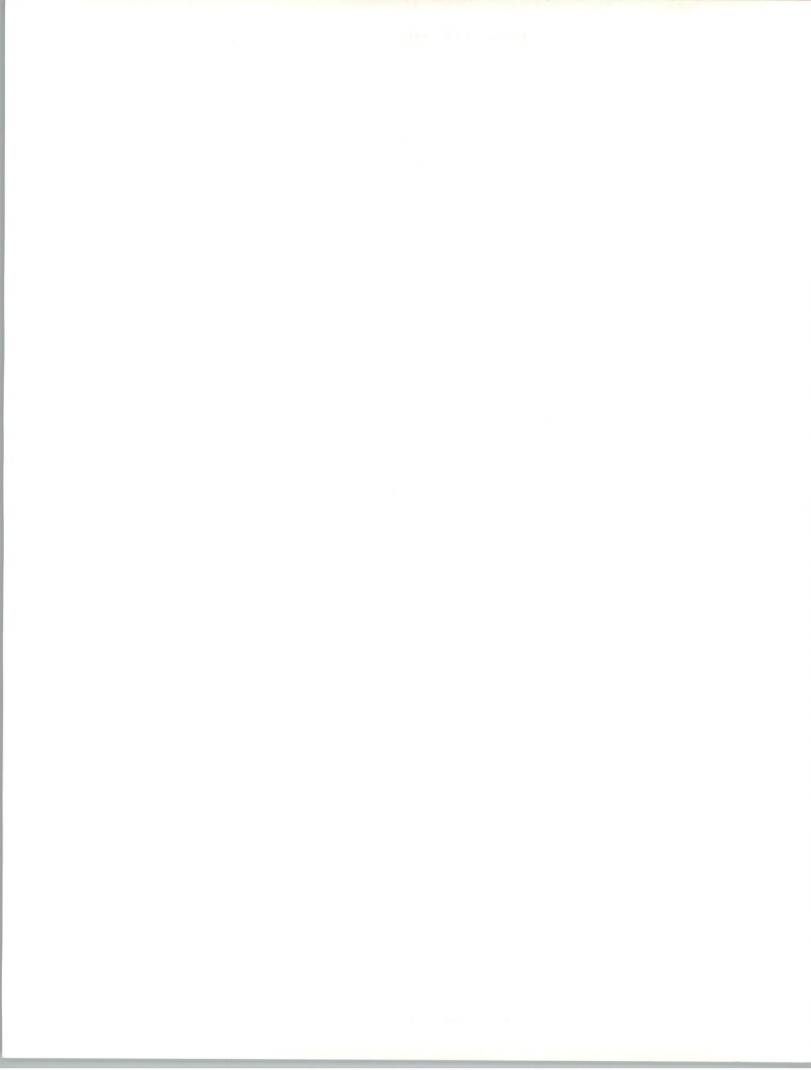
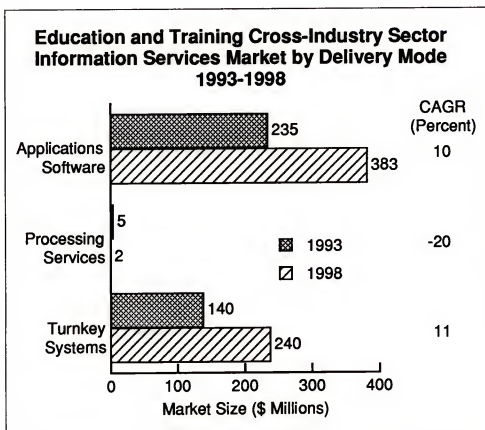


EXHIBIT III-3



1. Processing Services

Processing systems will continue to decrease in use falling to a relatively small amount in 1998, which may represent temporary usage or a trial of products than continuing usage. A number of products for this sector, such as the Plato products of CDC, were introduced in the past on processing services run on mainframes, but the current preference is for products that will run on workstations.

2. Turnkey Systems

Turnkey systems will continue to grow at a rate of 11%.

- Turnkey solutions continue to be popular because they can be delivered with equipment to run CD ROMs, video disks and other equipment that can be utilized in training courses.
- Turnkey systems are acquired by large and small firms for training purposes. For a number of other applications, turnkey systems are less likely to be used by large firms.

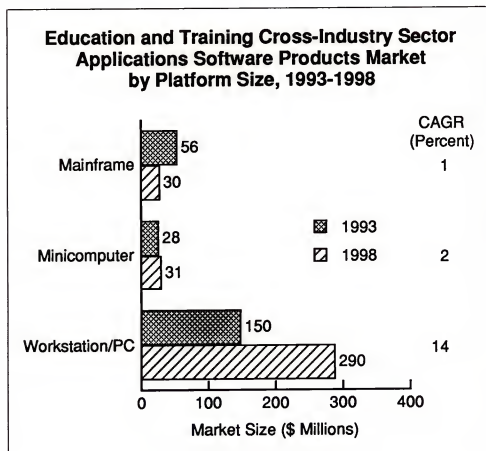
In 1998, expenditures for turnkey systems for this market will reach a level of \$240 million, which will still be below expenditures for software products.

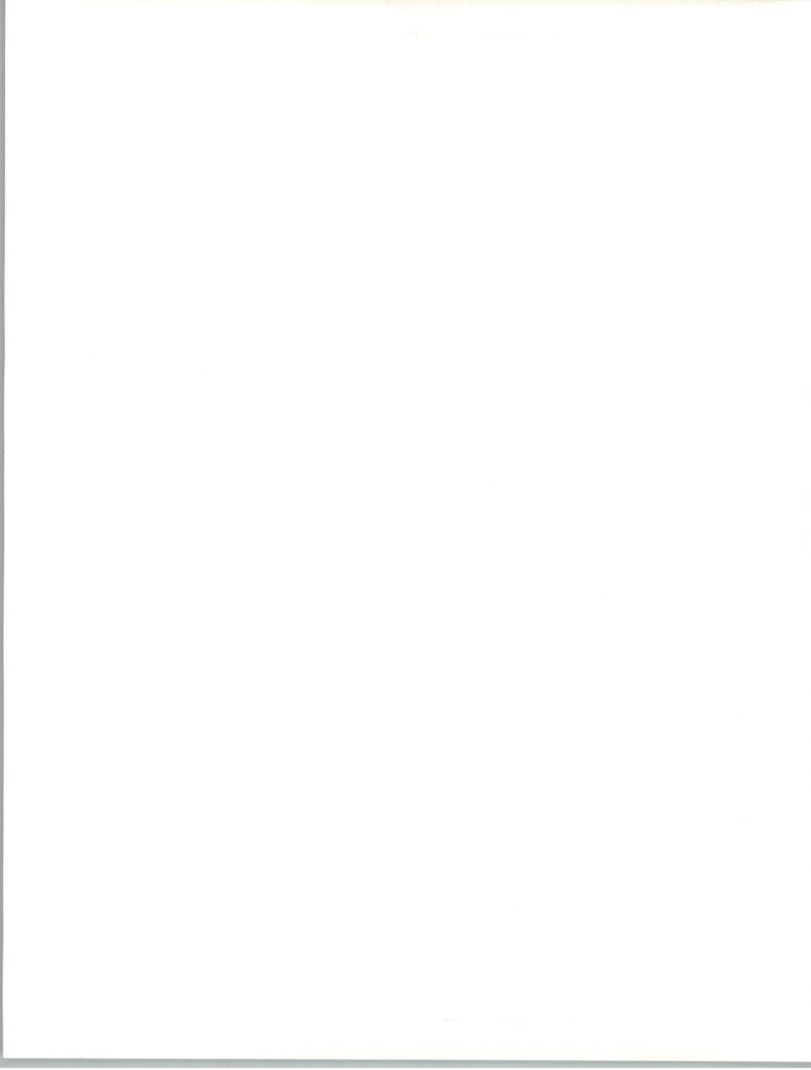
3. Application Software Products

Expenditures for applications software products will grow at a CAGR of 10% between 1993 and 1998. The rate forecast for 1992 to 1997 in the previous forecast was 1% lower. A pickup in the sales of CBT and EPSS products, and the sales of software products to support multimedia education and provide aids and examples will be responsible for the increase in usage.

- As Exhibit III-4 illustrates, the growth in use of software products is reflected chiefly in the growth of products for workstation/PC platforms.
- In almost all training situations, the use of workstations or LAN-based workstations is much more convenient and less costly than providing terminals connected to mainframes or minicomputers. In addition, the software capabilities available on workstations such as GUI enhance their use for individual or small group instruction.

EXHIBIT III-4

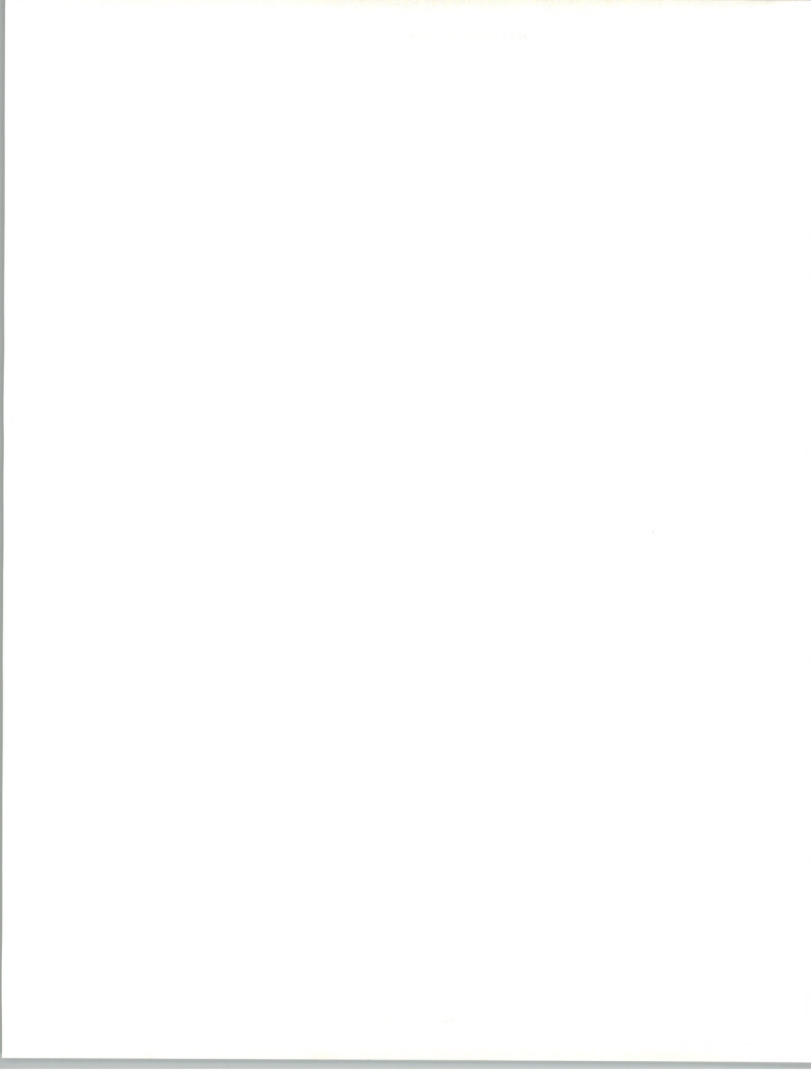




Most CBT products such as those of Crwth and Goal (now part of Legent) have been moved or are rapidly being moved to workstations.

Vendors of information services to the cross-industry market for education and training and organizations that offer IS education and training are listed below:

- Aimtech
- AMRIS (AMR, American Airlines)
- Andersen Consulting
- AT&T
- Broderbund Software
- CDC (Renamed Ceridian)
- Comsell
- Cobre Group
- Davidson & Associates
- Digital Equipment
- DPEC
- EDS
- ExecuTrain
- Goal (Acquired and now a division of Legent)
- Impact Research
- Learning Company
- Learning Tree
- SRA/Crwth (McGraw Hill)
- Skill Dynamics (IBM subsidiary)
- Texas Instruments
- Unisys





Forecast Data Base

A

Forecast Data Base

Exhibit A-1 is the user expenditure forecast data base for the education and training cross-industry sector.

EXHIBIT A-1

Education and Training Cross-Industry Sector Market Size by Delivery Mode, 1992-1998 (\$ Millions)

Delivery Modes	1992 (\$M)	Growth 92-93 (%)	1993 (\$M)	1994 (\$M)	1995 (\$M)	1996 (\$M)	1997 (\$M)	1998 (\$M)	CAGR 93-98 (%)
Sector Total	352	8	380	420	465	515	570	625	10
<i>Processing Services</i>	6	-20	5	4	4	3	3	2	-20
- Transaction Processing	6	-20	5	4	4	3	3	2	-20
<i>Turnkey Systems</i>	125	12	140	156	176	197	217	240	11
<i>Applications Software</i>	221	6	235	260	285	315	350	383	10
- Mainframe	55	1	56	56	57	58	59	60	1
- Minicomputer	27	4	28	29	29	30	30	31	2
- Workstation/PC	139	9	151	175	199	229	261	292	14

Exhibit A-2 reconciles this year's forecast with INPUT's 1990 forecast. INPUT has adjusted its information services forecasts upward to reflect increasing interest in education and training brought about by government interests in retraining, and end-user interests in gaining more IS training to support the growth of client/server and workstation use.

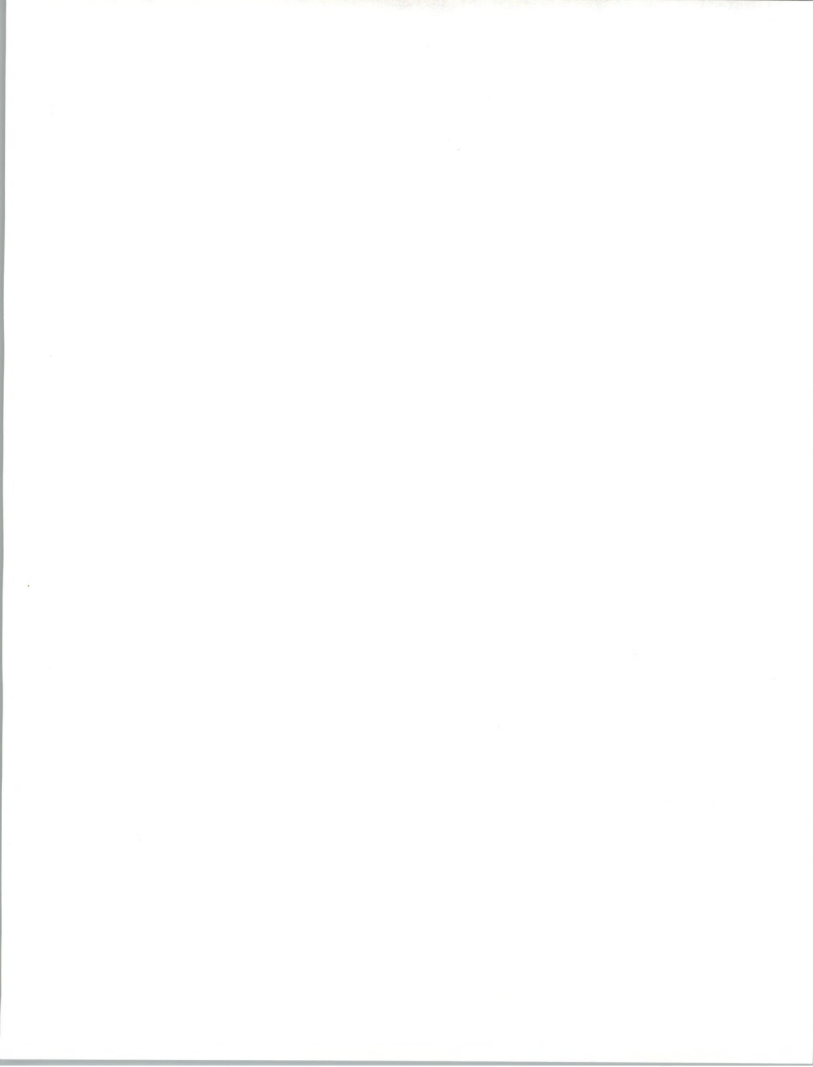
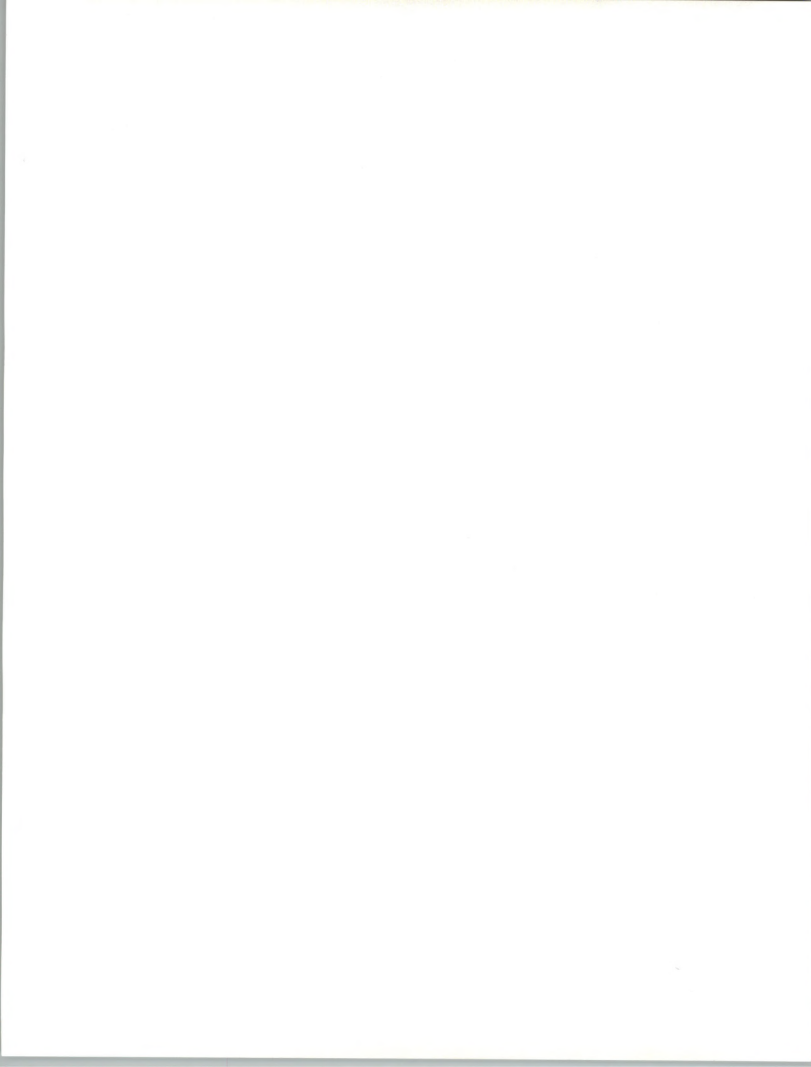


EXHIBIT A-2

**Education and Training Cross-Industry Sector
1993 MAP Data Base Reconciliation
(\$ Millions)**

Delivery Modes	1992 Market				1997 Market				92-97 CAGR per data 92 Rpt (%)	92-97 CAGR per data 93 Rpt (%)
	1992 Report (Fcst) (\$M)	1993 Report (Actual) (\$M)	Variance from 1992 Report		1992 Report (Fcst) (\$M)	1993 Report (Fcst) (\$M)	Variance from 1992 Report			
			(\$M)	(%)			(\$M)	(%)		
Sector Total	339	352	13	38	533	570	37	7	10	10
Processing Services - Transaction Processing	6 6	6 6	0 0	0 0	2 2	3 3	1 1	50 50	-20 -20	-20 -20
Turnkey Systems	120	125	5	4	200	217	17	9	12	11
Applications Software Products	213	221	8	4	331	350	19	5	9	10
- Mainframe	56	55	-1	-2	62	59	-3	-5	2	1
- Minicomputer	27	28	0	0	29	30	1	3	2	2
- Workstation/PC	130	139	9	7	240	261	21	9	14	15



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- Client/Server
- Systems Integration
- IT Vendor Analysis
- EDI / Electronic Commerce
- U.S. Federal Government
- IT Procurements

— EUROPEAN —

- Outsourcing
- Systems Integration
- Customer Services

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