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Current accessibility of, knowledge of, and experience with distance education technologies at three small colleges in Kelskemet Hungary

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CURRENT ACCESSIBILITY OF, KNOWLEDGE OF, AND EXPERIENCE WITH DISTANCE EDUCATION TECHNOLOGIES AT THREE SMALL COLLEGES IN KECSKEMÉT HUNGARY

by

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ABSTRACT

In Kecskemét, Hungary, three small colleges are discussing plans to form a new university and implement some of their courses using distance education technologies, if political and economic conditions are favorable. The purpose of this case study was to answer some basic questions about: (1) the accessibility to 74 different technologies which could be used in the planning and implementation of distance education programs, (2) the knowledge of the planners about these technologies, and (3) their experience using them. Planners were selected by respective college rectors as: Horticulture College (N=16), Mechanical Engineering and Automation College (N-16), Teacher Training College (N=7). The planners' selections were based on the assumption that they would likely be used in the development and implementation of future distance education programs. No other conditions were set for their selection in the hopes that the most natural conditions might be replicated, i.e., decisions for program planning and implementation ultimately rest with administrators' decisions.

From the analysis of both individual and group data, it was determined that (1) the Horticulture and Mechanical Engineering and Automation Colleges were roughly equivalent

in accessibility to and experience with the technologies surveyed, (2) the Mechanical Engineering and Automation College had more knowledge of the technologies than the other two colleges, (3) the Teacher Training and Horticulture Colleges had equal knowledge of these technologies, (4) the Teacher Training College had less accessibility to and experience with these technologies than the other two colleges, (5) as individuals, surveyed respondents possessed definite use and knowledge strengths and weaknesses, and (6) there was significant accessibility to many of these technologies outside of the three colleges that should be pursued.

When final planning begins, it will be useful to look at table details rather than broader conclusions. In Tables 1-100 can be found: accessibility, knowledge and experience strengths and weaknesses (for both individuals and groups), internal and external accessibilities, i.e., details which can be used to maximize networking and develop required staff and faculty training programs.

Respondents' comments to open-ended questions, found in Tables 101-106, ask about: the potential use of distance education in their work assignments, colleges, geographic areas and all work assignments, their perceptions of the current degree of support for distance education, the political influence on distance education in Hungary, and the biggest barriers to implementing education in their schools. Also included are researcher reactions to some of these comments and ideas for overcoming some difficulties.

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This dissertation is a testament to the potential that international education holds for all people. It serves to bring us closer together in many ways - both professionally and personally. To those contemplating cooperative educational and cultural research between different countries, it is a very doable and satisfying experience - one that cannot be fully appreciated in books. For those interested in coming together with fellow humans locked previously in cultural, political, economic, and personal combat, one is tempted to wonder now and forever - was the basis for former animosity merely contrived?

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CHAPTER I

INTRODUCTION

Hungarian life witnessed major political and economic changes since the end of World War II. Today, many believe that the resulting social, political, and educational systems are now insufficient to meet the needs for change as Hungary attempts to regain ground and increasingly integrate with the West. Immense efforts are required to solve this country's problems - especially when one compares the realities of the old and new systems.

The transformations that will be necessary include changing from: a central planned economy to a market economy; state to private ownership; large industry/farm cooperatives to medium/small businesses/farms; Central/Eastern European to Western markets; guaranteed trading (with former Eastern bloc countries and the U.S.S.R.) to international competition for goods and services; restrictions on foreign investment and international trade to increased international investment and trading; communism to parliamentary democracy; and state-controlled ideology to a multi-faceted one where many unmet social, political, and personal goals exist (The Development of Distance Education in Hungary, 1992).

The Hungarian people are poised for the changes, and they will need a tremendous amount of determination, personal commitment, investment, hard work, and mass education. As well, they will increasingly need to focus on individual rights and responsibilities as fellow citizens in order to make it happen.

Throughout Hungary, a major reform effort is occurring in order to transform higher education into a modern system capable of meeting the social and economic goals already mentioned. This reform is taking place in government, businesses, public and private schools, and institutions of higher education. This case study focused on one small part of that effort.

In the central Hungarian town of Kecskemét, three small colleges are planning a new university which will serve the region. If the political and economic conditions allow for a final decision to proceed, the colleges combining forces will be: the Kecskemét Teacher Training College, the College of Horticulture, and the College of Mechanical Engineering and Automation (all of which currently operate separately).

The combined enrollment at the three colleges is about 1,300 full-time and 500 post-graduate students. Each college realizes the need to dramatically increase enrollment and train students to meet the rapidly changing economic and social conditions in Hungary. Traditional methodology and structure are believed to be insufficient to reach these goals. Despite the hardships ahead, the three colleges are committed to serving the needs of the community as a whole. The use of distance education technology is believed by some to play a key role in meeting these needs.

In order to assist university planners in the development of these new technologies and possibilities, the following case study research was developed to answer some basic questions about:

1. Current accessibility of technologies that can be used in distance education at the three colleges in Kecskemét,
2. Current knowledge of distance education technologies and potentials among planners, and
3. Current experience of the planners with these technologies.

Research Problem

In order to implement some of the programs and initiatives they envision, the planners of the new university feel the use of distance education technology can be very important. Before appropriate technologies can be chosen, many questions need to be answered. The focus of this case study was to assist the planners in answering three of these questions, i.e., the accessibility of, their knowledge of, and their experience using various distance education technologies.

The specific problem was addressed: There is little experience and understanding among planners as regards the various types of distance education technologies; and it is assumed that the three colleges have little or no access to these technologies.

Importance of Research

In order for the university planners to make the best selections from the available technologies, they need to have accessibility to the infrastructure, fully understand the possibilities, and have some experience using them (hopefully).

It is anticipated that some form of training will be required for the planners before serious planning for these new programs can begin. Determining which technologies are currently accessible, what they know, and what their experiences are constitute important information needed prior to training. If the planners are already familiar with and have a fair amount of experience using teleconferencing techniques, for instance, extensive training would likely represent a waste of time and scarce funds.

The objective of this case study research was to enable the planners to assess the current situation, and to serve as a guideline for future training, distance education program planning, and eventually, program implementation.

Research Questions

1. What is the accessibility of the infrastructure, i.e., hardware and software for planning and implementing distance education technologies within programs?
2. What is the knowledge of the planners about distance education technologies?
3. What experience do the planners have in using distance education technologies?

Assumptions

1. A sufficient number of planners can be found at each institution to participate in the survey data collection effort.
2. The data collected will be relevant, even if distance education technology-based programs are not implemented immediately.
3. The establishment of any program using distance education technology will need design, development, implementation, continual analyses and evaluation, and further changes. The efforts of this case study research are only a first step towards a vital, efficient, and productive future using the technologies available.

Limitations of the Study

1. The views and efforts to establish distance education technology-based programs will be based on the views of 30-45 planners, equally divided between the three participating colleges. The data collected will not represent the community of people that will eventually be impacted by these new programs.
2. Political and economic conditions are rapidly changing, so updates will be necessary if the most current information is needed. The case study conclusions and recommendations will have general applicability based on current local conditions and needs.
3. The data collected were from one small area of Hungary, and therefore may not be applicable to other areas, conditions, or time periods.
4. Because of the low number of survey participants, it is risky to draw inferences on a wider population.

CHAPTER II

REVIEW OF LITERATURE

Hungary is currently involved in a massive nationwide effort to reform its educational system at all levels. Because this case study dealt with institutions of higher education, that was the level of primary focus. The topics in this review of literature included the national system of higher education in Hungary, the national system of vocational and adult training, national reform efforts in higher education, national reform efforts in vocational and adult training, Kecskemét reform efforts, and the barriers faced with meeting content requirements, learner needs, technology selection, institutional needs and duties, and politics/support. The final section is used to briefly describe some of the technologies surveyed on the instrument.

National System - Higher Education

As a result of past mistakes and poor management by the former political and social system, the following attributes generally characterize higher and vocational adult education:

1. poor material and educational infrastructure

2. imbalanced intellectual levels
3. little international cooperation
4. little inter-institutional cooperation
5. highly structured and inflexible systems
6. lower standards when compared to competitive counterparts in the more developed countries
7. almost non-existent continuing education
8. little or no possibility to transfer credits between institutions
9. great need for content, methodology and goal developments

Even though these conditions warrant immediate attention, it is only fair to point out that there remain some high quality, effective educational systems that compete very well internationally (The Development of Distance Education in Hungary, 1992).

Hungarian higher education is divided into universities, colleges and "other" institutions. These "other" institutions, such as management training schools and regional training centers, are not integrated into the official system and are therefore not accredited. There are 21 universities, 65 colleges and 11 colleges at the university level. University degrees take four to six years to complete, and colleges take three to four. Four universities have "comprehensive" programs, and others have specialized curricula (i.e., agriculture, economics, engineering, technology, and medicine). There are universities of arts and sciences, economics, medicine, technology, art, and agriculture. University-level colleges have programs in design, drama, film, fine arts, military science, music, physical education and theology. Colleges specialize in administration, agriculture, art, business, economics, engineering, health services, teacher training, and technology (Pre-Review of Higher Education in Hungary, 1993).

By the year 2000, the projected numbers for student enrollment in institutions of higher education are expected to be lower. The total 1991 enrollment figures can be found in the first column of Table 1 below, and projected numbers for the year 2000 in the second (Kocsis, 1992).

In Table 2, the percentage (based on total academic-age Hungarian population) of students enrolled in full-time, evening study and correspondence education programs is shown (The Development of Distance Education in Hungary, 1992).

These represent only 65-80% of the corresponding enrollment figures in other developed countries. Between 1993 and 1998, a 32% increase in secondary school graduates is expected. After 1998, the numbers will drop below the 1985 graduation levels. Therefore, there is a substantial need to increase student enrollment at colleges and universities.

TABLE 1

HIGHER EDUCATIONAL ENROLLMENT (1991/2000)

UNIVERSITIES	1991	2000
Universities of Arts and Sciences	22,975	19,065
Technical Universities	11,424	10,905
Medical Universities	9,136	9,136
Agricultural Universities	6,067	5,616
Other Universities	3,578	3,103
COLLEGE FACULTIES AT UNIVERSITIES	**1991**	**2000**
Teacher Training	4,093	3,611
Technical	1,561	1,235
Health Care	2,195	1,829
Agricultural	2,732	2,176
Other Faculties	4,181	3,205
COLLEGES AND ACADEMIES	**1991**	**2000**
Teacher Training	22,411	17,788
Business	1,347	4,827
Technical	9,379	7,859

TABLE 2

ACADEMIC-AGE SCHOOL ATTENDANCE PERCENTAGE (1991)

INSTITUTIONS	OVERALL %	FULL TIME %	EVENING %	CORRESPOND %
Universities	6.34	5.25	.24	.85
Colleges	8.28	5.71	.43	2.14
Combined	14.62	10.96	.67	2.99

Because of the difficulty in learning the Hungarian language, job market needs cannot be expected to be met through the hiring of foreigners fluent in Hungarian. Higher percentages of Hungarians are expected to move abroad (either temporarily or permanently), so qualified professionals in many critical fields are expected to decrease. In order to attract larger numbers of students, colleges and universities need to adapt to changing needs in many areas and continuing education (The Development of Distance Education in Hungary, 1992).

National System - Vocational and Adult Training

Vocational/adult training is generally typified as having low-quality training, narrow skills, outdated curricula, and very rigid curricular frameworks. Because of the recent political, social, and economic changes already described, many jobs have been eliminated. Many workers are unable to meet the higher demands that the new and emerging workplace conditions demand (The Development of Distance Education in Hungary, 1992).

Vocational training begins in the lower grades. After primary school (grades 1-8), several vocational tracks are available for students: vocational secondary schools, skilled worker's schools, and vocational schools. Vocational secondary schools last four to five years with a combined curriculum of general academic and special skills training. Special skills are in the areas of agriculture, commerce, construction, cultural services, economic services, forestry, health, industry, personal services, postal services, public administration, social services, water supply, and telecommunications. Graduates receive a skilled worker's certificate, final secondary exam (baccalaureate), and a technician's certificate after meeting appropriate conditions.

Skilled worker's schools offer theoretical and practical programs, mainly in agriculture, commerce, construction, forestry, industry, postal services, telecommunications, and water supply. Graduates receive a skilled worker's certificate. Vocational schools offer programs in shorthand/typing and nursing, and also programs for slow learners.

All three school types may offer day, evening and correspondence courses, though most students are enrolled in daytime studies. Graduates of secondary schools may also attend with shorter curriculum schedules. These students can get training to become, beauticians, dental mechanics, foreign trade correspondents, goldsmiths, opticians, photographers, silversmiths, tourist guides, window dressers, or wood carvers. Adults who attend these institutions can become, bee keepers, boat builders, booksellers, drivers, metallurgists, and shipmen. The metallurgy programs are labor-intensive.

Training courses of varying length (2-200 hours) are offered to semi-skilled and other workers in almost every occupation. They also prepare students for the final certificate examination. Courses are held during work and off-duty working hours with approximately 58% of the students between the ages of 30-49, 7% over 50 years of age, and 30% under the age of 29. Costs for these programs are either shared by the organizing business or institution and students, or separately.

College and university vocational training usually take three to four years, and four to six years, respectively. Colleges specialize in agriculture, commerce and catering, construction, electro-technology, engineering, finance and accounting, foreign trades, forestry, gardening and viticulture, and other areas, while universities specialize in engineering, medicine, economics, law, and other areas. Both offer day, evening and correspondence programs of study (Héthy & Héthy, 1990).

Approximately 43% of all primary school graduates (grades 1-8) attend one of the 299 vocational training schools throughout Hungary. Approximately 40% of all secondary school graduates progress to higher education. At all levels of education in Hungary, workers have opportunities to pursue missed or continuing education through either adult education, correspondence courses, or evening studies (Public Education and Vocational Training in Hungary: 1960-1992, 1992).

National Reform Efforts - Higher Education

By the year 2000, a doubling of the student enrollment to 200,000 is planned. Before achieving this goal, many reform measures must be explored. Both efficiency and admission opportunities must be increased. This can be accomplished with variable length programs, a 15-20% reduction in the time required to graduate, program flexibility, and reduced per week attendance requirements (Kocsis, 1992; The Development of Distance Education in Hungary, 1992).

Admission to programs will be based more on prior academic performance, and more effort is needed to identify top and gifted students. For the more expensive post-graduate programs, only the best qualified students will gain entry.

Other reform measures include a desire to maintain the current part-time student level at 25% level, to establish and support attempts to attract internationally recognized scientists and scholars to teach, and to establish full-time post-graduate programs.

At every higher educational institution, there is a need to offer coursework designed for a credit-based system, and all student records and class schedules need to be maintained in a computerized database (Kocsis, 1992).

By the year 2000, reform efforts will hopefully result in a national university system that can offer broad-based curricula in theoretical and scientific studies. The national college system will offer more "practice-oriented" curricula. Program lengths at the university level are expected to be:

associate degrees - 3 year programs
bachelor degrees - 4-5 year programs
master degrees - 5-8 year programs
Ph.D. degrees - 8-10 year programs

Program lengths at the college level are expected to be:

associate degrees - 1-2 year programs
bachelor degrees - 3-4 year programs
bachelor degrees (specialized) - 4-5 year programs

In general, curricula will be broadened and less fixed (Kocsis, 1992; The Development of Distance Education in Hungary, 1992). Available areas of study will include law, arts, sciences, teaching, educational support, economics, business, engineering, technology, medicine, health care, agriculture, military science, police science, and theology (Kocsis, 1992).

As a means of further integrating Hungarian education with the West, the following significant changes are required: internationally recognized degrees in lifelong learning, business/industry retraining, European studies, business management, international studies, foreign language instruction, information and high technology, and environmental science. Programs should increase their emphases where possible in the development of small- and medium-sized businesses, public administration reorganization, economic restructuring, international/decentralized/commercial economics, and administration of business.

Due to high expected retirement rates, increased enrollments are needed in the areas of law, engineering, business administration, some sectors of social science, and foreign language teaching (The Development of Distance Education in Hungary, 1992).

Currently, university and college students attend between 25 and 32 classes per week. Mandatory class attendance at the university should drop to 20-22, and to 24-26 for college students. Technology program classes at the university will drop to less than 30 per week, and 30-32 per week will be required of polytechnical college students. Every week, 14-16 classes will be devoted to the introduction of "new materials," and self-study will replace small-group study (Kocsis, 1992).

Since there is too much duplication of functions, programs, and faculties at different higher educational institutions, institution and faculty consolidation is seen as a way of increasing efficiency and reducing costs

(Kocsis, 1992; The Development of Distance Education in Hungary, 1992).

By way of example, there are no universities in Hungary with student enrollments over 20,000. Some institutions have over 10,000, and many have less than 500. In 10 towns, 20 universities have a combined student enrollment of 4,600 in 47 faculties. In Budapest, eight universities enroll 27,000 students in 17 faculties. At 15 college faculties at universities in eight cities, 9,600 students are enrolled. There are also 57 independent institutions in 19 cities with programs in the arts, military science, police science, teacher training, theology, technical sciences, and nursing. In total, Hungary's 61 higher educational institutions are found in 37 towns, with an additional 16 academies and colleges for theological study.

Due to a traditional separation of teaching and research, research in Hungary is concentrated in select research institutions and the Hungarian Academy of Sciences. In the future, more resources will be shared, and increased connections between teaching and research will be funded. As well, monies will be made available to establish "scientific workshops" and research departments at more institutions of higher education (Kocsis, 1992).

In the future, higher educational institutions are expected to use graduate, post-graduate, and post-doctoral students in teaching capacities. As well, professors will be allowed to teach at other institutions, and duplication of programs at these institutions will be consolidated. Costs are expected to drop as more inter-institutional cooperation occurs (The Development of Distance Education in Hungary, 1992). One criteria of World Bank funding is that research institutes, colleges, and universities establish "unions" to coordinate these reform efforts (The Development of Distance Education in Hungary, 1992).

Increased funding is necessary for scholarships, fellowships, and other academic expenses, and costs will be lowered by reduced classroom use through fewer mandatory class attendance per week by students. Those staff working in laboratories will be consolidated whenever possible for further savings.

Reform measures require increased funding which will be realized in part through higher taxes, university and college-based business activities, foreign investments, grants and other funding ideas, and student tuition fees. At this time, tuition is not required, but by the year 2000, these funds will account for 8-10% of the costs for delivering education (Kocsis, 1992).

National Reform Efforts - Vocational and Adult Training

Between March 1990 and March 1991, the unemployment rate increased 4.5 times. Reasons for this include higher numbers of people entering the workplace with no skills, the lower need for unskilled labor, and the economic necessity for many businesses and companies to reduce their numbers of employees. The unemployment rate is expected to worsen.

Five to seven percent of the total workforce have no elementary school degree, and 10-15% never completed a secondary or vocational degree program, and 68.4% of all primary, secondary and post-secondary students in 1987 left education without a profession - as opposed to 55.8% in 1971 and 67.2% in 1979. By increasing opportunities to further their educations, workers and students will be better able to avoid unemployment (The Development of Distance Education in Hungary, 1992).

Based on national needs, a significant amount of retraining is necessary for workers, unemployed adults, and vocational teachers. Western-styled, broad-based retraining is necessary in the high technologies, information technologies, service industry, foreign languages, tourism, business, taxation, insurance, finance, free-market economies, quality control, competitiveness, and management. For employees and managers in businesses who are involved in (or who expect to increase their involvement in) international commerce, this retraining is essential - both inside and outside Hungary.

For example, after the collapse of the former political system, many Russian language teachers at all levels of education became unemployed. Retraining is called for. In addition, many teachers and professors whose previous fields were connected to socialist system government, policies, and education faced similar unemployment. Reform measures are expected to stimulate retraining efforts here as well (The Development of Distance Education in Hungary, 1992).

Héthy and Héthy (1990) point out many more areas of concern to vocational and adult education, and the reforms necessary. These are detailed below. Between 1991 and 1994, a 61 million dollar World Bank loan will be spent on restructuring and development of adult/youth training. Working with the Ministry of Labor and Central Statistics Office, funds will be spent on labor market institutions that will provide career counseling, job information, job counseling, and the establishment of a database for employers/employees/government (which will hold information on job outlook, market projections and other job information).

Using existing vocational schools, adult training programs will be established for vocational school dropouts, non-vocational educated students, adults wishing to start new jobs, and adults who need special training. In conjunction with the Ministries of Labor and Education/Culture, secondary schools will offer broad-based curricula which will better enable students to make the necessary transitions to higher education or adult vocational training, and will permit them to make job changes more easily (Public Education and Vocational Training in Hungary: 1960-1992, 1992).

There is a continuing controversy between different sectors of the Hungarian economy regarding the problems faced by the vocational education system which needs reforming. The "general opinion" voiced is that vocational students are too specialized and lack broad coping skills. The industrial sector complains that vocational graduates are not qualified enough, and that training should be better and more realistic.

Also in need of reform is the quality of the programs, and the use of current and future technologies. Equipment is in bad need of repair and replacement, and it is generally recognized that the program focuses have remained as they were when they were originally established back in the 1970's. Those areas badly neglected include biotechnology, computer science, materials (modern), micro-electronics, and manufacturing. Market needs for many skills are far ahead of supply, and other vocational skill areas are increasingly in less demand.

Access to computers in primary schools is virtually non-existent, secondary schools need more and better equipment, and vocational secondary schools are in a better position than the rest. Though secondary vocational schools have different kinds of computers, students do not have the daily access they need for quality experience. Many of the programs in computer science are geared for the skills necessary to operate, maintain, and program obsolete machines (i.e. punch cards and tapes).

Although some of the computer-based vocational programs are very highly regarded, the number of graduates falls short of the needs of the Hungarian economy, especially in the area of vocational teachers of computer-based programs. In other words, computer-based technologies need greater emphasis in vocational training.

Despite the reform and restructuring efforts in the economy, vocational training has failed to meet the needs for workers who can increasingly share in decision-making. In general, because the skilled worker's training schools attract the less-academically successful primary school graduates, and because the society sees more of a necessity to invest in its better students, the end result in many of these schools is poor-quality training by poorly qualified personnel. The increasingly lower status of these schools is not helped either by the high dropout rates (between 4-25%, depending on the area, based on 1982/85 figures.)

Even though the vocational secondary school curricula represent attempts to combine skilled training with academics, grammar school graduates are generally more qualified and more favored for entry into colleges and universities, and the skilled worker's certificates are less than or equal to the quality of the certificates earned in skilled worker's schools.

Secondary vocational training schools are poorly equipped with outdated equipment, there are not enough classrooms, the textbooks are outdated and revisions are too costly, there are shortages of key training personnel in computer science, and teacher's salaries are lower than for the students they produce.

Vocational education is directed and maintained by a variety of competing local/national organizations and ministries - which results in a less-than-ideal concern for the funding and quality required to turn out quality graduates.

In 1986/87, about 86% of all the training of students at skilled worker's schools (45% on average in vocational secondary schools) was carried out in business-owned and operated workshops. Businesses are required to contribute to the Vocational Training Fund, although these funds are insufficient to maintain quality level programs. Many have scaled back their programs.

Training courses have proven to be a better alternative in many ways when compared to public vocational training. The costs are realized by either the business, the student, or both, and students are trained in areas of immediate need as determined by prevailing market forces. In general (with many exceptions), these business-operated training courses are of better quality, they use better equipment, and the exit qualifications of the students are better.

Based on business projections of labor needs, vocational training programs are structured to meet these expected demands. Due to high dropout rates, the fact that businesses are under no obligation to hire graduates, and because of the competing interests of local and national players, shortage area skills do not attract enough trained workers. Business and state retraining programs are attempts to make up for these shortages of trained workers. The needed reforms are then:

1. The public vocational school system must cooperate with those involved with training courses.
2. Vocational schools should stop their attempts to meet market demands, and rather educate students to be less "ready-made workers" and more adaptable to changing conditions.
3. Vocational schools should stop specializing and increase their program qualities.
4. Vocational secondary schools should become the primary focus of public vocational education policy.
5. Traditional skilled worker's schools should concentrate on manual skills training.
6. Vocational secondary schools should increase program emphases in computer science, microelectronics, biotechnology, and other high-tech areas.

7. Vocational schools should be autonomous and free from many of the outside influences they now face.
8. Businesses should help finance and control vocational education.
9. National ministries should continue financial support, maintain the supply of personnel and supplies, and provide assistance with curricular design and development.

Kecskemét Reform Efforts

Many of the views seen at the national level are echoed as well by educators at the three colleges in Kecskemét. On a more regional level, yet with much similarity nationally, the following represent the current state of education in this small Hungarian town (Dovala, 1992;; Dovala, Sass, & Danyi, 1992; The Educational System and Teacher Training in Hungary, 1992).

In general, Kecskemét planners seek greater cooperation and joint-programs with the West in the areas of education, business, agriculture, and government. Higher education in this region (and throughout Hungary) has been typically separate and disconnected. These institutions have traditionally operated independent of one another, with little or no inter-institution cooperation. There is a need to integrate and streamline the curricula and structures of these institutions wherever possible. Although each operated earlier under highly structured central government control, more autonomy is now considered necessary. These reform efforts are expected to increase efficiency of operation, and enable greater numbers of students to enroll.

Traditionally, it has been extremely difficult for students to gain entrance to universities and colleges. Once enrolled, it is even harder to make career choice changes to other higher educational institutions. A lack of inter-institutional cooperation has resulted in few programs which allow for a transfer of credits. Students changing institutions are often required to start again - and they have been unable to obtain credit for previous courses completed. The three colleges in Kecskemét see the need to develop a credit system to overcome these difficulties, and allow for easier exit and entry to the system - as a further means of increasing enrollment and more student satisfaction.

The Kecskemét Teacher Training College trains teachers of children in the age group of 3 to 10. The College of Horticulture trains students as production engineers in horticulture, while the College of Engineering and Automation trains students as production engineers in industry.

The regional economy is based mainly on agriculture, viticulture, fruit production, and small business. Due to the recent political changes in Hungary, large industry and farm cooperatives are being replaced by smaller entities -

which means there is a great need for the College of Mechanical Engineering and Automation and the College of Horticulture to change their basic curricula to reflect the new economic realities.

Broadly speaking, it is necessary for the three colleges to increase the level and effectiveness of education in their respective programs, and to ensure higher staff and student mobility between the three colleges and other institutions. Taken together, the efforts at restructuring at all three colleges will improve graduates' chances of employment in the market.

Also necessary in the restructuring is to ensure that the degrees offered are equivalent to and will be accepted and recognized by Western European and American universities, as well as alternative degree program. One of these alternative degree programs (two-years in length) would be somewhat similar to community college programs common in the United States. This will require a good public relations effort in order to convince business, industry, and government that such programs will yield higher-quality employees than they might otherwise get.

Other two-year degree programs planned include general preparation coursework for students scoring low on college and university entrance exams, social worker training, extensive second language programs, family welfare worker training, and private secretary studies. Based on further research and personal visits to American community colleges, planners expect to expand the list of community college programs.

Keeping in line with the national reform efforts, these three colleges are expected to join together as a single university (if conditions are favorable for a final decision). In addition to the credit system and increased opportunity for students to make inter-college transfers, it is necessary to combine duplicate departments in the three colleges into single units. This will increase the efficiency and lower costs. By combining several departments into one, it will be more possible to gather together a wider range of professors' experiences which will allow for more opportunities for research and better program development.

In order for Hungary to gain greater exposure, better chances to compete in foreign markets, and attract foreign investment, students and working professionals need considerable second-language training. An integral part of the new university will be the establishment of a Foreign Language Communications Center (FLCC). Courses and programs will be offered in basic second-language training for teachers and other education professionals, and programs specific to the specialized second-language needs of all three colleges.

The goals of this new FLCC are to provide language training for: teacher certificate renewal, primary-education language teachers, full-time and post-graduate students, local citizens and businessmen (fee based), Russian language teacher retraining, preparing students for their second-language proficiency exams, skills improvement, elementary and kindergarten teachers involved in teaching second languages in schools (there are special problems and teacher skills associated with the language training of young children (ages 3-12)), language teachers seeking certification in a second-language, and second degrees for one-language language teachers.

Language offerings at the FLCC will include: English, German, and French language for kindergarten through secondary school teachers (internationally recognized); post-graduate language and language pedagogy training in Finnish, Italian, Spanish and other languages as needed; Hungarian as a foreign language for teachers of immigrant children, for people going abroad as AuPairs, or for foreigners living in Hungary; Gypsy language for teachers working in those areas with high Gypsy populations; English and German business language; English, German, and French for interpreters and special translators; and English, German, and French correspondence and word processing.

In addition, the FLCC is expected to offer self-study and refresher courses to language teachers in language, methodology, and teaching ability development. Other offerings will include evaluated pilot courses and intense language short courses with guest lecturers. The FLCC will maintain a collection of materials on foreign cultures and civilizations, offer internationally recognized diplomas, and advance new structural models and directions for language training. Curriculum development with upgraded teaching methods, principles, and study materials, as well as an expansion of program courses, linguistic research, and experiments is also expected.

Research activities will cover language training pedagogy of small children, foreign language teaching, and reading processes. Materials developed and used by the FLCC need to be proofread by "vernacular" teachers, and conversational courses with "vernacular" teachers are necessary for teachers at all three colleges already involved in international exchange programs. Because of the importance of internationally recognized language proficiency exams, preparation courses will be offered to interested faculty, staff, and students. In order to better prepare FLCC staff members, more intensive, specific, and refresher courses will become necessary.

The site for the new university, community college, FLCC, and distance education activities will be at a nearby, abandoned Russian military base. Many of the buildings have already been donated to the Teacher Training College and/or for use by the new university. Extensive renovation and repairs, however, will be required before the facilities can be utilized.

Modernization of technical equipment for use in language training, the establishment of the foreign language library and media-resource center for regional school use at all levels, the construction of the special purpose classrooms for language learning, the continuation of audio, text, and video purchases, and the further development of language training teaching materials for children in ages 3-12 is expected.

A prime goal of the FLCC will be to distribute new materials to other colleges and universities. This will require expanded preparation and distribution facilities. The three colleges feel the need to work closely with development experts and consultants - both foreign and domestic. Funding is also needed for abroad visits by Hungarians, as well as East-West exchanges of faculty, staff and students.

Distance Education Technologies

This part of the literature search deals with several key factors in planning for distance education programs, which were a subject of investigation in the survey's open-ended questions: barriers to program focus and technology selection, and political considerations and support.

Barriers To Program Focus and Technology Selection

There are many barriers that must be considered before, during, and after the planning and implementation of distance education programs. In planning for the use of distance education technologies in educational programs, planners are advised to learn as much about the field as possible. There are many factors which must be weighed before a decision is made whether to choose one technology over another, to choose a group of technologies to work in combination, or to even decide against the use of these technologies or the method itself.

The potential for disaster can be very heavy and involve large sums of money and lost effort. Even though sifting through the enormous number of sources available is very time consuming, the benefit of having a firm grasp of the potential barriers is well worth the effort. Some of the more important barriers are described below. If barriers are not anticipated or considered, unforeseen consequences will result. Barriers can be organized around various themes: content, institution, learner, and technology. There is no order implied and these four themes overlap.

Content

According to Hedberg (1989), information consists of several types: "aural, visual, verbal, mathematical, relational, logical, and physical." Attention needs to be paid to the types of information to be delivered, the level of the students, and the best technologies that can serve the purpose. How the material will be presented and delivered needs careful consideration (Fox, 1983; Hedberg, 1989; Holmberg, 1989a). Choosing the appropriate technology is crucial to matching these needs. Some subjects might be more suitable than others for "inquiry by argument" or "discussion and debate" (Holmberg, 1989b), or for demonstrating skills and/or knowledge (Holmberg, 1989b). Many tasks have psychological constraints (Chute, et. al., 1991). By organizing content carefully (Hedberg, 1989) and selecting appropriate media with these things in mind, better results can be expected. Knowing what to communicate (Sheppard, 1986) and what is expected from the students beforehand is a planning and ongoing consideration.

For the distance education course itself, some experts believe attention must be paid to "prescribed pacing" (Fox, 1983), carefully structuring of completion time limits and examination schedules (Fox, 1983; Holmberg, 1989a), and using student progress results to gauge program alterations (Villarroel, 1988). In other words, it is necessary to make program adjustments after students' abilities are better understood (Chute, et. al., 1991).

The production of high-quality materials is seen to be essential by many experts (Lane, 1989; Neil, 1981; Villarroel, 1988). In the case of written or textual materials, appropriate reading levels (Neil, 1981), relevancy (Milheim, 1991), and cultural relativity (Neil, 1981) are important. It is necessary to know students' reading levels and habits (Neil, 1981), and through periodic assessment (Villarroel, 1988), problems can be prevented for future classes and groups of students.

It is wise to have the following available to the students, especially since distance education students often work more in isolation when compared to their traditional counterparts: study guides, "good library services" (Holmberg, 1989b), and technology and content presentation options geared for the different learner characteristics (Hedberg, 1989).

The more varied the media options available to the student, the more success (Neil, 1981). The design for these options is often ensured through the combined efforts of teachers, students, administrators, and instructional designers. These players should be cognizant of the need to keep costs down, have sufficient facilities for duplication of materials, and maintain services and equipment at locations which may be located some distance from the main campus (Milheim, 1991).

Learner

There is a lot of concern that distance education programs maintain appropriate levels of teacher-student interaction. This "separation of teacher and learner" (Keegan, 1980) is an important consideration in deciding for or against "two-way communication." Maintaining contact can be realized in many ways, some via technology, some in-person.

In-person contact can be required through academic counseling sessions (Fox, 1983; Livingston, 1987), at registration time and exam time, through personal guidance sessions and at awards ceremonies (Villarroel, 1988), through teacher and staff visits to the students' locations or homes, during scheduled "residential sessions" and group meetings (Bernard & Naidu, 1990; Keegan, 1980), and through staffing at remote resource and study centers (Bernard & Naidu, 1990; Livingston, 1987). Technology can be used to initiate, enhance, and in some cases, provide fully for teacher-student interaction. Some include audio and audio/visual teleconferencing, toll-free telephones, interactive TV, voice mail, or computer-based communication (Bernard & Naidu, 1990).

Although close attention is always required for personal and academic development (Fox, 1983), the immediacy of telecommunications places "new demands on teachers and pupils", especially when compared to strictly "correspondence" education, where more time passes between encounters (Sheppard, 1986).

Getting the student involved in the process is very important as well. Although levels of student input vary with programs, the possibilities include: choice in content selection (Holmberg, 1989a), contracts between student and teacher (Holmberg, 1989a; Holmberg, 1989b), student-suggested study rates, deadlines, and program termination dates (Holmberg, 1989a). It is equally important that students be familiar with the technologies that will be employed. In this way, they are better able to direct their own learning better, make technology choices (Niemi & Gooler, 1987), and be relaxed and confident that their experiences will be easier and more rewarding (Hedberg, 1989). It is also possible to avoid many problems by adhering to "strict entrance requirements" (Fox, 1983).

When extra help is necessary, the availability of tutors will supplement the teacher's role in promoting the "self-teaching" aspect of distance education experiences (Villarroel, 1988). In some cases, it is important to gather groups together (especially large ones) at the beginning (over several days) in order to explain more fully the techniques and expectations of the program. These required sessions may take place closer to the students' homes, thus saving overall travel and boarding costs (Livingston, 1987).

Technology

The choice of which technology to use is perhaps the hardest problem to solve. An enormous amount of information is necessary to know beforehand if the right technology is to be chosen. Then again, the choice can be very limiting from the start, with technologies chosen accordingly. In an ideal situation, the following factors should be taken into account: accessibility of equipment (Hedberg, 1989; Neil, 1981), availability of equipment (Chute, et. al., 1991; Lane, 1989; Milheim, 1991; Neil, 1981), appropriateness of the technology (Chute, et. al., 1991; Hedberg, 1989; Neil, 1981; Sheppard, 1986), attitudes and characteristics of students, teachers, administrators, cooperating institutions, and the public (Chute, et. al., 1991; Holmberg, 1989b; Neil, 1981), costs (Chute, et. al., 1991; Milheim, 1991; Neil, 1981), desired quality (Neil, 1981), appropriate and effective management infrastructure, current development level of the technology in the country (Neil, 1981), previous experience with the technology (Milheim, 1991), available experts, consultants, and partners (Neil, 1981), appropriate and sufficient production, maintenance, and delivery facilities (Milheim, 1991; Neil, 1981), audience size, geographical distribution, and the ability to reach them technologically (Barker, 1990; Chute, et. al., 1991; Holmberg, 1989b; Milheim, 1991; Neil, 1981) postal, telephone, and repair service capacity/efficiency, material and program delivery time requirements (Milheim, 1991; Neil, 1981), tutorial help required (Holmberg, 1989a; Milheim, 1991), interactivity/communication requirements between teacher and students (Holmberg, 1989a; Milheim, 1991), politics, interests, laws, rules, and regulations between all those impacted (Neil, 1981), and the "ability to attract new students" (Lane, 1989).

Institution

The institution itself must be ready to accept change, make adjustments, and provide for the easiest possible distance education experiences. Some of these roles and functions include: restructuring and staff movements (Chute, et. al., 1991), conducting needs assessments and necessary evaluations (Hanson, 1990; Livingston, 1987; Milheim, 1991), finding the staff, equipment, facilities, and means to operate distance education programs (Hanson, 1990), requiring that the production and delivery of high quality products and programs be insured (Bernard & Naidu, 1990), making sure the programs envisioned are compatible with the goals of the institution and with educational "values" (Barker, 1990; Sheppard, 1986), developing a management style that compliments the processes and changes involved (Murgatroyd & Woudstra, 1989; Villarroel, 1988), developing overall plans for program maintenance, continuation, and networking (Murgatroyd & Woudstra, 1989); marketing the program effectively in order to attract new students and proponents, being accountable at every necessary level (Murgatroyd & Woudstra, 1989), realizing that changes will affect attitudes, and that adjustments will become necessary in order to motivate others (Villarroel, 1988), providing a schedule of deadlines and goals (Murgatroyd & Woudstra, 1989), providing for feedback and personal needs (Milheim, 1991; Murgatroyd & Woudstra, 1989; Villarroel, 1988), and using experts to guide the processes (Neil, 1981).

In looking at these barriers, a lot of planners' decision-making requires the careful consideration of many competing factors. It is necessary to weigh the learners' needs, institutional needs and capabilities, and advantages/disadvantages of the technologies with content and pedagogical constraints. Equally important is to take both political considerations and support into account throughout.

Politics and Support

Dodd and Rumble (1984) offer some cogent remarks on the actions and considerations that distance education coordinators must be aware of in the arena of politics and potential supporters. With due consideration for the local and national political and economic realities, their suggestions and experiences may prove crucial to developing successfully distance education programs in Kecskemét. Although their comments are geared towards the establishment of distance education universities, the same relative set of factors still apply.

They begin by stating that it is very important, foremost, that strong leaders be chosen, both locally and inside the appropriate ministries. Political support is extremely important at many levels of government. In this way, problems pertaining to inter-governmental cooperation and resistance have a better chance of being solved or eliminated. All parties involved must be committed to support of the distance education initiatives.

Political support from within is necessary, since the "system of distance education is not universally admired." This is due in part to the bad reputation of correspondence education. For the government in power, Dodd and Rumble suggest that distance education programs (in their case, distance education universities) will be popular because of the votes it represents, and unpopular to the opposition because it will serve to undermine the current government.

The key planners should select a distance education central committee composed of influential people in education, academe, and broadcasting (with due regard for ethnic and cultural mix). By choosing a committee general-secretary from the Ministry of Education, one is better positioned to maintain open communications with it and other Ministries. Influential committee members will also likely be able to donate office space, meeting areas, and other facilities for committee work, program development, and course implementation. Small committees offer the advantage of faster decisions and meeting times, and larger committees offer diversity and numbers required in case sub-committee projects are necessary.

Actions, recommendations, and efforts of the committee should be kept within the domain of public scrutiny. Although criticism from outside may hinder the processes of the committee, it is a good way to determine the exact nature of the opposition. Knowing what the opposition has to say allows for better preparation and techniques to combat objections. If a change of government or key officials is expected, current committee reports will serve to "safeguard politically the credit for the establishment of the Planning Committee and, it is to be hoped, its continuing existence."

If possible, trips to other areas where distance education programs are operating should be taken, and reference should be made to things seen when appropriate. This also applies to current research and publications. It is also wise to investigate possible support by "national and international aid agencies, by inter-governmental aid agreements and by institutions providing overseas consultancy services." This can lead to excellent publicity opportunities.

Livingston (1987) pointed out the additional need for planners to consult other institutions for the sharing of facilities and services. Bruder (1989) also agreed with the importance of taking into consideration, the "union, certification, or other legal constraints which would hamper the use of distance education technologies and courses."

Although the committee operating from Kecskemét will be operating on a smaller scale, committee plans and initiatives must take into consideration the same barriers faced with regards learners, content, institutions, technology selection, politics, and potential support. Overlooking a key barrier may prove disastrous, therefore the more preparation and knowledge beforehand, the better for the pilot program and future opportunities.

Some Technologies Available

In describing the types of distance education technologies, Bates (March 1990; 1988) divides the technologies into two main sections: traditional and newer technologies. The traditional technologies include broadcast television, broadcast radio, audio-cassette, and print. The newer technologies include the use of telephones and audio conferencing, audio-graphics, electronic publishing, video cassettes, satellites, cable systems, computer assisted learning, e-mail, computer conferencing, video conferencing, videodiscs, CD-ROM, and database access.

Nipper (1989) describes the breakdown of distance education technologies into first, second, or third generation categories. First generation technologies include correspondence education through printed material, where student-teacher interaction is characterized as "slow, sparse, and which are mostly restricted to the periods when the learners submit scheduled assignments." Second generation technologies include print combined with cassettes, radio, or television broadcasting, and sometimes computers. Interactions are increased through the use of the telephone or face-to-face meetings. Third generation technologies include those where higher degrees of interactivity are possible - via computer conferencing, audio/video conferencing, audio-graphics, and other advanced media. The potential advantages of these technologies are that they may be able to: accommodate more openly structured courses, lower material development and distribution costs, and individualized programs. Computer conferencing enables more group activities and discussions, while computer-mediated third generation distance education can result in more student input and "less authoritarian concepts of learning and teaching."

In keeping with the order of the survey instrument, brief descriptions of some of the technologies are included below. Each of the technologies can play an important role in distance education programs. The general technology categories used include audio, television, computer, computer software, and visual. There is an overlap between the groups, and distance education programs can incorporate technologies from one or more general categories - and usually do. These technologies are categorized and described for the newcomer to distance education, and are not intended to represent an author preference for one technology over another. As well, the grouping was not devised as a means to select between technologies. Local conditions and barriers are more important considerations.

Audio Technologies

Audio-Cassette Recorders

Through the use of audio-cassette recorders, the teacher is able to communicate with students in various ways. It has been used for the teacher presentation of materials, discussions of exam results (item by item), comments and student responses to the teacher's questions or other inquiries (Le Roux, 1987).

Audio-Cassettes

Audio-cassettes cost much less to produce than other forms of media (Bates, 1984; Bates, 1988) and are easy and inexpensive to distribute (Bates, 1984). They can be used to introduce current and complex materials (Bates, 1984), dramatic presentations, music, and language instruction (Kaye, 1981). Students have the options of self-pacing and replay, the teacher can present materials easily (Zucker, 1986), they are easy to blend with didactic materials (Bates, 1984), they can be used as "tutorials" for difficult concepts (Kaye, 1981), and if exchanged, they can serve as a communication link between teacher and student (Zucker, 1986).

Radios

Radios are universally available, are rapid forms of one-way communication, are non-interactive, and can reach large numbers of students at the same time (Zucker, 1986). They are appropriate for the presentation of dramatic presentations, current events, music, discussions (Holmberg, 1989a), and language training (Kaye, 1981).

Teleconferencing

Teleconferencing is the telecommunications method by which one-way or two-way interactive audio, visual, and/or graphics signals are exchanged between two or more individuals or groups located apart. Satellites can be used, and in the case of audio teleconferencing, two-way audio signals are transmitted over telephone lines to awaiting speakers, telephones, or speaker-phone hardware (Giltrow, 1989). It is also a method which gives students increased access to experts and guests who would otherwise be unavailable for travel (Zucker, 1986), or for teacher-student exchanges.

Telephones

Telephones can be used for two-way audio communication between teacher and student, or between students. Telephones are generally accessible, reliable, inexpensive, and portable. They offer a close duplication of traditional verbal exchange found in a classroom. Depending on the quality needed and distances between teacher and students, it may be necessary to consider the costs due to long-distance charges, speakerphones, and telephone bridges (allows more than one person to hear and speak with others participating in the conference simultaneously) (Ostendorf, 1989).

Television Technologies

Cable

The use of cable systems to deliver distance education programming requires cable connections and leased services (usually) from a cable company. Broadcasting may require trips to the cable company studio. Unless security measures are taken, normal cable subscribers can view the classes, and delivery times may be limited by existing cable company program schedules. Concurrent two-way audio interaction can be accomplished with telephones (Ostendorf, 1989).

Commercial Broadcast

Commercial broadcasting has very high production and delivery costs (Bates, 1984; Bates 1988), and they are usually high quality. They can be used to deliver many kinds of information: complex relationships, demonstrations, interpersonal skills and attitudes, dramatic presentations, sequencing, symbolism, and concrete examples (Bates, 1988), abstract concepts, experiments, interviews, and current events (Bates, 1984), behavior, animation, case-studies, documentaries, slow motion, and moving parts (Kaye, 1981), and discussions (Holmberg, 1989).

Programs produced by broadcasters are not easily changed. Unless students tape the programs, they cannot be paused, reversed, or self-paced - they can only be viewed once. They can reach large numbers of students and attract new ones, and viewing times are usually set by the broadcast company (Bates, 1984). For available broadcast materials, it is common to supply accompanying written materials (Giltrow, 1989).

Microwave (ITFS)

The Federal Communications Commission has authorized the use of special frequencies (ITFS - Instructional Television Fixed Services) which allow for the low-powered transmission of signals to and from one or more line-of-sight locations (usually no more than 15-20 miles) (Charp & Hines, 1988; Learning Resources and Technology. A Guide to Program Development, 1991; Ostendorf, 1989). These instructional materials and programs can be delivered via full-motion, one-way/two-way video, and/or one-way/two-way audio, though two-way is more expensive (Learning Resources and Technology. A Guide to Program Development, 1991; Ostendorf, 1989). The audio, visual, and data signals are converted into microwave radio signals (Charp & Hines, 1988) that require line-of-sight for successful transmission and reception. If objects or buildings block this view, then repeater stations can be used to bypass obstacles (Ostendorf, 1989).

Satellite Dishes (Downlink)

Satellites dishes must be focused on an orbiting stationary satellite in order to pick up the signal, whether or not the dish is fixed or moveable. The signal being captured determines the size of the dish, its positioning accuracy required, and the equipment quality and expense. C-band signals require cheaper equipment, larger dishes and equipment, and microwave interference is a problem. Ku-band signals require more accurate dish positioning, better quality equipment, and more expense. Rain causes interference. If dual-band equipment is used (can pick up both signal types), the expense is even higher (Ostendorf, 1989).

Satellite Uplinks

Satellite uplinks are ground-based transmitters (sometimes mounted on trucks) which send signals to an orbiting satellite for distribution to other sites and dishes. The transmission is referred to as "uplinking" (Ostendorf, 1989).

Satellites

Satellites are fixed-earth orbit relay stations that can pick up and retransmit video, audio, and data signals to ground-based dishes and receiving stations. It can handle one or two-way video and audio communication. The ground area where its signals reach is referred to as its "footprint (Ostendorf, 1989; Zucker, 1986).

Ground-based receivers (dishes) can then relay the signals to other locations via microwave transmission, cable, telephone line, fiber optics, or television broadcast (Zucker, 1986). There is a time-delay associated with satellite transmissions (due to the time it takes to receive a signal and forward it on) (Charp & Hines, 1988). A satellite can usually accommodate 24 separate programs (one per transponder), or twice that many - called "half transponder use," which requires larger dishes (due to the half-strength signal being sent out). The more receivers on the ground, the more economical the programming. It costs the same to transmit to one or to one hundred dishes. An advantage to satellite transmissions is that they can serve clients located far from one another (Ostendorf, 1989).

Slow Scan

Slow scan is a one-way or two-way technique whereby still graphics, photographs, video camera images, slides, or other print-based material can be transmitted inexpensively over telephone lines to remote monitors through receiving and decoding devices (Barden & Golden, 1986; Giltrow, 1989; Ostendorf, 1989). It takes between six and thirty seconds to complete a transmission, and images can be stored on computers before and after transmission (Giltrow, 1989; Ostendorf, 1989).

Teletext

Through the use of teletext decoders connected to television sets, students can receive broadcast or telephone-transmitted text and graphics across the bottom of their television screens (or as full television-sized "pages") (Bates, 1983; Pfaehler, 1985; Zucker, 1986).

The system is not interactive, although the "pages" can be stored for later viewing (Zucker, 1986). The data is transmitted in the vertical blanking interval of the television signals, and the costs of production and receiving are usually small (Elton & Carey, 1983; Pfaehler, 1985).

Video Teleconferencing

Video teleconferencing involves the transmission of video and audio (both two-way) signals between two or more sources. If only one site broadcasts video, then the receiving stations usually have two-way audio connections. With multi-point switching capabilities, two-way video is possible - even voice-activated video (Lothian, 1988).

Videotex

Videotex is an interactive method of receiving text, data, and graphics, or of accessing computer programs stored on a mainframe computer. Signals are transmitted over telephone lines or cable to a decoder connected to the television screen, or directly to a computer (Chang, et. al., 1983; Pfaehler, 1985; Zucker, 1986). Information can be stored on computer disk or printed (Zucker, 1986) after the students dial up the mainframe, connect, and make selections from a screen menu (Chang, et. al., 1983; Zucker, 1986). Videotex systems include Viewdata, Prestel, Teletel, Datavision, Teledon, and Captains (Chang, et. al., 1983).

Computer Technologies

Computer Assisted Instruction (CAI)

These are computer-based instructional programs, usually developed by a programmer working closely with a subject-matter expert, which deliver interactive lessons to the students. Lessons can contain text, questions, answers, and assignments, and they are commonly divided into modules. CAI lessons can be either tutorial, instructional, drill and practice, games, simulations, or modeling. Examples of CAI systems include PLATO (uses a central computer, graphics-display terminals, and TUTOR - a CAI language) and DECAL (uses a minicomputer, graphics-display terminals, and DECAL authoring language). CAI programs can be used with videodiscs for intelligent computer-based lessons (Chang, et. al., 1983). The use of CAI materials allows for greater teacher and student flexibility, but at a high cost for high quality products (Bates, 1988). CAI is the same as CAL.

Computer Managed Instruction (CMI)

Computer managed instruction is a computer program which collects and processes student progress and test scores from CAI or CAL programs, prepares grades and reports, and sequences individual lessons for each student (Holt, 1988).

Database Searching

There are several types of database searching - full-text and index. In full-text searching, the entire database is searched for targeted words of strings. In the other, prepared indices are searched. On CD-ROMs, since there is ample space for extensive indices, this is the preferred method. These indices do not contain "noise" words - i.e., articles such as "a", "an", "the", etc. (Strukhoff, 1987).

Electronic Mail

Users are able to send and receive messages (electronic mail) by using computers networked together - e.g., bulletin boards, Bitnet, Internet, CompuServe, and others (Giltrow, 1989). These communication networks can link users from all over the world (Learning Resources and Technology. A Guide to Program Development, 1991).

Fiber Optics

Fiber optic cables are thick cables of fine optical fibers (Ostendorf, 1989) that can transmit enormous amounts of information. The original electronic signals from computers are first converted into light signals (Charp &

Hines, 1988). They are expensive to install, yet are practically free of maintenance. They can carry high quality one-way or two-way audio, video, and data signals (Giltrow, 1989).

Modems

Modems are pieces of hardware which convert binary information (i.e., computer generated data, text, or graphics) to analog information (to transmit) and from analog to binary (to receive). In this way, computers (both binary systems) can be connected to one another where information is transmitted over analog telephone lines. Communication is possible 24 hours per day (Giltrow, 1989).

Networks (LAN)

Computers are connected to one another in a network, which can be arranged in several configurations: bus, star, tree, or ring. The connections between separate local area networks (LANs) are accomplished through the use of bridges or gateways. Bridges keep track of messages between LANs of similar type, while gateways keep track of messages, speed, and code conversions between dissimilar LANs (Charp & Hines, 1988).

Personal Computers

Personal computers are able to prepare text, generate graphics, perform calculations, perform multiple functions, operate software programs, and be used for programming.

with a modem and communications software, one-way or two-way communications is possible between computers (Ostendorf, 1989). They can be used to display both concrete and abstract knowledge (Bates, 1988), use CAL learning programs (Bates, 1983), and operate multi-media systems (Bates, 1988).

Computer Software Technologies

Artificial Intelligence

Artificial intelligence refers to the capabilities of computers to mimic human thought processes. These "fifth-generation" computers will be able to manipulate enormous amounts of audio, visual, numerical, and textual materials at very high speeds (Hannafin & Peck, 1988). An example of intelligent software is "expert systems" (Forrest, 1988).

Database Management

Mainframe computers are used to store enormous amounts of information, which can be remotely accessed using a computer, modem, telephone line, and communications software. There may be access costs to users (Learning Resources and Technology. A Guide to Program Development, 1991). Database management involves the updating, indexing, and sorting of data (Forrest, 1988).

Expert Systems

Expert systems software are knowledge-based systems that are used to mimic the thought processes of "experts" who have been previously interviewed. Based on these interviews, human decision-making rules are programmed into the software. Then, users can query a computer for the solution of similar problems (based on how the expert would have done it), or ones which are new and innovative (Forrest, 1988).

Hypercard

Hypercard is the hypertext system developed by Apple Computers. It has no local area network (LAN) or wide-area network (WAN) capability (Kahn, 1990). Hypertext is generic software which allows links to be made between strings or blocks of text. Hidden text can be extracted for viewing by selecting specific areas of the computer screen with a mouse or keyboard.

Hypermedia

Hypermedia is software which allows a user to make links between text, sound, and visual data. By "clicking" on hidden commands (underneath text) on the computer screen, more details or related data can be brought to the surface for viewing or listening (Forrest, 1988; Kahn, 1990). Hypertext refers to similar linking software where textual material is involved (DeBuse, 1988). "Authoring" is the process by which users create the information and links. It is important for the "author" to anticipate where new users might want to expand their searches (Slatin, 1990).

Simulations

Simulations are computer programs which try to duplicate processes, tasks, or conditions which are either too costly, too dangerous, or too slow to produce in reality (Hannafin & Peck, 1988). These programs generally present the student with a scenario, student-initiated parameter variations, results based on these changes, and help in completing these realistic tasks (Chang, et. al., 1983; Hannafin & Peck, 1988).

Word Processors

Word processors are software programs which allow users to create, read and edit text. More sophisticated desktop publishing software allows user to produce top quality publications that rival commercially-based mechanically-produced materials (Forrest, 1988).

Visual Technologies

16mm Films

Films are useful for the demonstration of experiments, behavior (human and animal), dramatic presentations, case-studies, documentaries, moving machine parts, animation, and slow motion (Kaye, 1981). Films have better sound and image quality when compared to videotapes. They can be shown on larger screens, and they must be prepared and developed in advanced of lessons - thus making them more unavailable (Chang, et al., 1983).

Electronic Blackboards

Through the use of electronic whiteboards, tablets, or blackboards, students can write on their specially designed surfaces while remote viewers view the results on video monitors (Benson & Hirschen, 1987; Ostendorf, 1989).

Facsimile (FAX)

Facsimile technology is an optical means by which hard copy text, graphics, or computer printouts are scanned, converted into electronic signals, transmitted to remote fax machines, reconverted, and printed again on hard copy for duplication (if desired) (Norenberg & Lundblad, 1987).

Optical Data Disks

CD-ROM means Compact Disk - Read Only Memory. These are fixed-database disks which must be updated on a regular basis in order to incorporate newer information (Learning Resources and Technology. A Guide to Program Development, 1991; Kennedy, 1986). These disks can hold 600 megabytes of information, or the equivalent of 1,500 floppy disks of information (Kennedy, 1986; Marchionini, 1989). Data can be audio or visual, and access times of less than two seconds are common (Learning Resources and Technology. A Guide to

Program Development, 1991; Marchionini, 1989). Access can be remote or from dedicated computers/CD-ROM players (Learning Resources and Technology. A Guide to Program Development, 1991).

Print Correspondence

Written text is very important to use in distance education programs. Unlike traditional classroom texts, these materials are designed to allow for more learner discretion and flexibility, they should be conversational in style, and they may contain places for entry of student and teacher comments. These materials should be pilot-tested, and feedback should be encouraged (Norenberg & Lundblad, 1987).

Videodiscs

Videodiscs are optically read and can hold 56,000 slides or 30 minutes of motion and audio. They are durable, protected with a coating of plastic, and can be expensive to produce (Bates, 1988; Chang, et. al., 1983). With either hand-held or computer-controlled capabilities, frames or motion sequences can be accessed very quickly. With the aid of computers, disks can be "repurposed" (frames or sequences chosen and incorporated into a computer-based learning packages) (Bates, 1988; Chang, et. al., 1983; Giltrow, 1989; Zucker, 1986).

Videotape Cassettes

Videotape cassettes are not interactive, they are easy to produce, copy (before or during transmission), and distribute, they offer students the ability to self-pace their studies, and they can be viewed repeatedly (Bates, 1984; Chang, et. al., 1983; Zucker, 1986). They can be produced with a videotape camera, or they can be professionally done at a lower cost (generally) when compared to television productions (Bates, 1984; Chang, et. al., 1983). Unlike other forms of media, changes are easier to make, broadcast times present no problem (they can be easily distributed), and they can be searched with computers for specific sequences or still images (more time consuming than with video disks) (Bates, 1984; Zucker, 1986).

These were some of the technologies selected from the survey instrument that can be used alone or in combinations to enhance or completely enable successful distance education programs. It is now helpful to see what changes and developments have taken place in Hungary in the area of distance education.

Distance Education History in Hungary

Correspondence Studies

Correspondence education has a history of use in Hungary since 1951. In that year, engineers and teachers at all universities could take correspondence classes. Later, this type of distance education was extended to colleges. Typically, these correspondence classes were developed and maintained by the departments responsible for the full-time classes. This political decision to institute correspondence education was an attempt by the government to offer education to those denied access to education in previous years for financial or social reasons. It was also a means for political appointees to increase their educational levels. As Hungary became increasingly industrialized, correspondence education was used by many specialists to increase their skills and educational experiences (The Development of Distance Education in Hungary, 1992).

Correspondence education continued afterwards when political motives ceased to be a factor. Its continuation enabled educational possibilities for students not admitted to full-time classes, the education of workers without professional diplomas or qualifications, and the retraining, further education, and the meeting of other student needs who were enrolled in correspondence courses (The Development of Distance Education in Hungary, 1992). Some comparative statistics are helpful (The Development of Distance Education in Hungary, 1992). (NOTE: Percentages are based on all students.)

TABLE 3

STUDENTS ENROLLED IN HUNGARIAN UNIVERSITIES/COLLEGES

PROGRAM TYPE	1956/57 %	1991/92 %
Full-time:	67.7	71.9
Evening	5.1	5.2
Correspondence	27.1	22.9

TABLE 4

HUNGARIAN COLLEGE STUDENTS ENROLLED (1991/92)

PROGRAM TYPE	TEACHER TNG %	TECHNICAL %	AGRICULTURE %	TOTAL %
Full-time	61.4	68.5	63.4	63.4
Evening	3.8	3.9	0	6.1
Correspondence	34.8	27.6	25.2	30.5

TABLE 5

DEGREES AWARDED BY PROGRAM TYPE (1985)

PROGRAM TYPE	UNIVERSITIES %	COLLEGE %	COMBINED %
Full-time	23.5	30.9	54.4
Evening	1.0	1.4	2.4
Correspondence	6.6	30.5	37.1
Combined	33.3	66.7	----

TABLE 6

ENROLLMENT BY PROGRAM TYPE (1991)

PROGRAM TYPE	UNIVERSITIES %	COLLEGES %
Full-time	80.0	30.9
Evening	4.5	1.4
Correspondence	15.5	30.5

TABLE 7

HIGH/LOW FULL-TIME ENROLLMENTS (1991)

UNIVERSITIES	%	
Medical Schools:	94.6	(High)
Univ. Of Arts/Sciences	71.3	(Low)
COLLEGES	%	
Arts Colleges	88.0	(High)
Colleges of Economics	52.1	(Low)

In general, correspondence education in Hungary operates in the following fashion. Correspondence students receive the same information as their full-time counterparts, but with additional methodology guidelines to follow. The majority of work is student-controlled, with two or three sessions set aside during a semester for group class sessions, lasting between one and three days. During the

TABLE 8

HIGH/LOW EVENING ENROLLMENTS (1991)

UNIVERSITIES	%	
Univ. Of Arts/Sciences	9.1	(High)
Med. Sch., Univ. Of Agr.	0	(Low)
COLLEGES	**%**	
Colleges of Economics	18.9	(High)
Colleges of Agriculture	0	(Low)

TABLE 9

HIGH/LOW CORRESPONDENCE ENROLLMENTS (1991)

UNIVERSITIES	%	
Univ. Of Arts/Sciences	19.6	(High)
Medical Schools	5.4	(Low)
COLLEGES	**%**	
Teacher Training	34.8	(High)
Colleges of Agriculture	3.9	(Low)

semester, student-teacher interaction is rare, except during group meetings. During these meetings, the teacher usually lectures, with little time set aside for consultations with students. Personal interactions are encouraged, but not mandatory. At the end of the semester, students take exams.

In effect then, students are free to study at their own leisure, but they must maintain a schedule which corresponds with the beginning and ending of semesters (The Development of Distance Education in Hungary, 1992).

Much criticism has been levied at correspondence education in recent years, because of: the former political motivations for its earlier beginnings, its inadequate quality, its lack of appeal for the best qualified professors, its heavy demand on a professor's time, its reputation of not being as reputable as full-time study, professors not being really able to control the process, its obsolete character, or its generally inefficient design (The Development of Distance Education in Hungary, 1992).

Other Distance Education Efforts

Other cited efforts are included below (The Development of Distance Education in Hungary, 1992). In the early 1970s, the Research Center for Higher Education Pedagogy researched ways to improve correspondence education, and it conducted experiments based on West European models.

In 1973, at the Research Center and Teacher Training College in Pécs, the first comprehensive distance education system was developed. Altogether, it graduated 900 students, and its example did not expand to much of Hungary. In the early 80s, it was terminated.

In the early 1980s, various distance education programs based on Spanish and British models were developed. At the

Buda Language Studio, more than 10,000 students studied a foreign language with the supplied language training packages. One hundred teachers were trained to teach high-school adult education at the Budapest Pedagogical Institute using the distance education packages supplied, and 500 managers were trained at the Institute for Industrial Manager Training via training packages and consultations.

In the late 1980s, 200 personnel and on-the-job managers were trained in a distance education program. In the Institute for Continuing Engineering Education at Budapest's Technical University, 200 engineers learned various subjects with distance education packages. As well, the Institute worked cooperatively with Hungarian Telecom to produce teleconference-based education courses for senior company managers.

In 1989, Hungarian Radio spent 5.1% of its airtime on distance education programming, while Hungarian Television utilized 2.9% of its time. Of these efforts, 60-70% of the programs directly involved education in schools. Most of these were Hungarian-produced programs.

In 1990, at the Agricultural University in Gödöllő, the faculty in the Mechanical Engineering Department developed distance education packages for many undergraduate courses. The result has been a marked increase in student enrollment. Here, only part of the program was developed for distance education. This program still continues.

In May 1990, the International Council for Distance Education held the European conference at the Technical University of Budapest. The goals were to educate leaders in higher education about the promise of distance education technologies. They were also able to form partnerships with distance education experts from Western Europe.

Based on subsequent efforts, a distance education center was established in Hungary under the auspices of a TEMPUS Joint European Project. The first goal of this center is to work cooperatively with three Hungarian universities, the National Institute for Vocational Training, and the Fernuniversität in Hagen, Germany, to deliver German language training. Included funding in this joint project will support the distance education programs to be transmitted by the EUROSPACE satellite.

Other desired projects include joint European projects designed to broadcast other distance education programs using the satellite, to institute distance education teacher training, to conduct a distance education survey of needs, and to found a distance education organization.

In May 1990, the International Council for Distance Education (ICDE) held a conference in Budapest at the Technical University. Here, the "Budapest Platform" was established. Further developments are expected.

In May 1991, Hungary established the National Council on Distance Education (NCDE) and its advisory body, the

Professional Council on Distance Education (PCDE). PCDE sends two delegates to sit on the NCDE. Representatives at NCDE include interested people at the Ministry of Education and Culture, the Hungarian Chamber of Commerce, the National Association of Entrepreneurs, the Rectors' Conference, the Conference of Directors of Colleges, the National Association for the Protection of Interests of Higher Education, and other organizations.

NCDE duties are to form and develop a national network for distance education, to support and advise different distance education efforts and associations, to conduct needs assessments, to operate public relations in support of distance education, to establish and support communication and activities between governmental and private organizations, to represent Hungary in international agreements and efforts, and to maintain a secretariat at the Coordination Office for Higher Education to lobby for support (the PCDE also maintains such a secretariat position).

Currently, numerous distance education courses from Britain have been adapted for Hungarian use, and they are increasing in number. The Ministry of Education and Culture recently submitted three proposals: one which seeks to establish a distance education network of five to six centers located in university towns. Decentralization is considered important for a more rapid dissemination of distance education materials and programs. A second proposal discusses the national and international distance education experiences so far, and the requirements for adapting distance education programs for use in Hungary. The third one asks for PHARE funds to establish an international network of distance education efforts for various Eastern/Central European countries.

Distance Education Technology Needs in Hungary

Seventy-three percent of the Hungarian population lives in regions of the country where no post-secondary institutions exist, and where dormitories, rental property, and cafeterias are not available. By taking advantage of distance education technologies, wider audiences needing further education can be reached (The Development of Distance Education in Hungary, 1992).

Many curriculum reform issues connected with distance education programs (correspondence education in particular) closely match the national educational reforms for Hungary. Because most of Hungary's experience in distance education is associated with correspondence education, it receives considerable attention. The details below are very comprehensive in nature (The Development of Distance Education in Hungary, 1992).

Rather than eliminating correspondence education programs, reform planners feel it is important to improve the efficiency of the existing programs using more advanced technologies. Where available, the best correspondence materials should be adapted for use in other universities and colleges. This added dimension will enable higher numbers of students to enroll at the institutions of their choices, as well as to attend other classes at and conducted by other institutions.

To solve the problems associated with program control, student isolation, and teacher-student interaction, distance education programs will be established where students are required to attend in-class lectures. Curriculum choices will be expanded and improved to include second-language training, business and free-market strategies, industrial production, and farming for businessmen, students, and the labor market. Extended coverage in subjects of related interest and need will be developed for various workers, such as public employees, health care workers, employees in the national transportation system, private enterprises of all kinds, the unemployed, skilled workers, technicians, and private industry craftsmen.

These distance education programs for training and retraining will be matched with and incorporated as parts of existing vocational training institutions, secondary vocational schools, vocational schools, independent schools, colleges, universities, and other organizations. Plans are also being made to develop distance education programs in basic education for those workers who were unable to complete their formal lower-level education or job qualification programs. One major use of distance education will be for the training assistance of foreign companies doing business in Hungary - who maintain expensive in-house training programs for their Hungarian employees.

The importance of integrating with Western markets and countries will be greatly enhanced through distance education efforts in language training. Internationally recognized programs in second-language instruction should be adapted from successful foreign distance education programs. The need for such programs is evident from the popularity of second-language training in Hungary. In 1980, 3.2% of all Hungarians could speak German, 1.1% could speak English, and less than 3.0% could speak French. In 1989, 13% of the Hungarian population studied languages in school, 1% studied in special language institutes, and an increasing number studied on their own or in private schools. In this same year, 41.6% of students elected to study English, 38% studied German, 13.3% studied Russian, and 6.1% studied French.

The success of distance education initiatives depend to a large extent on making sure the programs planned are firmly based on local conditions of the communities being served. The discussion which follows describes who the expected local experts and supporting staff are, and under what conditions they will likely be made available for extensive distance education work (The Development of Distance Education in Hungary, 1992).

There are about 2,000 university and college professors with considerable experience in the design, implementation, and evaluation of correspondence coursework and training who can be used to strengthen and devise new programs. Their other strengths include good teaching methods and strategies, foreign language proficiency, and international connections. In addition, between 100 and 200 university and college professors have experience in the more advanced distance education technologies.

Currently, the ratio of teachers to students in universities is 1:4, and in colleges, 1:5 or 6. With the massive reform efforts underway to achieve more students per teacher, many teachers will be potentially available for research in and the design of distance education programs. As the growing trend of releasing more students from mandatory class time continues, more professors can be utilized for distance education research and development.

As overall enrollments of students continue to decline, higher numbers of school teachers and professors can be redirected into the distance education field. There are also many non-academic professionals currently engaged in distance education programs throughout Hungary - in management institutes, at the Ministry level, in corporate institutions, and in other areas of private and public life.

Distance education, in general, suffers from credibility problems in Hungary. Even if professors could be attracted to the profession and are willing to relocate, there is a shortage of housing and other support systems they would require. Therefore, secondary circumstances such as housing will prevent marked increases in the relocation and involvement of higher educational personnel. Conversely, distance education itself is seen as a way to make up for the relative lack of professors in outlying areas, and partly because a sizeable proportion (66%) of them live and work in Budapest.

As with general reform initiatives, distance educators will depend on the shared use of facilities and materials by the institutions, schools, and organizations involved. Enrollment projections will decrease, and recent political events have alleviated some of the resource needs considerably. As student enrollment drops, more space will be available in the schools and institutions involved. Many buildings and properties formerly occupied by communist party officials and the Russian military have been donated to educational institutions.

However, many of these facilities are in varying states of disrepair. A massive renovation of buildings and properties will be required to support distance education efforts, followed by investments in classroom, office, and distance education equipment and supplies.

Further support is needed for the advancement of distance education technologies in general, and motivation of educators and staff are required for successful recruitment and implementation of these programs.

In any effort of this magnitude, a considerable array of resources and support systems must be established. The infrastructure present and needed is elaborated more fully below (The Development of Distance Education in Hungary, 1992).

Institutions of higher education usually have access to equipment and capabilities directly needed in distance education programs: e-mail, fax machines, telexes, word processing, desktop publishing, video cameras/recorders, printing operations, etc.

About 17-20% of all households in Hungary are equipped with telephones. In Budapest, 61-72% of all households have telephones, while the percentages in smaller towns and villages range between 37-44%. Videotext is not available on a wide scale for use with the telephone network. The telephone system is under constant development to improve service.

Three million out of the total 3,800,000 households in Hungary have televisions (1987). Of these households, 6.4% have video recorders, which represents 20-25% of all households (1987). There has been an annual increase of 46%. Regular teletext can be transmitted to an estimated

300,000 televisions sets equipped with teletext devices throughout Hungary.

Hungary has 62 cable companies which can become involved in distance education programming. Very few households have satellite dishes, but most households that subscribe to cable services can receive satellite broadcasts via the cables installed. Four hundred thousand households are able to receive locally produced programs of 1-6 hours duration.

EUROSTEP and EUROSPACE satellite programs can be received by some universities, and Hungary has already developed programs utilizing satellite programming with teleconferencing capabilities. One hundred fifty thousand households have Commodore 64s, and 15,000 have IBM Compatible personal computers.

Funding and support is needed for preliminary work before distance education programs can be planned. These areas include more knowledge about distance education theory and practice, needs assessments, application ideas, legal and copyright constraints, legislative issues, and public relations. Much of this experiences will have to be obtained through overseas travel by Hungarian educators to distance education facilities for study and research.

During the planning, development, and implementation stages of distance education programs, support will be needed in training distance education teachers, technicians, and other staff members, in maintaining and improving support systems, and in developing and disseminating materials to students.

Other concurrent needs include the formation and support of distance education organizations, the further improvement of correspondence education, international recognition of degrees obtained through distance education programs, adaptation of foreign-made distance education programs for use in Hungary, higher foreign investment in Hungarian efforts (through grants, foreign government support, and foreign company support), and cooperative efforts with foreign educational and other institutions.

The Hungarian planners believe that The Council of Europe can contribute greatly to Hungary's efforts to establish viable distance education programs. They seek support from them for the following initiatives: for cooperative international efforts, for collecting and distributing distance education materials, research, and practices, for a clearing house for distance education materials and programs, for a network of distance education resource centers, and for successful models of distance education programs. Additionally, they need assistance in determining the advantages and disadvantages of distance education technologies, as well as the best method to utilize Hungarian professors and professionals to support distance education program development, implementation, and evaluation.

Distance Education Technology Needs in Kecskemét

Student access to the three colleges in Kecskemét follows the same general trend as in other parts of Hungary. For example, at the Teacher Training College, is was common for students to travel long distances to stay in the college dormitory during the week and attend classes. On Friday afternoon after classes were over, most would return home, usually by train or bus. This was readily apparent because the dormitory was almost empty. Even though the costs of staying in provided-housing are low compared to western standards, it represents a burdensome investment to many students or their parents. The college also provides a cafeteria service for interested students (and even to the community - a means of raising revenue) - though some students complain that the prices are still too high. The costs of housing, travel, and board represent national and local public education expenditures that can be reduced if proper planning of cost-effective distance education programs is achieved.

Many planned programs and institutional reform efforts have been described already for Hungary and Kecskemét. Because Kecskemét is in a rural farming community, many of the learners that could be impacted by improved opportunities live some distance from the town. If the burdens of travel, housing, and board could be reduced because the students could stay close to their own homes or communities, then access to the colleges could increase, and the savings could be redirected towards attracting even more students. The availability of good distance education programs could benefit them and allow for greater access to educational opportunities that are beyond their reach at this time.

There is a general upbeat attitude in Kecskemét about the future. Small businesses are abundant in this area, and it is common for college students with second-language skills to hire themselves out as tutors to school-age children. The young students sometimes spend time between classes making money this way. Others work part or full-time in local businesses. A common attitude among these students is that as long as they can meet their basic needs and save a little money for the future, they are happy.

In the community, it is not uncommon for several families to share the same dwelling - because of the housing shortage. When the former Russian military base educational complex becomes fully operational, the three colleges will be able to handle housing for students much easier - but this will cost a considerable amount of money. The expectation in Hungary and in Kecskemét is to gradually require some level of tuition payments from attending students - to help pay the costs of these educational services. If distance education programs can be developed for larger audiences, the costs per student are expected to be lower.

The potential for greater access to educational opportunities depends in large part on the successful reform efforts of all three colleges, the introduction of cost effective distance education programs, and the freeing up of funds and materials now inexorably tied up in the current system in the area.

At this point, it is hard to say what exact programs the planners in Kecskemét will ultimately establish. Getting ideas from the planners was a partial goal of the survey instrument. Some have been mentioned specifically, though. At the Horticultural College, planners see the possibility of offering courses of community interest such as flower arranging and other courses directly applicable and useful for the area farmers. A program has already begun for farmers concerning bookkeeping and statistics. One administrator suggested that distance education technologies would be best applied in post-graduate programs at this institution. When the community college is established, then the feeling is that distance education programs will really be needed. The Horticulture College has plans to develop a distance education program for Slovakian farmers in which the professor will travel to the area to give examinations and offer assistance.

Overall, much depends on the available money, resources, and personnel required for such operations. They are just beginning to entertain the possibilities that distance education holds for them. Several pre-planning ingredients are still missing. Knowing the accessibility that planners have to the infrastructure, what they know about the various technologies, and what their experiences have been with these technologies, are essential before serious planning can begin.

It is safe to say, however, that distance programs can be considered in the following areas of study that have already been discussed by the planners in Kecskemét. These include a full variety of course possibilities in the areas of second-language training, business and free-market strategies, industrial production, farming, teaching, vocational training, retraining, academic study, social work, and community interests. What programs will be developed, or which will come first has yet to be decided. The results of this case study will hopefully enable the decision-making process.

In Kecskemét, any planned distance education program will need the support and cooperation of many educators and technical professionals. These people are important because of their intimate familiarity with the local conditions and needs. In addition, the importance of outside experts and the mutual exchanges of planners between distance education (and other project location) institutions and the colleges in Kecskemét have already been described. These efforts require funding.

In Kecskemét, many professors live in other areas of Hungary. Like students, they travel home on weekends. Some even live in the dormitory with the students (i.e., at the Teacher Training College - the director of the college, the international relations director, and other teachers) during the weekdays. On the weekends, they return home to Budapest. This situation matches the general conditions already described for Hungary. It further points to the possible lack of available professionals and professors for full-time, local efforts to establish and maintain distance education programs.

Many of the professors and planners are ready to become involved in preliminary research into distance education planning - and even to eventual development and implementation. But, many more experts will be needed - and they may not be readily available in the area. Attracting their cooperation may be further difficult, especially when one considers the general lack of trust for distance education - mainly the result of Hungary's history with correspondence education and the feeling that the costs are simply too high.

Because there are very few professors with experience in the more advanced distance education technologies, the shortage can only be reduced by involving and training larger numbers of traditional educators and staff members. Kecskemét will face a concerted training effort regardless of the number of locally available people.

As more professors and teachers become available in Kecskemét as a result of the expected student shortage, they too can be utilized in distance education research and program implementation.

Describing the material needs of the planners is problematic at this point. What technologies they need or desire depends on the programs they choose to teach, available funding, what they currently possess, and what is available from cooperating institutions. The survey questions were designed in part to answer some of these questions.

Based on observations made while in the area, the following conditions and needs exist. At the Horticultural College, a professional and well-equipped laboratory for video production is needed, as well as better printing facilities. None of the students have computers at home. They have access to the X25 system which gives them access to Internet and Bitnet. Presently, there are 25 IBM compatibles in a single room, which will soon be connected to the X25 system. The various departments of the college are connected via a network, and a separate network is used by administration (10 machines). There are also computers used to monitor and regulate paprika and tomato growth in the laboratories. There are 20-25 PC ATs, three Sun Workstations, and three 386s. One laboratory is equipped with six 386s dedicated to AutoCad applications. In another lab, five 386s are utilized in tool design. Throughout various offices, there are other single use computers.

At the Teacher Training College, there are numerous computers used by administrators and professors, and they have a separate facility for the production of printed materials. There are also two PC labs available to students and professors for programming, software use, and word processing requirements.

At the Mechanical Engineering and Automation College, there are a large number of computers available for engineering and other applications. They have good facilities for CAD/CAM programs and applications. Some machines are dedicated to machine-control and other teaching/learning requirements. Because there are so many students and so few machines, student accessibility is still a problem which requires careful planning and scheduling for optimum student use.

To facilitate the establishment of the FLCC, the need for materials is very extensive, to include books, dictionaries, textbooks, audio/visual materials, computer software, color televisions, VCR tape recorders, cassette recorders, video cameras, photo copiers, computers/printers, telefaxes, and a variety of office and classroom equipment and supplies. A mobile language lab is also envisioned with a capacity of 18 students. Other equipment and supplies, in general, are needed for the media room which will contain a lending section, reading room, studio, research facilities, and storage areas. A permanent language laboratory equipped for 20 will also be built and equipped.

In Kecskemét, the local public television station is ready to work with the three colleges in distance education projects where television broadcasting is a part. The station is equipped with a BETA-CAM SP system, five camcorders, two studio cameras, and other equipment for daily operation. They also have a teletext system which can be programmed for text presentation to local televisions equipped with special decoders. They broadcast their teletext messages to all homes twice a day. The station is received in 50,000 homes, and 30% of these have televisions equipped with the teletext decoders.

The Pedagogical Institute in Kecskemét is also involved with educational reform in the area. They perform pedagogical services for the area schools by organizing retraining programs, offering methodology classes, coordinating K-12 projects, and maintaining curriculum resources and other materials for teachers. They also work with primary school children and counsel them about secondary school choices. In close cooperation with administrators and professors at the Teacher Training College, support is common. At the Institute, a special laboratory is equipped for large scale production of cassette tape recording and copying. They also operate a computer lab to train teachers in the use of various hardware and software. The Institute currently is working with the three colleges on the development of the FLCC.

CHAPTER III

METHODOLOGY

The Locale

The rectors at the three colleges (Horticulture College, Mechanical Engineering and Automation College, and Teacher Training College) in Kecskemét, Hungary were asked to select 10-15 planners from their faculties and staff that would likely be involved in the planning, development, and implementation of distance education programs in the future. No other conditions were set for the selection of these participants. At predetermined times, the researcher met with the participants and interpreter to administer the instrument. The same interpreter was used throughout the process, and was involved in minor changes to the instrument when problems arose. After each session, the pages of the survey were coded in case they became separated during analyses. Data from the survey were analyzed using SPSSX. The number of respondents were as follows: Horticulture College (N=16), Mechanical Engineering and Automation College (N=16), and Teacher Training College (N=7).

Due to scheduling conflicts of respondents at both the Horticulture and Mechanical Engineering and Automation

Colleges, the survey instrument was administered at each college on two different days. The survey of respondents at the Teacher Training College was completed in one session.

After a brief introduction (by the interpreter) and general overview of the survey instrument, the survey was distributed. No time limit was given to complete the survey. The researcher and interpreter were present at all times to answer questions or clarify misunderstandings. At the Horticulture College, several questions arose about the meaning of certain technologies. For example, the word "globe" was translated into Hungarian with the meaning of "earth", as opposed to the intended "model of the earth" found in classrooms. This was changed. It was also explained at several points when respondents asked for clarification that descriptions of the technologies could not be given, because this was data that needed to be collected via the survey. In quiet consultation with the interpreter, some words were changed (as above) to make their meanings more exact. All respondents were informed of the changes, and later on before the next survey administration, the changes were incorporated.

At the Teacher Training College, one respondent did not complete the survey. It was explained later by another colleague that this person did not want to bias the survey results because of a lack of knowledge in the field of technology. And finally, throughout survey administrations at both the Horticulture and Teacher Training Colleges, respondents would sometimes talk to one another. The interpreter indicated that the conversations were either to clarify the meaning of a word or were of a general nature that were unrelated to the knowledge being surveyed.

The Instrument

Although accessibility is mentioned first in the title and questions, it is listed last in the survey instrument. Placement in the survey was partially done because of a perceived "simple to complex" structure desired for easier administration and simplicity for the respondents. For reference, the English version is found in Appendix A and the Hungarian version in Appendix B.

Accessibility

In setting up the survey instrument, the possible categories to choose from included NOT accessible (coding value = 0), accessible IN THE AREA (coding value = 1), accessible IN THE COLLEGE (coding value = 2), and accessible IN THE DEPARTMENT (coding value = 3). There was no possibility for choosing an I DON'T KNOW response. The respondents had to make a choice based on their knowledge of local conditions.

Since some questions were left blank by respondents, this could be interpreted as either an I DON'T KNOW, they did not know what technology was being asked about, or they chose for some other reason not to respond. There was no way of knowing for sure, so analyses of blanks were not done. Blanks found for knowledge and experience responses were similarly ignored.

Some respondents chose more than one response per question. In these cases, their answer was recorded as the highest coding value among the responses chosen. The rationale for this decision is as follows: If a respondent chose IN THE AREA, IN THE COLLEGE, and IN THE DEPARTMENT, then they might have been logically covering the actual situation. To have a technology IN THE DEPARTMENT would also mean that it is automatically accessible at least in one department of that college, IN THE COLLEGE, and at least at one location in the area (by default).

If multiple responses were meant to indicate that respondents had access to the technology at various places within the community, then the same rationale applies for selecting the response with the highest coding value. Since this research was also interested in how close to the respondents the technology was accessible, the selection of the higher valued response yielded such information. Since respondents were asked to "circle the correct response", not "circle the correct responses", one decision was required for data coding.

The potential meaning of possible responses needs some clarification. Because Hungary is a rather small country, distances between cities, and therefore potentially coordinating institutions are much lower when compared to the United States. Whereas IN THE AREA might mean something special in the United States, it might be interpreted differently inside Hungary. No attempt was made to define what IN THE AREA actually meant, or distances to be understood. It could mean in the area surrounding the three colleges, all of Hungary, or some other arbitrary boundary. The key point to be made is that IN THE AREA means the technology is accessible - as opposed to not being accessible.

The choice IN THE COLLEGE implied that the technology was accessible within the actual confines of the college being surveyed, but there was no reason to exclude the possibility of branch campuses or centers in other cities or towns. This might be the case, for example, if mainframe facilities were accessible at the college at some level, but the actual mainframe was located in another city and/or at another institution.

IN THE DEPARTMENT was the lowest level the technology could be found within the college. Since some administrators taught classes (sometimes in more than one department) as well as performed administrative duties in other areas of the college, the choice of the department to which they responded was their own. Their answers could have been mixed between different departments. They were not asked to be consistent, choose only one department, or even identify their specific departments. Since various departments within the colleges were therefore represented in the data, responses of IN THE DEPARTMENT do not refer to any particular subject area.

Knowledge

On this portion of the survey instrument, respondents were asked to rate their own knowledge levels of each technology indicated. The possible responses included NONE, VERY LITTLE, SOME, and A LOT. Respondents' choices were subjective and required self-ratings. They were not asked to compare their levels of knowledge with some "ideal" situation or in relation to other, and perhaps more knowledgeable experts. The self-analysis aspect of these sets of questions was purposeful.

The use of the term "knowledge" was left to the interpretation of the respondents because of the many possible sources or conditions under which knowledge can be gained. These can include, but are not limited to magazine articles, workshops, actual experience, television or radio programs, books, newspapers, casual conversation, etc. No limitations were placed on the respondents as they attempted to rate their own levels of knowledge, or by some external body of knowledge they may have used as a comparison.

Experience

On this portion of the survey instrument, respondents were asked to indicate how many times they had used the technologies. The possible responses included NOEN, USED 1-3 TIMES, USED 4-6 TIMES, and USED AT LEAST ONCE A MONTH. Although there may be little practical difference between having used a technology 1-3 or 4-6 times, those who chose either response would have had to think carefully to make the correct choice. By choosing USED AT LEAST ONCE A MONTH, the individual would have been indicating a regular usage of the technology.

Like the data collected on accessibility, low valid percentages or frequency values in experience do not necessarily exclude the possibility of one or more well-experienced respondents in a particular or group of technologies.

Data Analysis

Data analysis was performed using SPSSX, and all tables were prepared using WordPerfect 6.0.

Overview

Chapter IV contains the raw and accumulated data from the survey instruments, rationales for analyses, and discussions of findings. There are five parts to the chapter: Overview, Demographics of Respondents, Data Analysis, Qualitative Assessment and Summary.

Demographics of Respondents

In this section, respondent demographics were examined, based on their answers from the survey instrument. The areas covered include: work experience in their present job (Question 88), gender (Question 89), age (Question 90), their perceived future role in the design, development, or implementation of distance education programs (Question 91), their highest level of education obtained (Question 92), and in general, to what degree they are aware of distance education (Question 93).

Quantitative Survey Results

This part is divided into four parts - each part becoming progressively broader in scope as the analyses continue. Part 1 begins with 45 tables showing the frequencies of responses for each of the 74 technologies surveyed with the instrument. In these tables can also be found the valid percentages that these frequencies represent. In Part 2, frequencies from Part 1 were reorganized so that all three colleges were contained in the same tables. In this way, comparisons between colleges were easier to make. In Part 3, the highest valid percentages from Part 2 were collected into several more tables for easier comparisons. Part 4 consists of four sections. In the first section, frequencies were totaled from earlier tables and presented in order to make further comparisons between the colleges. In the second section, two technology categories (audio and visual) were divided into advanced and less advanced technologies to see if any patterns emerged. Since the other three technology categories (television, computer, and computer software) contained only advanced technologies, they were not repeated. Their respective results were found in earlier tables. In the third section, valid percentages were averaged for a broader view of accessibility, experience, and knowledge at each college. In the final section, the averages from the previous section were averaged in order to give the broadest perspective of accessibility, experience, and knowledge of the 74 surveyed technologies.

At the beginning of each part, a Data Analysis Rationale details the reasons for selecting particular data, the analyses that were performed, any changes to or operations performed on the data, as well as some cautionary statements about proper interpretation of findings. Within each part, tables were ordered as described in their respective Data Analysis Rationales, and findings for each table precede each table.

Qualitative Assessment

In this section, open-ended Questions 80-85 from the survey are examined. The questions asked the respondents to say how distance education would be used in work assignments, how they envisioned the use of distance education in their college or geographic area, how they felt about using distance education for all work assignments, what the current degree of support was for the use of distance education, what role politics played in the use of distance education, and what barriers to implementing distance education in their schools would exist if they had sufficient funds for the needed technology. The tabled responses are revealing in many ways, so the reader is encouraged to spend some time reviewing them carefully. Prior to each of the six groups of tables (one group of tables per question), the findings are shown.

Summary

In this final section of the chapter, the summaries from tables were reduced and organized by the five technology categories (audio, television, computer, computer software, visual) within the three major survey categories (accessibility, experience, knowledge). Within each technology category, the order of summarization was based on presentation of tables found in the Quantitative Survey Results portion of this chapter. The overall, average, and final tables were not included, but used for the final summary and conclusions in Chapter V. The final summation brings together the qualitative data collected from the open-ended questions.

CHAPTER IV

DATA ANALYSIS AND QUALITATIVE ASSESSMENT

Overview

The rectors at the three colleges (Horticulture College, Mechanical Engineering and Automation College, and Teacher Training College) in Kecskemét, Hungary were asked to select 10-15 planners from their faculty and staff that would likely be involved in the planning, development, and implementation of distance learning programs in the future. No other conditions were set for the selection of these participants. At predetermined times, the researcher met with the participants and interpreter to administer the instrument. The same interpreter was used throughout the process, and was involved in necessary changes to the instrument when problems arose. After each session, the pages of the survey were coded in case they became separated during analyses. The data from the survey were analyzed using SPSSX. The number of respondents were as follows: Horticulture College (N=16), Mechanical Engineering and Automation College (N=16), and Teacher Training College (N=7).

This chapter contains raw and accumulated data from the survey instruments, rationales for analyses and discussions of findings. There are five parts to this chapter - Overview, Demographics of Respondents, Data Analysis, Qualitative Assessment and Summary.

Demographics of Respondents

In this section, respondent demographics are examined, based on their answers from the survey instrument. The areas covered included: work experience in their present job (Question 88), gender (Question 89), age (Question 90), their perceived future role in the design, development, or implementation of distance education programs (Question 91), their highest level of education obtained (Question 92), and in general, to what degree they were aware of distance education (Question 93).

At the beginning of each section, the Data Analysis Rationale describes how data were analyzed, what calculations were performed on the data, and any facts pertinent to reading and understanding the tables of data. Before each table, a summary of its findings is shown.

Quantitative Survey Results

This is divided into four parts - each part becoming progressively broader in scope as the analyses continue. Part 1 begins with 45 tables showing in detail the frequencies of responses for each of the 74 technologies surveyed with the instrument. In these tables, the valid percentages that these frequencies represent are also found. In Part 2, the frequencies from Part 1 were reorganized so that all three colleges were contained in the same tables. In this way, comparisons among colleges were easier to make. In Part 3, the highest valid percentages from Part 2 were collected into tables for easier comparisons. Part 4 has four sections. In the first section, frequencies were totaled from earlier tables and presented in order to make further comparisons between the colleges. In the second section, two technology categories (audio and visual) were divided into advanced and less advanced technologies to see if any patterns emerged. Since the other three technology categories (television, computer, and computer software) contained only advanced technologies, they were not repeated. Their respective results are found in earlier tables. In the third section, valid percentages were averaged for a broader view of accessibility, experience, and knowledge at each college. In the final section, the averages from the previous section were averaged in order to give the broadest perspective of accessibility, experience, and knowledge of the 74 surveyed technologies.

At the beginning of each part, a data analysis rationale is explains the reasons for selecting particular data, the analyses that were performed, any changes to or operations performed on the data, as well as some cautionary statements about proper interpretation of findings. Within each Part, the tables were ordered as described in their respective data analysis rationales, and the findings for each table preceded the presentation of the particular table.

The reader is reminded of the three research questions:

1. What is the accessibility of the infrastructure, i.e., hardware and software for planning and implementing distance education technologies within programs?
2. What is the knowledge of the planners about distance education technologies?
3. What experience do the planners have in using distance education technologies?

Qualitative Assessment

In this section, open-ended Questions 80-85 from the survey were examined. The questions asked respondents to say how distance education would be used in work assignments, how they envisioned the use of distance education in their college or geographic area, how they felt about using distance education for all work assignments, what the current degree of support was for the use of distance education, what role politics played in the use of distance education, and what barriers to implementing distance education in their schools would exist if they had sufficient funds for the needed technology. Prior to each of the six groups of tables (one group of tables per question), the findings are shown.

Summary

In this final section of the chapter, the summaries from tables were reduced and organized by the five technology categories (audio, television, computer, computer software, visual) within the three major survey categories (accessibility, experience, knowledge).

Within each technology category, the order of summarization was based on presentation of tables found in the data analysis portion of this chapter. The overall, average, and final tables were not included, but were used for the final summary and conclusions in Chapter V. The final summation brings together the qualitative data collected from the open-ended questions.

Demographics of Respondents

Overview

In this section, respondent demographics were examined, based on their answers from the survey instrument. The areas covered include: work experience in their present job (Question 88), gender (Question 89), age (Question 90), their perceived future role in the design, development, or implementation of distance education programs (Question 91), their highest level of education obtained (Question 92), and in general, to what degree they were aware of distance education (Question 93).

At the beginning of each section, the data analysis rationale describes how data was analyzed, what calculations were performed on the data, and any facts pertinent to reading and understanding the tables of data. Before each table, a summary of its findings is shown.

Work Experience in Present Job - Data Analysis Rationale

Years of experience data were collected for each college faculty, tallied, and averaged overall, by college and by gender. In cases where respondents indicated less than one year's experience, they were assigned an experience value of "1 year" in order to use their data in calculations. Any fractional years over one were included without change.

In general, both males and females had equivalent years experience (within their gender categories) at their present jobs at all three colleges separately, and for all three colleges combined. At all three colleges, men were employed on average longer than women. In every college, the longest and shortest employed person was a man (Table 10).

Respondent Gender - Data Analysis Rationale

Gender data were collected for each college, tallied, and percentages determined overall and by college.

TABLE 10

RESPONDENT WORK EXPERIENCE IN PRESENT JOB
(IN YEARS)

	TOTAL			MALE			FEMALE		
COLLEGE	HIGH	LOW	MEAN	HIGH	LOW	MEAN	HIGH	LOW	MEAN
Horticulture	23	1	10	23	1	10	19	3	10
Mechanical	26	1	9	26	1	9	21	1.5	9
Teacher	15	1	6	15	1	7	10	2	6
Overall	26	1	9	26	1	9	21	1.5	8

There were more men at the Horticulture and Mechanical Engineering and Automation Colleges when compared to the Teacher Training College. From highest to lowest percentage of males at each college, the following was true: Horticulture College, Mechanical Engineering and Automation College, Teacher Training College. The same order existed for women, but from lowest to highest. See Table 11.

TABLE 11

RESPONDENT GENDER

	MALE		FEMALE	
COLLEGE	TOTAL	PERCENT	TOTAL	PERCENT
Horticulture	12	75	4	25
Mechanical	10	63	6	37
Teacher	3	43	4	57
Overall	25	64	14	36

Respondent Age - Data Analysis Rationale

Respondent age data were collected for each college, tallied, and percentages determined overall, by college and by gender.

On average, at the Horticulture and Teacher Training Colleges, the males were older than females. From oldest to youngest (both males and females, combined, and as individual respondents), the colleges were so ordered: Teacher Training College, Horticulture College, Mechanical Engineering and Automation College. See Table 12 below.

TABLE 12

RESPONDENT AGE

	TOTAL			MALE			FEMALE		
COLLEGE	HIGH	LOW	MEAN	HIGH	LOW	MEAN	HIGH	LOW	MEAN
Hort	58	30	47	58	34	48	54	30	44
Mech	53	25	38	53	25	37	47	26	39
Teach	64	39	51	64	45	56	55	39	48
Overall	64	25	44	64	25	45	55	26	43

Perceived Roles - Data Analysis Rationale

On the instrument, respondents were asked to identify in what capacity they perceived themselves to be for the future design, development, or implementation of distance education programs at their colleges. In some cases, respondents indicated more than one position. All responses were tallied.

Most had no idea at the time about their roles. Overall, four persons responded with teaching, four as no role, one to provide written suggestions, one expecting to be involved in committee work, and three to take leadership positions (Table 13).

TABLE 13

NUMBER OF RESPONSES TO PERCEIVED ROLES IN DISTANCE LEARNING PROGRAM

COLLEGE	NO ROLE	UN-KNOWN	WRITTEN SUGGESTIONS	COMM INVOLVE-MENT	LEADER	TEACHER
Horticulture	1	12	1	1	2	1
Mechanical	2	13	0	0	1	1
Teacher	1	5	0	0	0	2

Highest Education Completed - Data Analysis Rationale

On the instrument, respondents were asked to indicate their highest educational level completed. In many cases, both university/college and doctorate degrees were listed. In Table 14 that follows, only the highest of the two was tallied. It is helpful at this time to briefly describe the structure of higher education in Hungary.

Hungarian higher education is composed of three levels: colleges, universities, and other institutions. Most of the higher educational institutions are state-run, with the majority being of the college type. College degrees usually take about three years to complete, and universities take between four and six. There are 65 colleges, 21 universities, and 11 univeristy-level colleges. Four of the universities are comprehensive in nature (having various faculties), and most are specialized (agriculture, economics, medicine, sciences, technical) with the others specialized. The university-level colleges have four-year programs in design, drama, film, fine arts, military science, music, physical education, and theology. The colleges are of many types: agriculture, arts, economics, medicine, state administration, teacher education, and technical. The third level has institutes to train teachers of handicapped children, and others for nursing. Examinations are required for entry into and exit from higher educational institutions. Data analysis now follows.

At the Horticulture College, 56% of the respondents had doctorate degrees, 19% at the Mechanical Engineering and Automation College, and 71% at the Teacher Training College. University (non-doctoral) degree holders at the Horticulture College were at 44%, 69% at the Mechanical Engineering and Automation College, and 29% at the Teacher Training College. In addition, at the Mechanical Engineering and Automation College, 12% had college degrees.

Awareness of Distance Education - Data Analysis Rationale

On the instrument, respondents were asked to indicate their general awareness of distance education. The

TABLE 14

NUMBER OF RESPONSES/PERCENT TO HIGHEST EDUCATION COMPLETED

	HIGH SCHOOL		VOCA-TIONAL		COLLEGE		UNIVERSITY		DOCTORATE	
	N	%	N	%	N	%	N	%	N	%
Horticulture	0	0	0	0	0	0	7	44	9	56
Mechanical	0	0	0	0	2	12	11	69	3	19
Teacher	0	0	0	0	0	0	2	29	5	71

responses were tallied and percentages determined by college.

At the Horticulture and Mechanical Engineering and Automation Colleges, 56% of the respondents had no awareness of distance education, while the percentage at the Teacher Training College was 57%. No one claimed a high degree of awareness of distance education. Overall, at all three colleges combined, 15% had moderate knowledge of distance education, 28% had a little knowledge, and 57% had none at all (Table 15).

TABLE 15

NUMBER OF RESPONSES/PERCENT TO GENERAL AWARENESS OF DISTANCE LEARNING

COLLEGE	NONE AT ALL		A LITTLE		MODERATE		HIGH	
	N	%	N	%	N	%	N	%
Horticulture	9	56	5	31	2	13	0	0
Mechanical	9	56	4	25	3	19	0	0
Teacher	4	57	2	29	1	14	0	0

Quantitative Survey Results

In Part I of the data analysis, 45 tables were divided into three major groups - accessibility, experience, and knowledge. Within each group, tables were divided by college - Horticulture, Mechanical Engineering and Automation, and Teacher Training. Within these, the technology categories were divided as: audio, television, computer, computer software, and visual. These tables present frequency and valid percentage data from the SPSSX results.

In Part 2 of the data analysis, frequency data from the tables in Part 1 were extracted and reorganized into 15 tables, so that responses of all three colleges were together on the same tables. In Part 3 of the data analysis, valid percentage data from the tables in Part 1 were extracted and reorganized into 15 tables, so that all three colleges were together on the same tables. This allowed for easier comparisons between colleges.

In Part 4, four distinct sections are found. In the first section, three tables contain frequency totals from the 15 tables in Part 2 as a way of examining overall levels of accessibility, experience, and knowledge.

In the second section, both audio and visual categories were divided into advanced and less advanced technologies, and the frequencies from Part 2 were collected and totaled. Since the television, computer, and computer software technology categories contained only advanced technologies, there was no need to divide or repeat tables.

In the third section, valid percentage data from Part 3 were averaged to obtain overall technology category averages for each survey category - accessibility, experience and knowledge. In addition, averages were ordered from highest to lowest to see if any patterns existed.

In the final section, averages from the above three tables were averaged again for a final broad description of the survey data collected.

At the beginning of Part 1, Part 2, Part 3 and Part 4, the data analysis rationale for each part describes reasons for selecting particular data, analyses that were performed, any changes to or operations performed on the data, as well as some cautionary statements about proper interpretation of findings. Within each part, tables were ordered as already described above. Prior to each table is found the discussion of the findings for that table.

Part 1 - Data Analysis Rationale

Frequency Data

The 45 tables below contain frequencies for accessibility, experience and knowledge. Frequencies refer to the actual count of respondents who answered in a particular way. Asterisks found within tables mean that no one responded. The reporting of frequency data was different for accessibility, experience and knowledge. The reason was because accessibility, experience and knowledge are different kinds of information. Unlike experience and knowledge, accessibility findings needed to be examined in the wider context of across-respondents within a college to determine actual local conditions.

Understandings of what technologies were accessible depended on respondents' awareness and personal/professional connections. It was expected that responses would widely differ. As such, accessibility frequencies for all respondents within a college (and between colleges) were taken into consideration. Ignoring positive accessibility responses (i.e., IN THE AREA, IN THE COLLEGE, IN THE DEPARTMENT) by even one individual runs the risk of eliminating one or more technologies that can be utilized for joint-projects.

Positive accessibility responses by any respondent indicated accessibility to the technology for the entire group or program under development. Frequency accessibility data were examined in this manner. Positive accessibility frequency responses were reported as: "technology XYZ was accessible in more than one level". It was also important to examine the accessibility "agreement" within college respondent groups - through the use of majority responses. This is examined below under valid percentage analysis rationale.

For experience and knowledge data, it was less important to compare respondents' responses to determine actual local conditions. The level of experience and knowledge that respondents had was more personal in nature and must be considered more fixed. In other words, they knew what they knew and what they had experience using, so it was unnecessary to weigh their answers against those of their colleagues in order to determine actual local conditions. Their answers represented the actual local conditions. Both frequency and valid percentage data could have been used interchangeably in reporting these experience and knowledge findings. Because valid percentage data are more useful than raw numbers, it was used (and will be covered under the next section).

Valid Percentage Data

The 45 tables below also contain valid percentage findings for accessibility, experience, and knowledge. A valid percentage value refers to the actual percentage of respondents who answered in a particular way. It neither includes nor averages in non-responses. If no frequencies were reported, then the valid percentage is shown with an asterisk too. The reporting of valid percentage data is different for accessibility, experience, and knowledge.

As a way of examining agreement on accessibility within a college, valid percentage data were examined. It was necessary to keep in mind that "majority" opinions about accessibility did not necessarily represent true local conditions. In fact, since very few technologies had 100% agreement on accessibility level, pointing out majority responses may very well had led to erroneous results - i.e., they ignoreed the "minority" opinion which may be more informed. Majority accessibility opinions were examined nonetheless to gain insight into prevailing opinions of the majority of respondents.

In describing accessibility valid percentage findings, particular attention was therefore paid to valid percentages over 50%. The use of the words "a majority of respondents" meant that over 50% of respondents within a college group agreeded with each other. These were be reported as: "a majority of respondents agreed that XYZ technology was/was not accessible at XYZ level."

For majority experience and knowledge data, valid percentage examinations and findings were less controversial. Frequency data could have been examined, but percentages were more useful.

There were widely different experience and knowledge levels reported by respondents. The rectors did not choose purely "technology types" to participate in the survey - but rather people with varying knowledge and experience levels with technology - and the data supported this result. So, attempting to extrapolate the valid percentage findings to the entire faculty and staff was a reasonable first approach to getting at the levels of experience and knowledge of all three colleges.

To compare experience and knowledge levels within and between colleges, rank order by valid percentage values were chosen for those technologies that were used regularly or known very well (i.e., USED AT LEAST ONCE A MONTH and A LOT, respectively). Only the highlights were mentioned; for more detailed reporting, tables are provided.

The reader is reminded of the three research questions:

1. What is the accessibility of the infrastructure, i.e., hardware and software for planning and implementing distance education technologies within programs?
2. What is the knowledge of the planners about distance education technologies?
3. What experience do the planners have in using distance education technologies?

Data Analysis - Accessibility

Horticulture College

At the Horticulture College, based on the frequency data, all technologies were accessible at some level. A majority of respondents agreed that audio cassette recorders, audio cassettes, and telephones were accessible in the department, and that mobile cellular phones, speech synthesizers and teleconferencing technologies were not accessible. See Table 16.

TABLE 16

AUDIO TECHNOLOGY ACCESSIBILITY - HORTICULTURE COLLEGE

QUESTIONS/ TECHNOLOGIES	NOT ACCESS F	NOT ACCESS VAL%	IN THE AREA F	IN THE AREA VAL%	IN THE COLL F	IN THE COLL VAL%	IN THE DEPT F	IN THE DEPT VAL%
1 Audio Cass Recorders	2	13.3	*	*	4	26.7	9	60.0
2 Audio Cassettes	1	6.3	1	6.3	2	12.5	12	75.0
3 Mobile Cellular Phone	9	60.0	3	20.0	2	13.3	1	6.7
4 Radios	2	13.3	2	13.3	5	33.3	6	40.0
5 Short-Wave Radios	5	33.3	3	20.0	5	33.3	2	13.3
6 Speech Synthesizers	11	78.6	1	7.1	2	14.3	*	*
7 Teleconferencing	10	71.4	3	21.4	*	*	1	7.1
8 Telephones	1	7.1	*	*	3	21.4	10	71.4

F=Frequency

At the Horticulture College, based on frequency data, all television technologies were accessible at some level. A majority of respondents agreed that commercial broadcast technologies were accessible in the area, that videotape cameras/recorders were accessible in the college, and that microwave (ITFS), satellite uplinks, satellites, slow scan, video teleconferencing, and videotex were not accessible. (Table 17).

At the Horticulture College, based on frequency data, all computer technologies were accessible at some level. A majority of respondents agreed that minicomputers, personal computers, and printers were accessible in the department,

TABLE 17

TELEVISION TECHNOLOGY ACCESSIBILITY - HORTICULTURE COLLEGE

	NOT ACCESS		IN THE AREA		IN THE COLL		IN THE DEPT	
QUESTIONS/ TECHNOLOGIES	F	VAL%	F	VAL%	F	VAL%	F	VAL%
10 Cable	3	21.4	3	21.4	6	42.9	2	14.3
11 Closed-Captioned	4	28.6	2	14.3	5	35.7	3	21.4
12 Closed-Circuit	7	50.0	3	21.4	3	21.4	1	7.1
13 Commercial Broadcast	1	7.1	10	71.4	2	14.3	1	7.1
14 Microwave (ITFS)	9	75.0	3	25.0	*	*	*	*
15 Public Broadcast	3	20.0	6	40.0	4	26.7	2	13.3
16 Sat. Dishes Downlink	5	35.7	3	21.4	5	35.7	1	7.1
17 Satellite Uplinks	11	78.6	2	14.3	1	7.1	*	*
18 Satellites	10	71.4	1	7.1	3	21.4	*	*
19 Slow Scan	10	71.4	2	14.3	2	14.3	*	*
20 Teletext	5	35.7	3	21.4	5	35.7	1	7.1
21 Video Teleconference	10	71.4	4	28.6	*	*	*	*
22 Videotape Cam/Record	1	7.1	1	7.1	11	78.6	1	7.1
23 Videotex	8	57.1	2	14.3	3	21.4	1	7.1

F=Frequency

that mainframes and LANs were accessible in the college, and that CMI, electronic mail, fiber optics, modems, and multimedia were not accessible (Table 18).

At the Horticulture College, based on frequency data, all computer software technologies were accessible at some level. A majority of respondents agreed that data processing and word processors were accessible in the department, that database management technology was accessible in the college, and that artificial intelligence, expert systems, hypercard, hypermedia and simulation technologies were not accessible (Table 19).

TABLE 18

COMPUTER TECHNOLOGY ACCESSIBILITY - HORTICULTURE COLLEGE

QUESTIONS/ TECHNOLOGIES	NOT ACCESS F	NOT ACCESS VAL%	IN THE AREA F	IN THE AREA VAL%	IN THE COLL F	IN THE COLL VAL%	IN THE DEPT F	IN THE DEPT VAL%
25 Animation	6	42.9	4	28.6	4	28.6	*	*
26 Comp Asst Design CAD	5	38.5	*	*	4	30.8	4	30.8
27 Comp Asst Instru CAI	3	20.0	1	6.7	5	33.3	6	40.0
28 Comp Asst Learn CAL	5	35.7	*	*	5	35.7	4	28.6
29 Comp Mngd Instru CMI	8	57.1	3	21.4	1	7.1	2	14.3
30 Database Searching	3	21.4	2	14.3	4	28.6	5	35.7
31 Electronic Mail	8	57.1	3	21.4	3	21.4	*	*
32 Fiber Optics	11	78.6	3	21.4	*	*	*	*
33 Graphics	5	35.7	3	21.4	2	14.3	4	28.6
34 Mainframes	1	7.1	1	7.1	11	78.6	1	7.1
35 Minicomputers	4	28.6	1	7.1	1	7.1	8	57.1
36 Modems	8	66.7	2	16.7	2	16.7	*	*
37 Multimedia	8	66.7	2	16.7	*	*	2	16.7
38 Networks (LAN)	4	28.6	*	*	8	57.1	2	14.3
39 Personal Computers	3	21.4	*	*	2	14.3	9	64.3
40 Printers	3	20.0	*	*	1	6.7	11	73.3

F=Frequency

At the Horticulture College, based on frequency data, all visual technologies were accessible at some level. A majority of respondents agreed that 35mm slides, charts, field trips, filmstrips, manipulatives, maps, models, overhead transparencies, and videotape cassettes were accessible in the department, that 16mm films, faxes and

TABLE 19

COMPUTER SOFTWARE TECHNOLOGY ACCESSIBILITY - HORTICULTURE COLLEGE

	NOT ACCESS		IN THE AREA		IN THE COLL		IN THE DEPT	
QUESTIONS/ TECHNOLOGIES	F	VAL%	F	VAL%	F	VAL%	F	VAL%
42 Artif. Intelligence	8	57.1	2	14.3	3	21.4	1	7.1
43 Communications Soft.	7	50.0	2	14.3	5	35.7	*	*
44 Courseware Design	7	46.7	4	26.7	4	26.7	*	*
45 Data Processing	2	13.3	1	6.7	4	26.7	8	53.3
46 Database Management	3	21.4	1	7.1	8	57.1	2	14.3
47 Desktop Publishing	3	21.4	2	14.3	4	28.6	5	35.7
48 Expert Systems	8	57.1	3	21.4	3	21.4	*	*
49 Hypercard	11	78.6	2	14.3	1	7.1	*	*
50 Hypermedia	11	84.6	2	15.4	*	*	*	*
51 Programmed Instruct	6	42.9	5	35.7	2	14.3	1	7.1
52 Simulations	8	61.5	1	7.7	4	30.8	*	*
53 Spreadsheets	2	14.3	2	14.3	4	28.6	6	42.9
54 Word Processors	1	7.7	1	7.7	2	15.4	9	69.2

F=Frequency

teletypewriters were accessible in the college, and that puppets were not accessible. No one claimed a lack of accessibility to 35mm slides, charts, manipulatives or overhead transparencies (Table 20).

Mechanical Engineering and Automation College

At the Mechanical Engineering and Automation College, based on frequency data, all audio technologies were accessible at some level. A majority of respondents agreed that audio cassette recorders, audio cassettes, radios, and telephones were accessible in the department, and that mobile cellular phones, short-wave radios, speech synthesizers, and teleconferencing technologies were not accessible (Table 21).

TABLE 20

VISUAL TECHNOLOGY ACCESSIBILITY - HORTICULTURE COLLEGE

	NOT ACCESS		IN THE AREA		IN THE COLL		IN THE DEPT	
QUESTIONS/ TECHNOLOGIES	F	VAL%	F	VAL%	F	VAL%	F	VAL%
56 16MM Films	2	14.3	*	*	9	64.3	3	21.4
57 35MM Slides	*	*	1	7.1	3	21.4	10	71.4
58 Bulletin Boards	6	42.9	6	42.9	2	14.3	*	*
59 Charts	*	*	3	18.8	3	18.8	10	62.5
60 Electr. Blackboards	7	50.0	6	42.9	1	7.1	*	*
61 Facsimile (FAX)	2	12.5	1	6.3	13	81.3	*	*
62 Field Trips	1	6.7	*	*	5	33.3	9	60.0
63 Filmstrips	1	6.3	1	6.3	3	18.8	11	68.8
64 Games	5	35.7	1	7.1	4	28.6	4	28.6
65 Globes	5	33.3	2	13.3	5	33.3	3	20.0
66 Manipulatives	*	*	1	6.7	3	20.0	11	73.3
67 Maps	1	6.3	*	*	4	25.0	11	68.8
68 Mock-Ups	2	14.3	2	14.3	5	35.7	5	35.7
69 Models	1	7.1	*	*	5	35.7	8	57.1
70 Optical Data Disks	6	50.0	3	25.0	1	8.3	2	16.7
71 Overhead Transpar	*	*	2	12.5	*	*	14	87.5
72 Posters	2	13.3	2	13.3	5	33.3	6	40.0
73 Print Correspondence	5	33.3	1	6.7	2	13.3	7	46.7
74 Puppets	8	57.1	4	28.6	1	7.1	1	7.1
75 Teletypewriters	3	20.0	1	6.7	10	66.7	1	6.7
76 Video Disks	6	46.2	3	23.1	4	30.8	*	*
77 Videotape Cassettes	1	6.3	1	6.3	4	25.0	10	62.5
78 Virtual Reality	7	50.0	1	7.1	*	*	6	42.9

F=Frequency

At the Mechanical Engineering and Automation College, based on frequency data, all television technologies were accessible at some level. A majority of respondents agreed that videotape cameras/recorders were accessible in the college, and that microwave (ITFS), satellite uplinks, satellites, and slow scan were not accessible. See Table 22 below.

At the Mechanical Engineering and Automation College, based on frequency data, all computer technologies were accessible at some level. A majority of respondents agreed that computer managed instruction (CMI), database searching, electronic mail, fiber optics, and modems were not accessible (Table 23).

TABLE 21

AUDIO TECHNOLOGY ACCESSIBILITY - MECHANICAL ENGINEERING & AUTOMATION COLLEGE

	NOT ACCESS		IN THE AREA		IN THE COLL		IN THE DEPT	
QUESTIONS/ TECHNOLOGIES	F	VAL%	F	VAL%	F	VAL%	F	VAL%
1 Audio Cass Recorders	*	*	1	6.3	1	6.3	14	87.5
2 Audio Cassettes	1	6.3	1	6.3	1	6.3	13	81.3
3 Mobile Cellular Phone	8	53.3	5	33.3	1	6.7	1	6.7
4 Radios	3	18.8	1	6.3	1	6.3	11	68.8
5 Short-Wave Radios	7	43.8	2	12.5	1	6.3	6	37.5
6 Speech Synthesizers	9	56.3	3	18.8	3	18.8	1	6.3
7 Teleconferencing	14	93.3	1	6.7	*	*	*	*
8 Telephones	1	6.3	1	6.3	*	*	14	87.5

F=Frequency

TABLE 22

TELEVISION TECHNOLOGY ACCESSIBILITY -
MECHANICAL ENGINEERING & AUTOMATION COLLEGE

	NOT ACCESS		IN THE AREA		IN THE COLL		IN THE DEPT	
QUESTIONS/ TECHNOLOGIES	F	VAL%	F	VAL%	F	VAL%	F	VAL%
10 Cable	2	12.5	6	37.5	6	37.5	2	12.5
11 Closed-Captioned	6	37.5	7	43.8	1	6.3	2	12.5
12 Closed-Circuit	8	50.0	5	31.3	1	6.3	2	12.5
13 Commercial Broadcast	8	50.0	8	50.0	*	*	*	*
14 Microwave (ITFS)	12	92.3	1	7.7	*	*	*	*
15 Public Broadcast	6	40.0	7	46.7	2	13.3	*	*
16 Sat. Dishes Downlink	8	50.0	6	37.5	1	6.3	1	6.3
17 Satellite Uplinks	11	68.8	5	31.3	*	*	*	*
18 Satellites	10	62.5	5	31.3	*	*	1	6.3
19 Slow Scan	12	80.0	1	6.7	1	6.7	1	6.7
20 Teletext	5	31.3	7	43.8	2	12.5	2	12.5
21 Video Teleconference	15	93.8	1	6.3	*	*	*	*
22 Videotape Cam/Record	1	6.3	4	25.0	9	56.3	2	12.5
23 Videotex	7	50.0	5	35.7	1	7.1	1	7.1

F=Frequency

TABLE 23

COMPUTER TECHNOLOGY ACCESSIBILITY -
MECHANICAL ENGINEERING & AUTOMATION COLLEGE

	NOT ACCESS		IN THE AREA		IN THE COLL		IN THE DEPT	
QUESTIONS/ TECHNOLOGIES	F	VAL%	F	VAL%	F	VAL%	F	VAL%
25 Animation	5	31.3	4	25.0	4	25.0	3	18.8
26 Comp Asst Design CAD	1	6.3	1	6.3	5	31.3	9	56.3
27 Comp Asst Instru CAI	3	18.8	1	6.3	4	25.0	8	50.0
28 Comp Asst Learn CAL	4	26.7	1	6.7	5	33.3	5	33.3
29 Comp Mngd Instru CMI	10	71.4	2	14.3	*	*	2	14.3
30 Database Searching	9	60.0	5	33.3	1	6.7	*	*
31 Electronic Mail	10	66.7	3	20.0	1	6.7	1	6.7

TABLE 23 (CONTINUED)

QUESTIONS/ TECHNOLOGIES	NOT ACCESS		IN THE AREA		IN THE COLL		IN THE DEPT	
	F	VAL%	F	VAL%	F	VAL%	F	VAL%
32 Fiber Optics	9	60.0	3	20.0	2	13.3	1	6.7
33 Graphics	6	37.5	3	18.8	1	6.3	6	37.5
34 Mainframes	6	40.0	6	40.0	3	20.0	*	*
35 Minicomputers	4	28.6	1	7.1	4	28.6	5	35.7
36 Modems	8	61.5	1	7.7	2	15.4	2	15.4
37 Multimedia	7	46.7	3	20.0	3	20.0	2	13.3
38 Networks (LAN)	4	28.6	*	*	4	28.6	6	42.9
39 Personal Computers	1	6.3	*	*	2	12.5	13	81.3
40 Printers	1	6.3	*	*	1	6.3	14	87.5

F=Frequency

At the Mechanical Engineering and Automation College, based on frequency data, all computer software technologies except Hypercard were accessible at some level. A majority of respondents agreed that data processing and word processor technologies were accessible in the department, and that artificial intelligence, Hypercard, hypermedia, and programmed instruction technologies were not accessible (Table 24).

TABLE 24

COMPUTER SOFTWARE TECHNOLOGY ACCESSIBILITY - MECHANICAL ENGINEERING & AUTOMATION COLLEGE

QUESTIONS/ TECHNOLOGIES	F	VAL%	F	VAL%	F	VAL%	F	VAL%
42 Artif. Intelligence	10	66.7	*	*	3	20.0	2	13.3
43 Communications Soft.	6	46.2	3	23.1	2	15.4	2	15.4
44 Courseware Design	7	46.7	2	13.3	2	13.3	4	26.7
45 Data Processing	2	12.5	2	12.5	3	18.8	9	56.3

TABLE 24 (CONTINUED)

QUESTIONS/ TECHNOLOGIES	F	VAL%	F	VAL%	F	VAL%	F	VAL%
46 Database Management	7	46.7	2	13.3	3	20.0	3	20.0
47 Desktop Publishing	1	6.3	1	6.3	6	37.5	8	50.0
48 Expert Systems	5	33.3	1	6.7	5	33.3	4	26.7
49 Hypercard	14	100.0	*	*	*	*	*	*
50 Hypermedia	12	85.7	2	14.3	*	*	*	*
51 Programmed Instruct	12	92.3	*	*	1	7.7	*	*
52 Simulations	5	33.3	*	*	4	26.7	6	40.0
53 Spreadsheets	4	25.0	2	12.5	3	18.8	7	43.8
54 Word Processors	1	6.3	*	*	1	6.3	14	87.5

F=Frequency

At the Mechanical Engineering and Automation College, based on frequency data, all visual technologies were accessible at some level. A majority of respondents agreed that charts, manipulatives, overhead transparencies, posters, and videotape cassettes were accessible in the department, that faxes and maps were accessible in the college, and that electronic blackboards, puppets, videodisks, and virtual reality technologies were not accessible (Table 25).

Teacher Training College

At the Teacher Training College, based on frequency data, all audio technologies except speech synthesizers and teleconferencing were accessible at some level. A majority of respondents agreed that audio cassette recorders, audio cassettes, radios, and telephones were accessible in the department, and that mobile cellular phones, short-wave radios, speech synthesizers, and teleconferencing technologies were not accessible (Table 26).

TABLE 25

VISUAL TECHNOLOGY ACCESSIBILITY - MECHANICAL ENGINEERING & AUTOMATION COLLEGE

QUESTIONS/ TECHNOLOGIES	F	VAL%	F	VAL%	F	VAL%	F	VAL%
56 16MM Films	2	12.5	4	25.0	7	43.8	3	18.8
57 35MM Slides	2	12.5	2	12.5	7	43.8	5	31.3
58 Bulletin Boards	7	46.7	7	46.7	*	*	1	6.7
59 Charts	*	*	*	*	1	6.3	15	93.8
60 Electr. Blackboards	8	53.3	5	33.3	2	13.3	*	*
61 Facsimile (FAX)	1	6.3	*	*	13	81.3	2	12.5
62 Field Trips	*	*	2	12.5	8	50.0	6	37.5
63 Filmstrips	2	12.5	1	6.3	7	43.8	6	37.5
64 Games	4	26.7	3	20.0	5	33.3	3	20.0
65 Globes	5	33.3	2	13.3	6	40.0	2	13.3
66 Manipulatives	*	*	1	6.7	2	13.3	12	80.0
67 Maps	3	20.0	2	13.3	8	53.3	2	13.3
68 Mock-Ups	1	6.3	3	18.8	4	25.0	8	50.0
69 Models	*	*	2	12.5	6	37.5	8	50.0
70 Optical Data Disks	5	35.7	4	28.6	4	28.6	1	7.1
71 Overhead Transpar	*	*	*	*	2	12.5	14	87.5
72 Posters	1	6.7	*	*	4	26.7	10	66.7
73 Print Correspondence	3	18.8	3	18.8	2	12.5	8	50.0
74 Puppets	8	53.3	7	46.7	*	*	*	*
75 Teletypewriters	6	40.0	2	13.3	7	46.7	*	*
76 Video Disks	7	53.8	2	15.4	3	23.1	1	7.7
77 Videotape Cassettes	*	*	2	12.5	2	12.5	12	75.0

F=Frequency

At the Teacher Training College, based on frequency data, all television technologies except microwave (ITFS), satellite uplinks, slow scan, and video teleconference technologies were accessible at some level. A majority of respondents agreed that all television technologies but cable, public broadcast, and videotape cameras/recorders were not accessible (Table 27).

TABLE 26

AUDIO TECHNOLOGY ACCESSIBILITY - TEACHER TRAINING COLLEGE

QUESTIONS/ TECHNOLOGIES	F	VAL%	F	VAL%	F	VAL%	F	VAL%
1 Audio Cass Recorders	1	14.3	*	*	1	14.3	5	71.4
2 Audio Cassettes	*	*	*	*	*	*	6	100.0
3 Mobile Cellular Phone	4	80.0	1	20.0	*	*	*	*
4 Radios	*	*	*	*	1	16.7	5	83.3
5 Short-Wave Radios	3	60.0	*	*	1	20.0	1	20.0
6 Speech Synthesizers	5	100.0	*	*	*	*	*	*
7 Teleconferencing	5	100.0	*	*	*	*	*	*
8 Telephones	1	16.7	*	*	1	16.7	4	66.7

F=Frequency

TABLE 27

TELEVISION TECHNOLOGY ACCESSIBILITY - TEACHER TRAINING COLLEGE

QUESTIONS/ TECHNOLOGIES	F	VAL%	F	VAL%	F	VAL%	F	VAL%
10 Cable	2	33.3	*	*	2	33.3	2	33.3
11 Closed-Captioned	4	80.0	1	20.0	*	*	*	*
12 Closed-Circuit	5	83.3	*	*	1	16.7	*	*
13 Commercial Broadcast	4	80.0	*	*	1	20.0	*	*
14 Microwave (ITFS)	4	100.0	*	*	*	*	*	*
15 Public Broadcast	2	33.3	1	16.7	2	33.3	1	16.7
16 Sat. Dishes Downlink	4	80.0	*	*	*	*	1	20.0
17 Satellite Uplinks	5	100.0	*	*	*	*	*	*
18 Satellites	4	80.0	*	*	*	*	1	20.0
19 Slow Scan	5	100.0	*	*	*	*	*	*
20 Teletext	4	80.0	*	*	1	20.0	*	*
21 Video Teleconference	5	100.0	*	*	*	*	*	*
22 Videotape Cam/Record	1	14.3	*	*	3	42.9	3	42.9
23 Videotex	4	80.0	1	20.0	*	*	*	*

F=Frequency

At the Teacher Training College, based on frequency data, only fiber optics technology was not accessible. A majority of respondents agreed that printers were accessible in the department, that animation, CAD, graphics, LANs and personal computer technologies were accessible in the college, and that computer managed instruction (CMI), electronic mail, fiber optics, modems, and multimedia were not accessible (Table 28).

TABLE 28

COMPUTER TECHNOLOGY ACCESSIBILITY - TEACHER TRAINING COLLEGE

QUESTIONS/ TECHNOLOGIES	F	VAL%	F	VAL%	F	VAL%	F	VAL%
25 Animation	1	16.7	*	*	4	66.7	1	6.7
26 Comp Asst Design CAD	2	40.0	*	*	3	60.0	*	*
27 Comp Asst Instru CAI	3	50.0	1	16.7	2	33.3	*	*
28 Comp Asst Learn CAL	2	33.3	1	16.7	3	50.0	*	*
29 Comp Mngd Instru CMI	3	60.0	1	20.0	1	20.0	*	*
30 Database Searching	2	50.0	1	25.0	1	25.0	*	*
31 Electronic Mail	4	80.0	*	*	1	20.0	*	*
32 Fiber Optics	5	100.0	*	*	*	*	*	*
33 Graphics	2	28.6	*	*	4	57.1	1	14.3
34 Mainframes	2	33.3	*	*	3	50.0	1	16.7
35 Minicomputers	2	40.0	*	*	2	40.0	1	20.0
36 Modems	4	80.0	*	*	1	20.0	*	*
37 Multi-Media	4	66.7	*	*	2	33.3	*	*
38 Networks (LAN)	1	16.7	*	*	5	83.3	*	*
39 Personal Computers	*	*	*	*	4	57.1	3	42.9
40 Printers	*	*	*	*	3	42.9	4	57.1

F=Frequency

At the Teacher Training College, based on frequency data, all computer technologies except data processing, desktop publishing, programmed instruction, spreadsheets, and word processors were not accessible at any level. A majority of respondents agreed that word processors were accessible in the department, and that artificial intelligence, communications software, courseware design, expert systems, Hypercard, hypermedia, and simulations were not accessible (Table 29).

TABLE 29

COMPUTER SOFTWARE TECHNOLOGY ACCESSIBILITY - TEACHER TRAINING COLLEGE

QUESTIONS/ TECHNOLOGIES	F	VAL%	F	VAL%	F	VAL%	F	VAL%
42 Artif. Intelligence	4	100.0	*	*	*	*	*	*
43 Communications Soft.	6	100.0	*	*	*	*	*	*
44 Courseware Design	5	100.0	*	*	*	*	*	*
45 Data Processing	2	40.0	*	*	2	40.0	1	20.0
46 Database Management	1	25.0	2	50.	1	25.0	*	*
47 Desktop Publishing	3	50.0	*	*	1	16.7	2	33.0
48 Expert Systems	4	100.0	*	*	*	*	*	*
49 Hypercard	4	100.0	*	*	*	*	*	*
50 Hypermedia	4	100.0	*	*	*	*	*	*
51 Programmed Instruct	3	50.0	1	16.	1	16.7	1	16.7
52 Simulations	3	75.0	*	*	*	*	1	25.0
53 Spreadsheets	2	40.0	*	*	1	20.0	2	40.0
54 Word Processors	*	*	*	*	1	14.3	6	85.7

F=Frequency

At the Teacher Training College, based on frequency data, all visual technologies were accessible at some level. A majority of respondents agreed that charts, filmstrips, manipulatives, overhead transparencies, and videotape cassettes were accessible in the department, that 16mm films, 35mm slides, faxes, field trips, globes, maps, and teletypewriters were accessible in the college, and that bulletin boards, electronic blackboards, optical data disks, video disks, and virtual reality technologies were not accessible (Table 30).

TABLE 30

VISUAL TECHNOLOGY ACCESSIBILITY - TEACHER TRAINING COLLEGE

QUESTIONS/ TECHNOLOGIES	F	VAL%	F	VAL%	F	VAL%	F	VAL%
56 16 MM Films	*	*	*	*	5	83.3	1	16.7
57 35 MM Slides	*	*	*	*	4	66.7	2	33.3
58 Bulletin Boards	5	83.3	1	16.	*	*	*	*
59 Charts	1	16.7	*	*	1	16.7	4	66.7
60 Electr. Blackboards	3	75.0	*	*	1	25.0	*	*
61 Facsimile (FAX)	*	*	*	*	5	83.3	1	16.7
62 Field Trips	1	14.3	*	*	4	57.1	2	28.6
63 Filmstrips	*	*	*	*	2	33.3	4	66.7
64 Games	1	16.7	*	*	2	33.3	3	50.0
65 Globes	1	16.7	*	*	4	66.7	1	16.7
66 Manipulatives	1	14.3	*	*	1	14.3	5	71.4
67 Maps	1	16.7	*	*	4	66.7	1	16.7
68 Mock-Ups	2	33.3	*	*	3	50.0	1	16.7
69 Models	1	16.7	*	*	3	50.0	2	33.3
70 Optical Data Disks	4	80.0	*	*	1	20.0	*	*
71 Overhead Transpar	*	*	*	*	2	28.6	5	71.4
72 Posters	1	16.7	*	*	2	33.3	3	50.0
73 Print Correspondence	2	40.0	*	*	2	40.0	1	20.0
74 Puppets	2	33.3	*	*	1	16.7	3	50.0
75 Teletypewriters	2	40.0	*	*	3	60.0	*	*
76 Video Disks	4	80.0	*	*	1	20.0	*	*
77 Videotape Cassettes	*	*	1	14.	2	28.6	4	57.1
78 Virtual Reality	4	100.0	*	*	*	*	*	*

F=Frequency

Data Analysis - Experience

At the Horticulture College, a majority of respondents had no experience using mobile cellular phones, speech synthesizers, and teleconferencing technologies, while the majority had some level of experience using the rest of these audio technologies. If USED AT LEAST ONCE A MONTH indicates regular usage of a technology, the strength at this college was: telephones (78.6%), radios (60%), audio cassette recorders (46.7%), and audio cassettes (43.8%) (Table 31).

TABLE 31

AUDIO TECHNOLOGY EXPERIENCE - HORTICULTURE COLLEGE

	NONE		USED 1-3 TIMES		USED 4-6 TIMES		USED ONCE/MON	
QUESTIONS/ TECHNOLOGIES	F	VAL%	F	VAL%	F	VAL%	F	VAL%
1 Audio Cass Recorders	2	13.3	2	13.3	4	26.7	7	46.7
2 Audio Cassettes	1	6.3	3	18.8	5	31.3	7	43.8
3 Mobile Cellular Phone	10	71.4	2	14.3	1	7.1	1	7.1
4 Radios	3	20.0	*	*	3	20.0	9	60.0
5 Short-Wave Radios	6	40.0	3	20.0	2	13.3	4	26.7
6 Speech Synthesizers	12	85.7	1	7.1	1	7.1	*	*
7 Teleconferencing	13	92.9	1	7.1	*	*	*	*
8 Telephones	3	21.4	*	*	*	*	11	78.6

F=Frequency

At the Horticulture College, the majority of respondents had no experience using microwave (ITFS), satellite uplinks, slow scan, video teleconference, and videotex technologies. Regular experience using technologies at this college was ranked from highest to lowest accordingly: cable (57.1%), closed-captioned (50%), public broadcast (46.7%) and, satellite dishes (downlink) (42.9%) (Table 32).

At the Horticulture College, a majority of respondents had no experience using the computer technologies except database searching, graphics, mainframes, minicomputers, personal computers, and printers. The most regular experience occurred with personal computers and then printers, at 33.3% and 28.6%, respectively (Table 33).

TABLE 32

TELEVISION TECHNOLOGY EXPERIENCE - HORTICULTURE COLLEGE

	NONE		USED 1-3 TIMES		USED 4-6 TIMES		USED ONCE/MON	
QUESTIONS/ TECHNOLOGIES	F	VAL%	F	VAL%	F	VAL%	F	VAL%
10 Cable	3	21.4	2	14.3	1	7.1	8	57.1
11 Closed-Captioned	4	28.6	1	7.1	2	14.3	7	50.0
12 Closed-Circuit	4	28.6	6	42.9	3	21.4	1	7.1
13 Commercial Broadcast	2	14.3	5	35.7	4	28.6	3	21.4
14 Microwave (ITFS)	11	84.6	2	15.4	*	*	*	*
15 Public Broadcast	1	6.7	5	33.3	2	13.3	7	46.7
16 Sat. Dishes Downlink	4	28.6	1	7.1	3	21.4	6	42.9
17 Satellite Uplinks	11	78.6	1	7.1	1	7.1	1	7.1
18 Satellites	7	50.0	1	7.1	2	14.3	4	28.6
19 Slow Scan	12	85.7	1	7.1	1	7.1	*	*
20 Teletext	5	35.7	5	35.7	2	14.3	2	14.3
21 Video Teleconference	13	92.9	1	7.1	*	*	*	*
22 Videotape Cam/Record	4	28.6	6	42.9	3	21.4	1	7.1
23 Videotex	12	85.7	1	7.1	1	7.1	*	*

F=Frequency

TABLE 33

COMPUTER TECHNOLOGY EXPERIENCE - HORTICULTURE COLLEGE

	NONE		USED 1-3 TIMES		USED 4-6 TIMES		USED ONCE/MON	
QUESTIONS/ TECHNOLOGIES	F	VAL%	F	VAL%	F	VAL%	F	VAL%
25 Animation	13	92.9	1	7.1	*	*	*	*
26 Comp Asst Design CAD	11	78.6	3	21.4	*	*	*	*
27 Comp Asst Instru CAI	8	53.3	4	26.7	2	13.3	1	6.7
28 Comp Asst Learn CAL	8	57.1	4	28.6	2	14.3	*	*
29 Comp Mngd Instru CMI	12	85.7	2	14.3	*	*	*	*
30 Database Searching	5	35.7	8	57.1	1	7.1	*	*

TABLE 33 (CONTINUED)

QUESTIONS/ TECHNOLOGIES	NONE		USED 1-3 TIMES		USED 4-6 TIMES		USED ONCE/MON	
	F	VAL%	F	VAL%	F	VAL%	F	VAL%
31 Electronic Mail	13	92.9	1	7.1	*	*	*	*
32 Fiber Optics	13	92.9	1	7.1	*	*	*	*
33 Graphics	6	42.9	6	42.9	1	7.1	1	7.1
34 Mainframes	7	46.7	7	46.7	1	6.7	*	*
35 Minicomputers	5	35.7	4	28.6	4	28.6	1	7.1
36 Modems	12	100.0	*	*	*	*	*	*
37 Multi-Media	10	76.9	2	15.4	1	7.7	*	*
38 Networks (LAN)	10	71.4	3	21.4	1	7.1	*	*
39 Personal Computers	4	26.7	2	13.3	4	26.7	5	33.3
40 Printers	4	28.6	4	28.6	2	14.3	4	28.6

F=Frequency

At the Horticulture College, a majority of respondents had no experience using computer software technologies except data processing, database management, spreadsheets, and word processors. Among respondents, the strength of regular experience was ranked accordingly: spreadsheets (21.4%), data processing (20%), word processors (15.4%) and desktop publishing (14.3%). Hypercard was the only technology where no respondent had experience (Table 34).

At the Horticulture College, a majority of respondents had no experience using bulletin boards, electronic blackboards, optical data disks, puppets, video disks and virtual reality technologies. Regular experience strengths among respondents were as follows: overhead transparencies (81.3%), charts (68.8%), 35mm slides (66.7%), manipulatives (60%) and filmstrips (50%). Respondents indicated no experience at all in using puppets, and no one indicated a lack of experience using field trips, manipulatives, overhead transparencies, and videotape cassettes (Table 35).

TABLE 34

COMPUTER SOFTWARE TECHNOLOGY EXPERIENCE - HORTICULTURE COLLEGE

	NONE		USED 1-3 TIMES		USED 4-6 TIMES		USED ONCE/MON	
QUESTIONS/ TECHNOLOGIES	F	VAL%	F	VAL%	F	VAL%	F	VAL%
42 Artif. Intelligence	10	71.4	3	21.4	1	7.1	*	*
43 Communications Soft.	11	78.6	1	7.1	2	14.3	*	*
44 Courseware Design	12	80.0	3	20.0	*	*	*	*
45 Data Processing	5	33.3	2	13.3	5	33.3	3	20.0
46 Database Management	7	50.0	4	28.6	3	21.4	*	*
47 Desktop Publishing	8	57.1	4	28.6	*	*	2	14.3
48 Expert Systems	11	78.6	2	14.3	1	7.1	*	*
49 Hypercard	14	100.0	*	*	*	*	*	*
50 Hypermedia	14	93.3	*	*	1	6.7	*	*
51 Programmed Instruct	9	64.3	4	28.6	1	7.1	*	*
52 Simulations	12	85.7	1	7.1	*	*	1	7.1
53 Spreadsheets	5	35.7	3	21.4	3	21.4	3	21.4
54 Word Processors	4	30.8	5	38.5	2	15.4	2	15.4

F=Frequency

TABLE 35

VISUAL TECHNOLOGY EXPERIENCE - HORTICULTURE COLLEGE

	NONE		USED 1-3 TIMES		USED 4-6 TIMES		USED ONCE/MON	
QUESTIONS/ TECHNOLOGIES	F	VAL%	F	VAL%	F	VAL%	F	VAL%
56 16 MM Film	6	42.9	4	28.6	2	14.3	2	14.3
57 35 MM Slides	2	13.3	1	6.7	2	13.3	10	66.7
58 Bulletin Boards	11	78.6	2	14.3	1	7.1	*	*
59 Charts	1	6.3	3	18.8	1	6.3	11	68.8
60 Electr. Blackboards	12	85.7	2	14.3	*	*	*	*
61 Facsimile (FAX)	3	18.8	5	31.3	3	18.8	5	31.3
62 Field Trips	*	*	5	33.3	5	33.3	5	33.3
63 Filmstrips	1	6.3	2	12.5	5	31.3	8	50.0
64 Games	4	26.7	7	46.7	4	26.7	*	*
65 Globes	4	28.6	4	28.6	6	42.9	*	*
66 Manipulatives	*	*	1	6.7	5	33.3	9	60.0

TABLE 35 (CONTINUED)

QUESTIONS/ TECHNOLOGIES	NONE F	NONE VAL%	USED 1-3 TIMES F	USED 1-3 TIMES VAL%	USED 4-6 TIMES F	USED 4-6 TIMES VAL%	USED ONCE/MON F	USED ONCE/MON VAL%
67 Maps	2	12.5	4	25.0	5	31.3	5	31.3
68 Mock-Ups	4	28.6	3	21.4	4	28.6	3	21.4
69 Models	3	21.4	3	21.4	6	42.9	2	14.3
70 Optical Data Disks	10	76.9	*	*	2	15.4	1	7.7
71 Overhead Transpar	*	*	2	12.5	1	6.3	13	81.3
72 Posters	5	33.3	3	20.0	3	20.0	4	26.7
73 Print Correspondence	6	40.0	2	13.3	4	26.7	3	20.0
74 Puppets	14	100.0	*	*	*	*	*	*
75 Teletypewriters	6	40.0	4	26.7	2	13.3	3	20.0
76 Video Disks	12	80.0	3	20.0	*	*	*	*
77 Videotape Cassettes	*	*	3	18.8	9	56.3	4	25.0
78 Virtual Reality	8	57.1	1	7.1	*	*	5	35.7

F=Frequency

Mechanical Engineering and Automation College

At the Mechanical Engineering and Automation College, a majority of respondents had no experience in using mobile cellular phones, speech synthesizers, and teleconferencing technologies. Regular experience strengths among respondents were ranked accordingly: telephones (75%), audio cassette recorders (68.8%), audio cassettes (62.5%), and radios (50%). No one claimed a lack of experience using audio cassette recorders or audio cassettes. Teleconferencing was the only technology that all respondents indicated they had no experience using (Table 36).

At the Mechanical Engineering and Automation College, a majority of respondents indicated no experience using all of the television technologies except cable, teletext and

TABLE 36

AUDIO TECHNOLOGY EXPERIENCE - MECHANICAL ENGINEERING & AUTOMATION COLLEGE

QUESTIONS/ TECHNOLOGIES	NONE		USED 1-3 TIMES		USED 4-6 TIMES		USED ONCE/MON	
	F	VAL%	F	VAL%	F	VAL%	F	VAL%
1 Audio Cass Recorders	*	*	*	*	5	31.3	11	68.8
2 Audio Cassettes	*	*	1	6.3	5	31.3	10	62.5
3 Mobile Cellular Phone	8	53.3	5	33.3	2	13.3	*	*
4 Radios	1	6.3	4	25.0	3	18.8	8	50.0
5 Short-Wave Radios	4	26.7	5	33.3	1	6.7	5	33.3
6 Speech Synthesizers	11	68.8	5	31.3	*	*	*	*
7 Teleconferencing	15	100.0	*	*	*	*	*	*
8 Telephones	3	18.8	*	*	1	6.3	12	75.0

F=Frequency

videotape cameras/recorders. Cable ranked highest (56.3%) in regular experience by respondents. Rank ordering strengths of some other technologies was as follows: teletext (31.3%), satellite dishes (downlink) (18.8%), closed-circuit (13.3%), satellites (12.5%) and videotape cameras/recorders (12.5%) (Table 37).

At the Mechanical Engineering and Automation College, a majority of respondents indicated a lack of experience using animation, computer managed instruction (CMI), electronic mail, fiber optics, and modems. Regular experience strengths included: personal computers (81.3%), printers (62.5%), computer assisted design (CAD) (37.5%), LANs (33.3%), and computer assisted learning (CAL) (31.3%) (Table 38).

At the Mechanical Engineering and Automation College, a majority of respondents indicated a lack of experience using artificial intelligence, communications software, courseware

TABLE 37

TELEVISION TECHNOLOGY EXPERIENCE -
MECHANICAL ENGINEERING & AUTOMATION COLLEGE

QUESTIONS/ TECHNOLOGIES	NONE F	NONE VAL%	USED 1-3 TIMES F	USED 1-3 TIMES VAL%	USED 4-6 TIMES F	USED 4-6 TIMES VAL%	USED ONCE/MON F	USED ONCE/MON VAL%
10 Cable	4	25.0	2	12.5	1	6.3	9	56.3
11 Closed-Captioned	11	68.8	4	25.0	1	6.3	*	*
12 Closed-Circuit	8	53.3	5	33.3	*	*	2	13.3
13 Commercial Broadcast	11	68.8	3	18.8	1	6.3	1	6.3
14 Microwave (ITFS)	14	93.3	1	6.7	*	*	*	*
15 Public Broadcast	11	68.8	3	18.8	1	6.3	1	6.3
16 Sat. Dishes Downlink	10	62.5	2	12.5	1	6.3	3	18.8
17 Satellite Uplinks	13	81.3	1	6.3	2	12.5	*	*
18 Satellites	11	68.8	3	18.8	*	*	2	12.5
19 Slow Scan	14	87.5	1	6.3	*	*	1	6.3
20 Teletext	7	43.8	4	25.0	*	*	5	31.3
21 Video Teleconference	16	100.0	*	*	*	*	*	*
22 Videotape Cam/Record	3	18.8	9	56.3	2	12.5	2	12.5
23 Videotex	14	87.5	1	6.3	*	*	1	6.3

F=Frequency

TABLE 38

COMPUTER TECHNOLOGY EXPERIENCE -
MECHANICAL ENGINEERING & AUTOMATION COLLEGE

QUESTIONS/ TECHNOLOGIES	NONE F	NONE VAL%	USED 1-3 TIMES F	USED 1-3 TIMES VAL%	USED 4-6 TIMES F	USED 4-6 TIMES VAL%	USED ONCE/MON F	USED ONCE/MON VAL%
25 Animation	10	62.5	4	25.0	*	*	2	12.5
26 Comp Asst Design CAD	5	31.3	3	18.8	2	12.5	6	37.5
27 Comp Asst Instru CAI	6	37.5	5	31.3	1	6.3	4	25.0
28 Comp Asst Learn CAL	7	43.8	4	25.0	*	*	5	31.3
29 Comp Mngd Instru CMI	11	73.3	2	13.3	*	*	2	13.3
30 Database Searching	13	81.3	1	6.3	2	12.5	*	*

TABLE 38 (CONTINUED)

QUESTIONS/ TECHNOLOGIES	NONE F	NONE VAL%	USED 1-3 TIMES F	USED 1-3 TIMES VAL%	USED 4-6 TIMES F	USED 4-6 TIMES VAL%	USED ONCE/MON F	USED ONCE/MON VAL%
31 Electronic Mail	12	75.0	2	12.5	1	6.3	1	6.3
32 Fiber Optics	14	87.5	2	12.5	*	*	*	*
33 Graphics	7	43.8	5	31.3	3	18.8	1	6.3
34 Mainframes	6	37.5	6	37.5	4	25.0	*	*
35 Minicomputers	5	31.3	4	25.0	5	31.3	2	12.5
36 Modems	8	53.3	3	20.0	3	20.0	1	6.7
37 Multi-Media	7	43.8	6	37.5	*	*	3	18.8
38 Networks (LAN)	3	20.0	6	40.0	1	6.7	5	33.3
39 Personal Computers	2	12.5	1	6.3	*	*	13	81.3
40 Printers	3	18.8	*	*	3	18.8	10	62.5

F=Frequency

design, database management, expert systems, Hypercard, hypermedia, and programmed instruction technologies. Regular experience strengths included the following: word processors (43.8%), data processing (31.3%), desktop publishing (25%), and spreadsheets (25%). No respondent had experience using Hypercard (Table 39).

TABLE 39

COMPUTER SOFTWARE TECHNOLOGY EXPERIENCE - MECHANICAL ENGINEERING & AUTOMATION COLLEGE

QUESTIONS/ TECHNOLOGIES	NONE F	NONE VAL%	USED 1-3 TIMES F	USED 1-3 TIMES VAL%	USED 4-6 TIMES F	USED 4-6 TIMES VAL%	USED ONCE/MON F	USED ONCE/MON VAL%
42 Artif. Intelligence	13	81.3	1	6.3	1	6.3	1	6.3
43 Communications Soft.	8	53.3	6	40.0	*	*	1	6.7
44 Courseware Design	11	68.8	*	*	3	18.8	2	12.5
45 Data Processing	6	37.5	3	18.8	2	12.5	5	31.3
46 Database Management	10	66.7	2	13.3	2	13.3	1	6.7
47 Desktop Publishing	7	43.8	2	12.5	3	18.8	4	25.0
48 Expert Systems	12	75.0	2	12.5	*	*	2	12.5

TABLE 39 (CONTINUED)

QUESTIONS/ TECHNOLOGIES	NONE		USED 1-3 TIMES		USED 4-6 TIMES		USED ONCE/MON	
	F	VAL%	F	VAL%	F	VAL%	F	VAL%
49 Hypercard	15	100.0	*	*	*	*	*	*
50 Hypermedia	14	93.3	1	6.7	*	*	*	*
51 Programmed Instruct	13	86.7	2	13.3	*	*	*	*
52 Simulations	8	50.0	4	25.0	1	6.3	3	18.8
53 Spreadsheets	8	50.0	2	12.5	2	12.5	4	25.0
54 Word Processors	4	25.0	2	12.5	3	18.8	7	43.8

F=Frequency

At the Mechanical Engineering and Automation College, a majority of respondents indicated a lack of experience using bulletin boards, electronic blackboards, optical data disks, puppets, teletypewriters, video disks and virtual reality technologies. Regular experience strengths were as follows: charts (87.5%), manipulatives (62.5%), overhead transparencies (56.3%) and videotape cassettes (56.3%). No one indicated a lack of experience using charts, manipulatives or overhead transparencies (Table 40).

Teacher Training College

At the Teacher Training College, no one indicated experience with mobile cellular phones, speech synthesizers, and teleconferencing technologies, and a majority had no experience using short-wave radios. Regular experience strengths included: telephones (66.7%), audio cassettes (33.3%), audio cassette recorders (28.6%), and radios (14.3%) (Table 41).

At the Teacher Training College, no one had experience using commercial broadcast, microwave (ITFS), satellite uplinks, slow scan, video teleconferencing, and videotex, and a majority had no experience using closed-captioned, satellite dishes (downlink), satellites, and teletext. Regular experience strength were: satellite dishes (Downlink) (20%), teletext (20%), cable (16.7%), and public broadcast (16.7%) (Table 42).

TABLE 40

VISUAL TECHNOLOGY EXPERIENCE -
MECHANICAL ENGINEERING & AUTOMATION COLLEGE

QUESTIONS/ TECHNOLOGIES	NONE		USED 1-3 TIMES		USED 4-6 TIMES		USED ONCE/MON	
	F	VAL%	F	VAL%	F	VAL%	F	VAL%
56 16 MM Films	4	25.0	7	43.8	4	25.0	1	6.3
57 35 MM Slides	2	12.5	3	18.8	7	43.8	4	25.0
58 Bulletin Boards	14	87.5	2	12.5	*	*	*	*
59 Charts	*	*	1	6.3	1	6.3	14	87.5
60 Electr. Blackboards	14	87.5	2	12.5	*	*	*	*
61 Facsimile (FAX)	4	25.0	5	31.3	2	12.5	5	31.3
62 Field Trips	3	18.8	4	25.0	7	43.8	2	12.5
63 Filmstrips	3	18.8	7	43.8	3	18.8	3	18.8
64 Games	3	18.8	7	43.8	2	12.5	4	25.0
65 Globes	7	43.8	3	18.8	3	18.8	3	18.8
66 Manipulatives	*	*	1	6.3	5	31.3	10	62.5
67 Maps	8	50.0	2	12.5	3	18.8	3	18.8
68 Mock-Ups	3	18.8	5	31.3	5	31.3	3	18.8
69 Models	3	18.8	5	31.3	3	18.8	5	31.3
70 Optical Data Disks	13	81.3	1	6.3	2	12.5	*	*
71 Overhead Transpar	*	*	2	12.5	5	31.3	9	56.3
72 Posters	3	18.8	6	37.5	4	25.0	3	18.8
73 Print Correspondence	4	25.0	4	25.0	4	25.0	4	25.0
74 Puppets	11	68.8	4	25.0	1	6.3	*	*
75 Teletypewriters	13	81.3	*	*	2	12.5	1	6.3
76 Video Disks	14	87.5	1	6.3	1	6.3	*	*
77 Videotape Cassettes	1	6.3	1	6.3	5	31.3	9	56.3
78 Virtual Reality	12	85.7	2	14.3	*	*	*	*

F=Frequency

TABLE 41

AUDIO TECHNOLOGY EXPERIENCE - TEACHER TRAINING COLLEGE

QUESTIONS/ TECHNOLOGIES	NONE		USED 1-3 TIMES		USED 4-6 TIMES		USED ONCE/MON	
	F	VAL%	F	VAL%	F	VAL%	F	VAL%
1 Audio Cass Recorders	1	14.3	*	*	4	57.1	2	28.6
2 Audio Cassettes	1	16.7	*	*	3	50.0	2	33.3
3 Mobile Cellular Phone	4	100.0	*	*	*	*	*	*
4 Radios	1	14.3	3	42.9	2	28.6	1	14.3
5 Short-Wave Radios	3	60.0	1	20.0	1	20.0	*	*
6 Speech Synthesizers	5	100.0	*	*	*	*	*	*
7 Teleconferencing	5	100.0	*	*	*	*	*	*
8 Telephones	1	16.7	1	16.7	*	*	4	66.7

F=Frequency

TABLE 42

TELEVISION TECHNOLOGY EXPERIENCE - TEACHER TRAINING COLLEGE

QUESTIONS/ TECHNOLOGIES	NONE		USED 1-3 TIMES		USED 4-6 TIMES		USED ONCE/MON	
	F	VAL%	F	VAL%	F	VAL%	F	VAL%
10 Cable	1	16.7	2	33.3	2	33.3	1	16.7
11 Closed-Captioned	3	75.0	*	*	1	25.0	*	*
12 Closed-Circuit	3	50.0	*	*	3	50.0	*	*
13 Commercial Broadcast	4	100.0	*	*	*	*	*	*
14 Microwave (ITFS)	4	100.0	*	*	*	*	*	*
15 Public Broadcast	2	33.3	2	33.3	1	16.7	1	16.7
16 Sat. Dishes Downlink	3	60.0	1	20.0	*	*	1	20.0
17 Satellite Uplinks	5	100.0	*	*	*	*	*	*
18 Satellites	4	80.0	*	*	1	20.0	*	*
19 Slow Scan	5	100.0	*	*	*	*	*	*
20 Teletext	3	60.0	*	*	1	20.0	1	20.0
21 Video Teleconference	5	100.0	*	*	*	*	*	*
22 Videotape Cam/Record	2	28.6	2	28.6	3	42.9	*	*
23 Videotex	5	100.0	*	*	*	*	*	*

F=Frequency

At the Teacher Training College, no one indicated experience using fiber optics or modems, and a majority of respondents indicated no experience with any other computer technology except graphics, personal computers, and printers. Regular experience strengths were as follows: printers (50%), personal computers (42.9%), and multimedia (16.7%) (Table 43).

TABLE 43

COMPUTER TECHNOLOGY EXPERIENCE - TEACHER TRAINING COLLEGE

	NONE		USED 1-3 TIMES		USED 4-6 TIMES		USED ONCE/MON	
QUESTIONS/ TECHNOLOGIES	F	VAL%	F	VAL%	F	VAL%	F	VAL%
25 Animation	4	66.7	2	33.3	*	*	*	*
26 Comp Asst Design CAD	3	75.0	1	25.0	*	*	*	*
27 Comp Asst Instru CAI	4	66.7	1	16.7	1	16.7	*	*
28 Comp Asst Learn CAL	4	66.7	1	16.7	1	16.7	*	*
29 Comp Mngd Instru CMI	4	80.0	1	20.0	*	*	*	*
30 Database Searching	3	75.0	1	25.0	*	*	*	*
31 Electronic Mail	4	80.0	1	20.0	*	*	*	*
32 Fiber Optics	5	100.0	*	*	*	*	*	*
33 Graphics	3	42.9	1	14.3	3	42.9	*	*
34 Mainframes	4	66.7	2	33.3	*	*	*	*
35 Minicomputers	4	80.0	1	20.0	*	*	*	*
36 Modems	5	100.0	*	*	*	*	*	*
37 Multi-Media	5	83.3	*	*	*	*	1	16.7
38 Networks (LAN)	5	83.3	1	16.7	*	*	*	*
39 Personal Computers	1	14.3	2	28.6	1	14.3	3	42.9
40 Printers	1	16.7	1	16.7	1	16.7	3	50.0

F=Frequency

At the Teacher Training College, no one indicated having experience using artificial intelligence, courseware design, expert systems, Hypercard, or hypermedia technologies. A majority of respondents also lacked experience using communications software, data processing, database management, and simulation technologies. Regular experience strengths were: word processors (42.9%), spreadsheets (20%), desktop publishing (16.7%), and programmed instruction (16.7%) (Table 44).

TABLE 44

COMPUTER SOFTWARE TECHNOLOGY EXPERIENCE - TEACHER TRAINING COLLEGE

	NONE		USED 1-3 TIMES		USED 4-6 TIMES		USED ONCE/MON	
QUESTIONS/ TECHNOLOGIES	F	VAL%	F	VAL%	F	VAL%	F	VAL%
42 Artif. Intelligence	5	100.0	*	*	*	*	*	*
43 Communications Soft.	4	66.7	1	16.7	1	16.7	*	*
44 Courseware Design	5	100.0	*	*	*	*	*	*
45 Data Processing	3	60.0	2	40.0	*	*	*	*
46 Database Management	3	75.0	1	25.0	*	*	*	*
47 Desktop Publishing	3	50.0	2	33.3	*	*	1	16.7
48 Expert Systems	4	100.0	*	*	*	*	*	*
49 Hypercard	4	100.0	*	*	*	*	*	*
50 Hypermedia	4	100.0	*	*	*	*	*	*
51 Programmed Instruct	2	33.3	1	16.7	2	33.3	1	16.7
52 Simulations	3	75.0	1	25.0	*	*	*	*
53 Spreadsheets	2	40.0	1	20.0	1	20.0	1	20.0
54 Word Processors	1	14.3	3	42.9	*	*	3	42.9

F=Frequency

At the Teacher Training College, no one indicated experience using optical data disks or virtual reality technologies. A majority of respondents indicated a lack of experience using bulletin boards, electronic blackboards, teletypewriters, or video disks. Regular experience strengths were: overhead transparencies (71.4%), manipulatives (57.1%), maps (50%), videotape cassettes (42.9%), and print correspondence (40%) (Table 45).

TABLE 45

VISUAL TECHNOLOGY EXPERIENCE -
TEACHER TRAINING COLLEGE

	NONE		USED 1-3 TIMES		USED 4-6 TIMES		USED ONCE/MON	
QUESTIONS/ TECHNOLOGIES	F	VAL%	F	VAL%	F	VAL%	F	VAL%
56 16 MM Films	1	16.7	*	*	5	83.3	*	*
57 35 MM Slides	*	*	*	*	5	83.3	1	16.7
58 Bulletin Boards	5	83.3	1	16.7	*	*	*	*
59 Charts	1	16.7	1	16.7	2	33.3	2	33.3
60 Electr. Blackboards	3	75.0	1	25.0	*	*	*	*
61 Facsimile (FAX)	1	16.7	1	16.7	2	33.3	2	33.3
62 Field Trips	1	14.3	*	*	5	71.4	1	14.3
63 Filmstrips	*	*	*	*	4	66.7	2	33.3
64 Games	1	16.7	*	*	5	83.3	*	*
65 Globes	1	20.0	1	20.0	2	40.0	1	20.0
66 Manipulatives	1	14.3	*	*	2	28.6	4	57.1
67 Maps	2	33.3	*	*	1	16.7	3	50.0
68 Mock-Ups	2	33.3	2	33.3	2	33.3	*	*
69 Models	1	16.7	1	16.7	2	33.3	2	33.3
70 Optical Data Disks	5	100.0	*	*	*	*	*	*
71 Overhead Transpar	*	*	*	*	2	28.6	5	71.4
72 Posters	2	33.3	1	16.7	2	33.3	1	16.7
73 Print Correspondence	2	40.0	*	*	1	20.0	2	40.0
74 Puppets	2	33.3	*	*	2	33.3	2	33.3
75 Teletypewriters	3	60.0	1	20.0	1	20.0	*	*
76 Video Disks	4	80.0	*	*	*	*	1	20.0
77 Videotape Cassettes	*	*	1	14.3	3	42.9	3	42.9
78 Virtual Reality	4	100.0	*	*	*	*	*	*

F=Frequency

Data Analysis - Knowledge

Horticulture College

At the Horticulture College, a majority of respondents had no knowledge of speech synthesizers and teleconferencing. No one claimed a lack of knowledge of audio cassette recorders and audio cassettes. The knowledge strengths were: telephones (46.7%), radios (42.9%), and audio cassette recorders (40%) (Table 46).

TABLE 46

AUDIO TECHNOLOGY KNOWLEDGE - HORTICULTURE COLLEGE

	NONE		VERY LITTLE		SOME		A LOT	
QUESTIONS/ TECHNOLOGIES	F	VAL%	F	VAL%	F	VAL%	F	VAL%
1 Audio Cass Recorders	*	*	2	13.3	7	46.7	6	40.0
2 Audio Cassettes	*	*	2	12.5	9	56.3	5	31.3
3 Mobile Cellular Phone	5	33.3	3	20.0	5	33.3	2	13.3
4 Radios	1	7.1	1	7.1	6	42.9	6	42.9
5 Short-Wave Radios	5	31.3	3	18.8	5	31.3	3	18.8
6 Speech Synthesizers	14	93.3	*	*	*	*	1	6.7
7 Teleconferencing	8	57.1	2	14.3	3	21.4	1	7.1
8 Telephones	2	13.3	1	6.7	5	33.3	7	46.7

F=Frequency

At the Horticulture College, a majority of respondents had no knowledge of microwave (ITFS) and slow scan technologies. Knowledge strength was strongest in closed-captioned technology (46.7%). Others included: cable (37.5%), closed-circuit (33.3%), teletext (26.7%), satellite dishes (downlink), (26.7%) and public broadcast (25%). No one claimed a lack of knowledge of videotape cameras/ recorders (Table 47).

At the Horticulture College, a majority of respondents reported a lack of knowledge with electronic mail, fiber optics, and modems. Knowledge strengths were: electronic mail (13.3%), personal computers (13.3%), and mainframes (12.5%) (Table 48).

TABLE 47

TELEVISION TECHNOLOGY KNOWLEDGE - HORTICULTURE COLLEGE

	NONE		VERY LITTLE		SOME		A LOT	
QUESTIONS/ TECHNOLOGIES	F	VAL%	F	VAL%	F	VAL%	F	VAL%
10 Cable	1	6.3	3	18.8	6	37.5	6	37.5
11 Closed-Captioned	4	26.7	1	6.7	3	20.0	7	46.7
12 Closed-Circuit	2	13.3	4	26.7	4	26.7	5	33.3
13 Commercial Broadcast	2	13.3	5	33.3	5	33.3	3	20.0
14 Microwave (ITFS)	11	78.6	3	21.4	*	*	*	*
15 Public Broadcast	1	6.3	3	18.8	8	50.0	4	25.0
16 Sat. Dishes Downlink	3	20.0	2	13.3	6	40.0	4	26.7
17 Satellite Uplinks	7	46.7	3	20.0	3	20.0	2	13.3
18 Satellites	3	20.0	5	33.3	6	40.0	1	6.7
19 Slow Scan	10	66.7	4	26.7	1	6.7	*	*
20 Teletext	3	20.0	3	20.0	5	33.3	4	26.7
21 Video Teleconference	4	26.7	6	40.0	4	26.7	1	6.7
22 Videotape Cam/Record	*	*	5	33.3	7	46.7	3	20.0
23 Videotex	6	40.0	5	33.3	4	26.7	*	*

F=Frequency

TABLE 48

COMPUTER TECHNOLOGY KNOWLEDGE - HORTICULTURE COLLEGE

	NONE		VERY LITTLE		SOME		A LOT	
QUESTIONS/ TECHNOLOGIES	F	VAL%	F	VAL%	F	VAL%	F	VAL%
25 Animation	6	40.0	5	33.3	4	26.7	*	*
26 Comp Asst Design CAD	3	20.0	9	60.0	3	20.0	*	*
27 Comp Asst Instru CAI	1	6.3	11	68.8	4	25.0	*	*
28 Comp Asst Learn CAL	4	26.7	5	33.3	5	33.3	1	6.7
29 Comp Mngd Instru CMI	7	50.0	4	28.6	3	21.4	*	*
30 Database Searching	4	26.7	7	46.7	4	26.7	*	*

TABLE 48 (CONTINUED)

QUESTIONS/ TECHNOLOGIES	NONE F	NONE VAL%	VERY LITTLE F	VERY LITTLE VAL%	SOME F	SOME VAL%	A LOT F	A LOT VAL%
31 Electronic Mail	8	53.3	5	33.3	*	*	2	13.3
32 Fiber Optics	8	53.3	5	33.3	2	13.3	*	*
33 Graphics	3	20.0	7	46.7	5	33.3	*	*
34 Mainframes	2	12.5	10	62.5	2	12.5	2	12.5
35 Minicomputers	2	13.3	7	46.7	5	33.3	1	6.7
36 Modems	8	61.5	4	30.8	*	*	1	7.7
37 Multi-Media	7	50.0	6	42.9	1	7.1	*	*
38 Networks (LAN)	3	20.0	10	66.7	1	6.7	1	6.7
39 Personal Computers	2	13.3	5	33.3	6	40.0	2	13.3
40 Printers	2	14.3	5	35.7	6	42.9	1	7.1

F=Frequency

At the Horticulture College, a majority of respondents had no knowledge of expert systems, hypercard, and hypermedia. Knowledge strengths were as follows: spreadsheets (13.3%), word processors (7.1%), and desktop publishing (6.7%) (Table 49).

At the Horticulture College, no one responded with a lack of knowledge of charts, field trips, manipulatives, overhead transparencies, or videotape cassettes, and a majority of respondents had some level of knowledge in all visual technologies. Knowledge strengths included: overhead transparencies (68.8%), 35mm slides (46.7%), charts (46.7%), filmstrips (43.8%), field trips (40%), and posters (33.3%) (Table 50).

TABLE 49

COMPUTER SOFTWARE TECHNOLOGY KNOWLEDGE - HORTICULTURE COLLEGE

QUESTIONS/ TECHNOLOGIES	NONE		VERY LITTLE		SOME		A LOT	
	F	VAL%	F	VAL%	F	VAL%	F	VAL%
42 Artif. Intelligence	7	46.7	7	46.7	1	6.7	*	*
43 Communications Soft.	5	33.3	8	53.3	2	13.3	*	*
44 Courseware Design	7	43.8	6	37.5	3	18.8	*	*
45 Data Processing	1	7.1	6	42.9	7	50.0	*	*
46 Database Management	3	20.0	8	53.3	4	26.7	*	*
47 Desktop Publishing	3	20.0	5	33.3	6	40.0	1	6.7
48 Expert Systems	8	53.3	5	33.3	2	13.3	*	*
49 Hypercard	14	93.3	*	*	1	6.7	*	*
50 Hypermedia	14	93.3	1	6.7	*	*	*	*
51 Programmed Instruct	6	37.5	5	31.3	5	31.3	*	*
52 Simulations	5	33.3	8	53.3	2	13.3	*	*
53 Spreadsheets	3	20.0	6	40.0	4	26.7	2	13.3
54 Word Processors	2	14.3	6	42.9	5	35.7	1	7.1

F=Frequency

At the Horticulture College, no one responded with a lack of knowledge of charts, field trips, manipulatives, overhead transparencies, or videotape cassettes, and a majority of respondents had some level of knowledge in all visual technologies. Knowledge strengths included: overhead transparencies (68.8%), 35mm slides (46.7%), charts (46.7%), filmstrips (43.8%), field trips (40%), and posters (33.3%) (Table 50).

Mechanical Engineering and Automation College

At the Mechanical Engineering and Automation College, a majority of respondents indicated knowledge of all audio technologies. Knowledge strengths included: telephones (75%), audio cassette recorders (68.8%), audio cassettes

TABLE 50

VISUAL TECHNOLOGY KNOWLEDGE -
HORTICULTURE COLLEGE

	NONE		VERY LITTLE		SOME		A LOT	
QUESTIONS/ TECHNOLOGIES	F	VAL%	F	VAL%	F	VAL%	F	VAL%
56 16MM Films	3	20.0	4	26.7	6	40.0	2	13.3
57 35MM Slides	1	6.7	1	6.7	6	40.0	7	46.7
58 Bulletin Boards	6	40.0		40.0	2	13.3	1	6.7
59 Charts	*	*		26.7	4	26.7	7	46.7
60 Electr. Blackboards	6	40.0		40.0	3	20.0	*	*
61 Facsimile (FAX)	1	6.7		26.7	6	40.0	4	26.7
62 Field Trips	*	*		6.7	8	53.3	6	40.0
63 Filmstrips	1	6.3		6.3	7	43.8	7	43.8
64 Games	3	20.0		13.3	6	40.0	4	26.7
65 Globes	3	20.0		*	7	46.7	5	33.3
66 Manipulatives	*	*		6.7	9	60.0	5	33.3
67 Maps	1	6.3		6.3	9	56.3	5	31.3
68 Mock-Ups	1	6.7		26.7	6	40.0	4	26.7
69 Models	1	6.7		13.3	7	46.7	5	33.3
70 Optical Data Disks	6	42.9		21.4	4	28.6	1	7.1
71 Overhead Transpar	*	*		6.3	4	25.0	11	68.8
72 Posters	1	6.7		13.3	7	46.7	5	33.3
73 Print Correspondence	3	20.0		13.3	4	26.7	6	40.0
74 Puppets	6	42.9		21.4	2	14.3	3	21.4
75 Teletypewriters	2	13.3		33.3	6	40.0	2	13.3
76 Video Disks	6	40.0		33.3	4	26.7	*	*
77 Videotape Cassettes	*	*		12.5	8	50.0	6	37.5
78 Virtual Reality	7	46.7		20.0	*	*	5	33.3

F=Frequency

(68.8%), and radios (62.5%). No one indicated a lack of knowledge of audio cassette recorders or audio cassettes (Table 51).

TABLE 51

AUDIO TECHNOLOGY KNOWLEDGE -
MECHANICAL ENGINEERING & AUTOMATION COLLEGE

	NONE		VERY LITTLE		SOME		A LOT	
QUESTIONS/ TECHNOLOGIES	F	VAL%	F	VAL%	F	VAL%	F	VAL%
1 Audio Cass Recorders	*	*	*	*	5	31.3	11	68.8
2 Audio Cassettes	*	*	1	6.3	4	25.0	11	68.8
3 Mobile Cellular Phone	3	20.0	4	26.7	4	26.7	4	26.7
4 Radios	2	12.5	1	6.3	3	18.8	10	62.5
5 Short-Wave Radios	3	18.8	2	12.5	5	31.3	6	37.5
6 Speech Synthesizers	3	18.8	8	50.0	3	18.8	2	12.5
7 Teleconferencing	4	26.7	5	33.3	6	40.0	*	*
8 Telephones	1	6.3	*	*	3	18.8	12	75.0

F=Frequency

At the Mechanical Engineering and Automation College, a majority of respondents indicated a lack of knowledge of microwave (ITFS) and slow scan technologies. Knowledge strengths were: cable (43.8%), satellite dishes (Downlink) (31.3%), satellites (31.3%), closed-captioned (25%), closed-circuit (25%), commercial broadcast (25%), teletext (25%), and videotape cameras/recorders (25%). No one indicated a lack of knowledge of cable, public broadcast, teletext or videotape cameras/recorders (Table 52).

At the Mechanical Engineering and Automation College, a majority of respondents indicated knowledge of all computer technologies. Knowledge strengths were: personal computers (43.8%), computer assisted design (CAD) (37.5%), modems (26.7%), computer assisted learning (CAL) (25%), graphics (25%), and printers (25%) (Table 53).

At the Mechanical Engineering and Automation College, a majority of respondents indicated a lack of knowledge of Hypercard and hypermedia technologies. Knowledge strengths were: word processors (37.5%), desktop publishing (25%),

TABLE 52

TELEVISION TECHNOLOGY KNOWLEDGE -
MECHANICAL ENGINEERING & AUTOMATION COLLEGE

	NONE		VERY LITTLE		SOME		A LOT	
QUESTIONS/ TECHNOLOGIES	F	VAL%	F	VAL%	F	VAL%	F	VAL%
10 Cable	*	*	4	25.0	5	31.3	7	43.8
11 Closed-Captioned	4	25.0	4	25.0	4	25.0	4	25.0
12 Closed-Circuit	3	18.8	4	25.0	5	31.3	4	25.0
13 Commercial Broadcast	4	25.0	3	18.8	5	31.3	4	25.0
14 Microwave (ITFS)	8	53.3	4	26.7	2	13.3	1	6.7
15 Public Broadcast	*	*	3	18.8	10	62.5	3	18.8
16 Sat. Dishes Downlink	1	6.3	6	37.5	4	25.0	5	31.3
17 Satellite Uplinks	6	37.5	7	43.8	2	12.5	1	6.3
18 Satellites	3	18.8	3	18.8	5	31.3	5	31.3
19 Slow Scan	10	62.5	3	18.8	2	12.5	1	6.3
20 Teletext	*	*	5	31.3	7	43.8	4	25.0
21 Video Teleconference	7	43.8	7	43.8	2	12.5	*	*
22 Videotape Cam/Record	*	*	2	12.5	10	62.5	4	25.0
23 Videotex	5	31.3	4	25.0	5	31.3	2	12.5

F=Frequency

expert systems (18.8%), simulations (18.8%), courseware design (12.5%), and spreadsheets (12.5%) (Table 54).

At the Mechanical Engineering and Automation College, a majority of respondents indicated knowledge of all visual technologies. No one indicated a lack of knowledge of charts, field trips, manipulatives, mock-ups, models, and overhead transparencies. Knowledge strengths were: charts (62.5%), overhead transparencies (62.5%), globes (50%),

TABLE 53

COMPUTER TECHNOLOGY KNOWLEDGE - MECHANICAL ENGINEERING & AUTOMATION COLLEGE

	NONE		VERY LITTLE		SOME		A LOT	
QUESTIONS/ TECHNOLOGIES	F	VAL%	F	VAL%	F	VAL%	F	VAL%
25 Animation	2	12.5	6	37.5	5	31.3	3	18.8
26 Comp Asst Design CAD	2	12.5	5	31.3	3	18.8	6	37.5
27 Comp Asst Instru CAI	3	18.8	3	18.8	7	43.8	3	18.8
28 Comp Asst Learn CAL	4	25.0	3	18.8	5	31.3	4	25.0
29 Comp Mngd Instru CMI	4	26.7	5	33.3	5	33.3	1	6.7
30 Database Searching	4	25.0	7	43.8	5	31.3	*	*
31 Electronic Mail	7	43.8	3	18.8	4	25.0	2	12.5
32 Fiber Optics	3	18.8	9	56.3	1	6.3	3	18.8
33 Graphics	2	12.5	7	43.8	3	18.8	4	25.0
34 Mainframes	3	18.8	3	18.8	7	43.8	3	18.8
35 Minicomputers	2	12.5	6	37.5	5	31.3	3	18.8
36 Modems	7	46.7	2	13.3	2	13.3	4	26.7
37 Multi-Media	3	18.8	6	37.5	5	31.3	2	12.5
38 Networks (LAN)	3	20.0	3	20.0	7	46.7	2	13.3
39 Personal Computers	1	6.3	2	12.5	6	37.5	7	43.8
40 Printers	3	18.8	1	6.3	8	50.0	4	25.0

F=Frequency

TABLE 54

COMPUTER SOFTWARE TECHNOLOGY KNOWLEDGE - MECHANICAL ENGINEERING & AUTOMATION COLLEGE

	NONE		VERY LITTLE		SOME		A LOT	
QUESTIONS/ TECHNOLOGIES	F	VAL%	F	VAL%	F	VAL%	F	VAL%
42 Artif Intelligence	4	25.0	7	43.8	4	5.0	1	6.3
43 Communications Soft	6	40.0	4	26.7	4	26.7	1	6.7
44 Courseware Design	7	43.8	3	18.8	4	25.0	2	12.5

TABLE 54 (CONTINUED)

QUESTIONS/ TECHNOLOGIES	NONE		VERY LITTLE		SOME		A LOT	
	F	VAL%	F	VAL%	F	VAL%	F	VAL%
45 Data Processing	4	25.0	3	18.8	8	50.0	1	6.3
46 Database Management	4	26.7	6	40.0	4	26.7	1	6.7
47 Desktop Publishing	3	18.8	2	12.5	7	43.8	4	25.0
48 Expert Systems	5	31.3	7	43.8	1	6.3	3	18.8
49 Hypercard	2	75.0	3	18.8	1	6.3	*	*
50 Hypermedia	11	68.8	3	18.8	1	6.3	1	6.3
51 Programmed Instruct	8	50.0	6	37.5	1	6.3	1	6.3
52 Simulations	4	25.0	5	31.3	4	25.0	3	18.8
53 Spreadsheets	2	12.5	5	31.3	7	43.8	2	12.5
54 Word Processors	2	12.5	2	12.5	6	37.5	6	37.5

F=Frequency

TABLE 55

VISUAL TECHNOLOGY KNOWLEDGE -
MECHANICAL ENGINEERING & AUTOMATION COLLEGE

QUESTIONS/ TECHNOLOGIES	NONE		VERY LITTLE		SOME		A LOT	
	F	VAL%	F	VAL%	F	VAL%	F	VAL%
56 16 MM Films	2	12.5		25.0	7	43.8	3	18.8
57 35 MM Slides	2	12.5		12.5	5	31.3	7	43.8
58 Bulletin Boards	4	25.0		37.5	4	25.0	2	12.5
59 Charts	*	*		*	6	37.5	10	62.5
60 Electr. Blackboards	5	31.3		25.0	5	31.3	2	12.5
61 Facsimile (FAX)	1	6.3		12.5	9	56.3	4	25.0
62 Field Trips	*	*		18.8	7	43.8	6	37.5
63 Filmstrips	1	6.3		18.8	6	37.5	6	37.5
64 Games	2	12.5		*	10	62.5	4	25.0
65 Globes	1	6.3		6.3	6	37.5	8	50.0
66 Manipulatives	*	*		*	8	50.0	8	50.0
67 Maps	1	6.3		6.3	8	50.0	6	37.5
68 Mock-Ups	*	*		*	9	56.3	7	43.8
69 Models	*	*		*	10	62.5	6	37.5
70 Optical Data Disks	4	25.0		37.5	4	25.0	2	12.5
71 Overhead Transpar	*	*		6.3	5	31.3	10	62.5
72 Posters	1	6.3		*	7	43.8	8	50.0
73 Print Correspondence	2	12.5		6.3	9	56.3	4	25.0

TABLE 55 (CONTINUED)

	NONE		VERY LITTLE		SOME		A LOT	
QUESTIONS/ TECHNOLOGIES	F	VAL%	F	VAL%	F	VAL%	F	VAL%
74 Puppets	4	25.0		31.3	4	25.0	3	18.8
75 Teletypewriters	3	18.8		31.3	4	25.0	4	25.0
76 Video Disks	6	37.5		37.5	1	6.3	3	18.8
77 Videotape Cassettes	1	6.3		6.3	7	43.8	7	43.8
78 Virtual Reality	5	35.7		50.0	1	7.1	1	7.1

F=Frequency

manipulatives (50%), posters (50%), 35mm slides (43.8%), mock-ups (43.8%) and videotape cassettes (43.8%) (Table 55).

Teacher Training College

At the Teacher Training College, a majority of respondents indicated a lack of knowledge of short-wave radios. Knowledge strengths included: audio cassette recorders (71.4%), audio cassettes (66.7%), telephones (60%), radios (42.9%) and short-wave radios (20%)(Table 56).

At the Teacher Training College, no one indicated knowledge of microwave (ITFS) or slow scan technologies. A majority of respondents indicated a lack of knowledge of satellite uplinks, video teleconferencing, and videotex technologies. Knowledge strengths were: satellite dishes (downlink) (60%), cable (50%), and public broadcast (33.3%) (Table 57).

TABLE 56

AUDIO TECHNOLOGY KNOWLEDGE -
TEACHER TRAINING COLLEGE

	NONE		VERY LITTLE		SOME		A LOT	
QUESTIONS/ TECHNOLOGIES	F	VAL%	F	VAL%	F	VAL%	F	VAL%
1 Audio Cass Recorders	*	*	*	*	2	28.6	5	71.4
2 Audio Cassettes	*	*	*	*	2	33.3	4	66.7
3 Mobile Cellular Phone	2	40.0	2	40.0	1	20.0	*	*
4 Radios	*	*	*	*	4	57.1	3	42.9
5 Short-Wave Radios	3	60.0	*	*	1	20.0	1	20.0
6 Speech Synthesizers	2	40.0	2	40.0	1	20.0	*	*
7 Teleconferencing	2	40.0	2	40.0	1	20.0	*	*
8 Telephones	1	20.0	*	*	1	20.0	3	60.0

F=Frequency

TABLE 57

TELEVISION TECHNOLOGY KNOWLEDGE -
TEACHER TRAINING COLLEGE

	NONE		VERY LITTLE		SOME		A LOT	
QUESTIONS/ TECHNOLOGIES	F	VAL%	F	VAL%	F	VAL%	F	VAL%
10 Cable	*	*	*	*	3	50.0	3	50.0
11 Closed-Captioned	1	20.0	*	*	3	60.0	1	20.0
12 Closed-Circuit	1	16.7	*	*	4	66.7	1	16.7
13 Commercial Broadcast	2	40.0	1	20.0	2	40.0	*	*
14 Microwave (ITFS)	5	100.0	*	*	*	*	*	*
15 Public Broadcast	2	33.3	*	*	2	33.3	2	33.3
16 Sat. Dishes Downlink	1	20.0	*	*	1	20.0	3	60.0
17 Satellite Uplinks	3	60.0	1	20.0	1	20.0	*	*
18 Satellites	1	20.0	1	20.0	2	40.0	1	20.0
19 Slow Scan	5	100.0	*	*	*	*	*	*
20 Teletext	1	20.0	*	*	3	60.0	1	20.0
21 Video Teleconference	3	60.0	2	40.0	*	*	*	*
22 Videotape Cam/Record	1	14.3	1	14.3	3	42.9	2	28.6
23 Videotex	3	60.0	1	20.0	1	20.0	*	*

F=Frequency

At the Teacher Training College, a majority of respondents indicated a lack of knowledge of fiber optics and modems. Knowledge strengths included: mainframes (16.7%) and personal computers (14.3%) (Table 58).

At the Teacher Training College, no one indicated having knowledge of Hypercard or hypermedia. A majority of respondents had no knowledge of expert systems, simulations, or spreadsheet technologies. Knowledge strengths were: programmed instruction (16.7%) and word processors (14.3%) (Table 59).

TABLE 58

COMPUTER TECHNOLOGY KNOWLEDGE - TEACHER TRAINING COLLEGE

	NONE		VERY LITTLE		SOME		A LOT	
QUESTIONS/ TECHNOLOGIES	F	VAL%	F	VAL%	F	VAL%	F	VAL%
25 Animation	2	33.3	3	50.0	1	16.7	*	*
26 Comp Asst Design CAD	2	40.0	1	20.0	2	40.0	*	*
27 Comp Asst Instru CAI	1	16.7	2	33.3	3	50.0	*	*
28 Comp Asst Learn CAL	1	16.7	2	33.3	3	50.0	*	*
29 Comp Mngd Instru CMI	1	20.0	3	60.0	1	20.0	*	*
30 Database Searching	1	25.0	3	75.0	*	*	*	*
31 Electronic Mail	3	50.0	3	50.0	*	*	*	*
32 Fiber Optics	4	80.0	*	*	1	20.0	*	*
33 Graphics	1	14.3	2	28.6	4	57.1	*	*
34 Mainframes	1	16.7	3	50.0	1	16.7	1	16.7
35 Minicomputers	2	40.0	1	20.0	2	40.0	*	*
36 Modems	4	80.0	1	20.0	*	*	*	*
37 Multi-Media	3	50.0	1	16.7	2	33.3	*	*
38 Networks (LAN)	1	16.7	2	33.3	3	50.0	*	*
39 Personal Computers	1	14.3	2	28.6	3	42.9	1	14.3
40 Printers	1	14.3	2	28.6	4	57.1	*	*

F=Frequency

TABLE 59

COMPUTER SOFTWARE TECHNOLOGY KNOWLEDGE -
TEACHER TRAINING COLLEGE

	NONE		VERY LITTLE		SOME		A LOT	
QUESTIONS/ TECHNOLOGIES	F	VAL%	F	VAL%	F	VAL%	F	VAL%
42 Artif. Intelligence	2	40.		60.0	*	*	*	*
43 Communications Soft.	1	16.		66.7	1	16.7	*	*
44 Courseware Design	2	40.		60.0	*	*	*	*
45 Data Processing	1	20.		40.0	2	40.0	*	*
46 Database Management	1	33.		66.7	*	*	*	*
47 Desktop Publishing	1	16.		16.7	4	66.7	*	*
48 Expert Systems	3	60.		40.0	*	*	*	*
49 Hypercard	5	100.		*	*	*	*	*
50 Hypermedia	5	100.		*	*	*	*	*
51 Programmed Instruct	1	16.		33.3	2	33.3	1	16.7
52 Simulations	3	75.		*	1	25.0	*	*
53 Spreadsheets	3	60.		20.0	1	20.0	*	*
54 Word Processors	1	14.		14.3	4	57.1	1	14.3

F=Frequency

At the Teacher Training College, a majority of respondents indicated a lack of knowledge of optical data disks, video disks, or virtual reality technologies. Knowledge strengths included: manipulatives (57.1%), 35mm slides (50%), charts (50%), globes (50%), puppets (50%), and field trips (42.9%) (Table 60).

In Part 1, the details of accessibility, experience and knowledge were examined for each college. In Part 2, data will be examined for a more global look at "coverage" (i.e., whether or not a technology is accessible internally or externally to the institution). It was also important to look at the experience and knowledge data in a more practical way. It was necessary to know about "any" and "regular" experience. "Any" experience referred to positive experience responses at any level other than none, and "regular" experience referred to used at least once a month. To better understand the knowledge levels at each of the

TABLE 60

VISUAL TECHNOLOGY KNOWLEDGE - TEACHER TRAINING COLLEGE

	NONE		VERY LITTLE		SOME		A LOT	
QUESTIONS/ TECHNOLOGIES	F	VAL%	F	VAL%	F	VAL%	F	VAL%
56 16 MM Films	*	*		33.3	4	66.7	*	*
57 35 MM Slides	*	*		16.7	2	33.3	3	50.0
58 Bulletin Boards	3	50.0		*	3	50.0	*	*
59 Charts	1	16.7		16.7	1	16.7	3	50.0
60 Electr. Blackboards	2	50.0		25.0	1	25.0	*	*
61 Facsimile (FAX)	*	*		16.7	4	66.7	1	16.7
62 Field Trips	1	14.3		*	3	42.9	3	42.9
63 Filmstrips	*	*		*	4	66.7	2	33.3
64 Games	1	16.7		*	5	83.3	*	*
65 Globes	1	16.7		*	2	33.3	3	50.0
66 Manipulatives	1	14.3		14.3	1	14.3	4	57.1
67 Maps	1	16.7		16.7	2	33.3	2	33.3
68 Mock-Ups	1	16.7		16.7	4	66.7	*	*
69 Models	1	16.7		16.7	3	50.0	1	16.7
70 Optical Data Disks	3	60.0		20.0	1	20.0	*	*
71 Overhead Transpar	*	*		*	5	71.4	2	28.6
72 Posters	2	33.3		*	3	50.0	1	16.7
73 Print Correspondence	2	40.0		*	2	40.0	1	20.0
74 Puppets	2	33.3		*	1	16.7	3	50.0
75 Teletypewriters	2	40.0		40.0	1	20.0	*	*
76 Video Disks	4	80.0		*	1	20.0	*	*
77 Videotape Cassettes	*	*		14.3	5	71.4	1	14.3
78 Virtual Reality	3	75.0		25.0	*	*	*	*

F=Frequency

colleges, both "high" knowledge and general "knowledge" were examined. "High" knowledge referred to the top level of A LOT, and general "knowledge" referred to all positive knowledge levels (used 1-3 times, used 4-6 times, and a lot).

Part 2 - Data Analyses Rationale

Accessibility Frequencies

From the accessibility frequency data at all three colleges, it was helpful to more closely examine the "positive" accessibility responses (in the area, in the college, in the department) for coverage. Clearly, it was more useful to have a technology accessible at either the college or department levels. These combined are referred to as "internal" accessibilities. Since IN THE AREA (referred to as "external") is non-specific, one cannot be sure from the responses whether these technologies were accessible nearby or not. It was therefore more reasonable to believe that college or department leveles were better levels of accessibility.

Therefore, each technology was examined for accessibility strengths and gaps at the "best" accessibility level (in the department), "internal" levels (in the college and in the department combined), and "external" levels (in the area). Particular attention was paid to the external accessibilities to the colleges' "weakest" technologies - those for which they had no internal accessibility.

Experience Frequencies

In looking at experience findings below, particular attention was paid to "regular" experience (i.e., used at least once a month), and then to "any" experience (i.e., used 1-3 times, used 4-6 times, and used at least once a month combined). When distance learning programs are being developed, and assuming the rectors choose the same individuals for development that participated in the survey, then it is important to know if there exists any experience whatsoever among the planners. Therefore, in the findings below, if a "college" was described as having experience in a particular technology, then the criteria for this conclusion was that "at least one respondent" had to respond positively. Since the tables below delt with frequencies and not valid percentages, the finding of "regular" or "any" experience was based on the existence of at least one individual. Group experience strengths were not be described here.

Knowledge Frequencies

As with experience frequencies, it was important to know if there existed individuals who would be participating in the development of distance learning programs and who had knowledge of the technologies that may be used. When discussions of findings where "high" knowledge levels or "knowledge" in general at a college were used, these were based on the fact that there existed at least one positive response in those levels queried. "High" knowledge levels referred to responses in the A LOT level, while "knowledge" in general referred to any positive response in any of the three possible levels (i.e., VERY LITTLE, SOME, and A LOT). Since a college's contribution to distance learning program development may very well depend on the knowledge of one or more experts in a particular technology, determining the existence of these people was very important. This was the reason, as with experience, of affording each college the maximum chance to identify their strengths - even if that expertise rested with a single individual.

The reader is reminded of the three research questions:

1. What is the accessibility of the infrastructure, i.e., hardware and software for planning and implementing distance education technologies within programs?
2. What is the knowledge of the planners about distance education technologies?
3. What experience do the planners have in using distance education technologies?

Data Analysis - Accessibility

At all three colleges, heavy accessibility of audio cassette recorders, audio cassettes, and telephones was found in the department. Short-wave radios were somewhat weaker, but still found at the same level in all three colleges. When college accessibility levels were included, mobile cellular phones and speech synthesizer technologies were accessible at both the Horticulture and Mechanical Engineering and Automation Colleges. Teleconferencing technologies were the strength of the Horticulture College.

For area responses, both the Horticulture and Mechanical Engineering and Automation Colleges had considerable connections and therefore increased accessibilities to technologies when compared to the Teacher Training College. In relation to its weaker technologies, the Teacher Training College had external accessibility to mobile cellular phones, but none to speech synthesizers and teleconferencing technologies. The Mechanical Engineering and Automation College had external access to its weakest technology, teleconferencing (Table 61).

At all three colleges, cable, satellite dishes (downlink), and videotape cameras/recorders were accessible at the department. When both college and department levels were combined, all three colleges had internal accessibility to cable, closed-circuit, public broadcast, satellite dishes (downlink), teletext, and videotape cameras/recorders. The Teacher Training College had no internal accessibility to closed-captioned, satellite uplinks, slow scan or videotex technologies. The Mechanical Engineering and Automation

TABLE 61

AUDIO TECHNOLOGY ACCESSIBILITY (FREQUENCIES)

	NOT ACCESS			IN THE AREA			IN THE COLL			IN THE DEPT		
QUESTIONS/TECHNOLOGIES	H	M	T	H	M	T	H	M	T	H	M	T
1 Audio Cass Recorders	2	*	1	*	1	*	4	1	1	9	14	5
2 Audio Cassettes	1	1	*	1	1	*	2	1	*	12	13	6
3 Mobile Cellular Phone	9	8	4	3	5	1	2	1	*	1	1	*
4 Radios	2	3	*	2	1	*	5	1	1	6	11	5
5 Short-Wave Radios	5	7	3	3	2	*	5	1	1	2	6	1
6 Speech Synthesizers	11	9	5	1	3	*	2	3	*	*	1	*
7 Teleconferencing	10	14	5	3	1	*	*	*	*	1	*	*
8 Telephones	1	1	1	*	1	*	3	*	1	10	14	4

H=Horticulture College.
M=Mechanical Engineering and Automation College
T=Teacher Training College

College had no internal accessibility to commercial broadcast and satellite uplinks. All three colleges had no internal accessibility to microwave (ITFS) and video teleconference technologies.

For area accessibilities, both the Horticulture and Mechanical Engineering and Automation Colleges had good connections in every television technology when compared to the Teacher Training College, who had accessibility outside the institution to closed-captioned (one of its weaker), public broadcast, and videotex (one of its weaker) technologies. In particular, both the Horticulture and Mechanical Engineering and Automation Colleges had external accessibility of all of their weakest technologies, while the Teacher Training College maintained no external accessibility to the following, all weaker technologies:

microwave (ITFS), satellite uplinks, slow scan, and video teleconferencing (Table 62).

TABLE 62

TELEVISION TECHNOLOGY ACCESSIBILITY (FREQUENCIES)

	NOT ACCESS			IN THE AREA			IN THE COLL			IN THE DEPT		
QUESTIONS/TECHNOLOGIES	H	M	T	H	M	T	H	M	T	H	M	T
10 Cable	3	2	2	3	6	*	6	6	2	2	2	2
11 Closed-Captioned	4	6	4	2	7	1	5	1	*	3	2	*
12 Closed-Circuit	7	8	5	3	5	*	3	1	1	1	2	*
13 Commercial Broadcast	1	8	4	10	8	*	2	*	1	1	*	*
14 Microwave (ITFS)	9	12	4	3	1	*	*	*	*	*	*	*
15 Public Broadcast	3	6	2	6	7	1	4	2	2	2	*	1
16 Sat. Dishes Downlink	5	8	4	3	6	*	5	1	*	1	1	1
17 Satellite Uplinks	11	11	5	2	5	*	1	*	*	*	*	*
18 Satellites	10	10	4	1	5	*	3	*	*	*	1	1
19 Slow Scan	10	12	5	2	1	*	2	1	*	*	1	*
20 Teletext	5	5	4	3	7	*	5	2	1	1	2	*
21 Video Teleconference	10	15	5	4	1	*	*	*	*	*	*	*
22 Videotape Cam/Record	1	1	1	1	4	*	11	9	3	1	2	3
23 Videotex	8	7	4	2	5	1	3	1	*	1	1	*

H=Horticulture College.
M=Mechanical Engineering and Automation College
T=Teacher Training College

At all three colleges, there was accessibility in the department to graphics, minicomputers, personal computers, and printers. When college and department levels were combined, all three colleges had internal accessibility to all computer technologies except fiber optics, which was exclusively internally accessible at the Mechanical Engineering and Automation College. Both the Horticulture and Mechanical Engineering and Automation Colleges were particularly strong at the department level for accessibility to CAD, CAI, CAL, graphics, minicomputers, personal computers, and printers. The Mechanical Engineering and Automation had additional accessibility strength in the department to LAN technologies, and the Teacher Training College strength was in accessibility to personal computers and printers.

Both the Horticulture and Mechanical Engineering and Automation Colleges had significant accessibilities to most computer technologies in the area, while the Teacher Training College had outside accessibility to CAL, CAI, CMI, and database searching technologies. Fiber optics technology was weakest in both the Horticulture and Teacher Training Colleges. While the Horticulture College had external accessibility to this technology, the Teacher Training College did not (Table 63).

TABLE 63

COMPUTER TECHNOLOGY ACCESSIBILITY (FREQUENCIES)

	NOT ACCESS			IN THE AREA			IN THE COLL			IN THE DEPT		
QUESTIONS/TECHNOLOGIES	H	M	T	H	M	T	H	M	T	H	M	T
25 Animation	6	5	1	4	4	*	4	4	4	*	3	1
26 Comp Asst Design CAD	5	1	2	*	1	*	4	5	3	4	9	*
27 Comp Asst Instru CAI	3	3	3	1	1	1	5	4	2	6	8	*
28 Comp Asst Learn CAL	5	4	2	*	1	1	5	5	3	4	5	*
29 Comp Mngd Instru CMI	8	10	3	3	2	1	1	*	1	2	2	*
30 Database Searching	3	9	2	2	5	1	4	1	1	5	*	*
31 Electronic Mail	8	10	4	3	3	*	3	1	1	*	1	*
32 Fiber Optics	11	9	5	3	3	*	*	2	*	*	1	*
33 Graphics	5	6	2	3	3	*	2	1	4	4	6	1
34 Mainframes	1	6	2	1	6	*	11	3	3	1	*	1

TABLE 63

	NOT ACCESS			IN THE AREA			IN THE COLL			IN THE DEPT		
QUESTIONS/TECHNOLOGIES	H	M	T	H	M	T	H	M	T	H	M	T
35 Minicomputers	4	4	2	1	1	*	1	4	2	8	5	1
36 Modems	8	8	4	2	1	*	2	2	1	*	2	*
37 Multi-Media	8	7	4	2	3	*	*	3	2	2	2	*
38 Networks (LAN)	4	4	1	*	*	*	8	4	5	2	6	*
39 Personal Computers	3	1	*	*	*	*	2	2	4	9	13	3
40 Printers	3	1	*	*	*	*	1	1	3	11	14	4

H=Horticulture College.
M=Mechanical Engineering and Automation College
T=Teacher Training College

All three colleges had accessibility in the department to data processing, desktop publishing, spreadsheets, and word processor technologies. When college and department levels were combined, all three colleges had internal accessibility to the above mentioned technologies plus programmed instruction and simulations technologies. The Teacher Training College had no internal accessibility to artificial intelligence, communications software, courseware design, and expert systems technologies. Both the Horticulture and Mechanical Engineering and Automation Colleges had internal accessibility to all computer software technologies. No college had internal accessibility to hypermedia, and only the Horticulture College had internal accessibility to Hypercard.

The Horticulture College had external accessibility to the computer software technology it lacked internal access to (hypermedia), while the Mechanical Engineering and Automation and Teacher Training Colleges lacked external accessibility to Hypercard. The Teacher Training College had external accessibility to database management and programmed instruction technologies, but to none of the remaining technologies it had no internal access to: artificial intelligence, communications software, courseware design, expert systems, and hypermedia (Table 64).

TABLE 64

COMPUTER SOFTWARE TECHNOLOGY ACCESSIBILITY (FREQUENCIES)

	NOT ACCESS			IN THE AREA			IN THE COLL			IN THE DEPT		
QUESTIONS/TECHNOLOGIES	H	M	T	H	M	T	H	M	T	H	M	T
42 Artif. Intelligence	8	10	4	2	*	*	3	3	*	1	2	*
43 Communications Soft.	7	6	6	2	3	*	5	2	*	*	2	*
44 Courseware Design	7	7	5	4	2	*	4	2	*	*	4	*
45 Data Processing	2	2	2	1	2	*	4	3	2	8	9	1
46 Database Management	3	7	1	1	2	2	8	3	1	2	3	*
47 Desktop Publishing	3	1	3	2	1	*	4	6	1	5	8	2
48 Expert Systems	8	5	4	3	1	*	3	5	*	*	4	*
49 Hypercard	11	14	4	2	*	*	1	*	*	*	*	*
50 Hypermedia	11	12	4	2	2	*	*	*	*	*	*	*
51 Programmed Instruct	6	12	3	5	*	1	2	1	1	1	*	1
52 Simulations	8	5	3	1	*	*	4	4	*	*	6	1
53 Spreadsheets	2	4	2	2	2	*	4	3	1	6	7	2
54 Word Processors	1	1	*	1	*	*	2	1	1	9	14	6

H=Horticulture College.
M=Mechanical Engineering and Automation College
T=Teacher Training College

All three colleges had accessibility in the department to all visual technologies except bulletin boards, electronic blackboards, facsimile, optical data disks, puppets, teletypewriters, video disks, and virtual reality technologies. When both college and department levels were combined, all three colleges had, in addition to the above mentioned technologies, internal accessibility to electronic blackboards, facsimile, and video disks. Both the Horticulture and Mechanical Engineering and Automation Colleges had internal accessibility to bulletin boards and virtual reality technologies, while the Mechanical Engineering and Automation had no internal accessibility to puppets. The Teacher Training College had no internal accessibility to bulletin boards and virtual reality technologies. All three colleges had accessibility strength in 35mm slides, charts, field trips, filmstrips, manipulatives, overhead transparencies, posters, print correspondence, and videotape cassettes. The Horticulture College had the most accessibility to virtual reality technologies.

The Mechanical Engineering and Automation College had external accessibility to puppets, and the Teacher Training College had external accessibility to bulletin boards, but not virtual reality technologies, their weakest technologies (Table 65).

Data Analysis - Experience

All three colleges (remember, "college" means one or more individuals at the college) had regular experience using audio cassette recorders, audio cassettes, radios, and

TABLE 65

VISUAL TECHNOLOGY ACCESSIBILITY (FREQUENCIES)

	NOT ACCESS			IN THE AREA			IN THE COLL			IN THE DEPT		
QUESTIONS/TECHNOLOGIES	H	M	T	H	M	T	H	M	T	H	M	T
56 16 MM Films	2	2	*	*	4	*	9	7	5	3	3	1
57 35 MM Slides	*	2	*	1	2	*	3	7	4	10	5	2
58 Bulletin Boards	6	7	5	6	7	1	2	*	*	*	1	*
59 Charts	*	*	1	3	*	*	3	1	1	10	15	4
60 Electr. Blackboards	7	8	3	6	5	*	1	2	1	*	*	*
61 Facsimile (FAX)	2	1	*	1	*	*	13	13	5	*	2	1
62 Field Trips	1	*	1	*	2	*	5	8	4	9	6	2
63 Filmstrips	1	2	*	1	1	*	3	7	2	11	6	4
64 Games	5	4	1	1	3	*	4	5	2	4	3	3
65 Globes	5	5	1	2	2	*	5	6	4	3	2	1
66 Manipulatives	*	*	1	1	1	*	3	2	1	11	12	5
67 Maps	1	3	1	*	2	*	4	8	4	11	2	1
68 Mock-Ups	2	1	2	2	3	*	5	4	3	5	8	1
69 Models	1	*	1	*	2	*	5	6	3	8	8	2
70 Optical Data Disks	6	5	4	3	4	*	1	4	1	2	1	*
71 Overhead Transpar	*	*	*	2	*	*	*	2	2	14	14	5
72 Posters	2	1	1	2	*	*	5	4	2	6	10	3
73 Print Correspondence	5	3	2	1	3	*	2	2	2	7	8	1
74 Puppets	8	8	2	4	7	*	1	*	1	1	*	3
75 Teletypewriters	3	6	2	1	2	*	10	7	3	1	*	*
76 Video Disks	6	7	4	3	2	*	4	3	1	*	1	*
77 Videotape Cassettes	1	*	*	1	2	1	4	2	2	10	12	4
78 Virtual Reality	7	8	4	1	2	*	*	2	*	6	*	*

H=Horticulture College.
M=Mechanical Engineering and Automation College
T=Teacher Training College

telephones. With all three experience levels included, only the Mechanical Engineering and Automation and Teacher Training Colleges had no experience whatsoever in some of the audio technologies: with teleconferencing, and with mobile cellular phones, speech synthesizers, and teleconferencing, respectively (Table 66).

TABLE 66

AUDIO TECHNOLOGY EXPERIENCE (FREQUENCIES)

	NO EXPERIENCE			1-3 TIMES			4-6 TIMES			AT LEAST 1/MON		
QUESTIONS/TECHNOLOGIES	H	M	T	H	M	T	H	M	T	H	M	T
1 Audio Cass Recorders	2	*	1	2	*	*	4	5	4	7	11	2
2 Audio Cassettes	1	*	1	3	1	*	5	5	3	7	10	2
3 Mobile Cellular Phon	10	8	4	2	5	*	1	2	*	1	*	*
4 Radios	3	1	1	*	4	3	3	3	2	9	8	1
5 Short-Wave Radios	6	4	3	3	5	1	2	1	1	4	5	*
6 Speech Synthesizers	12	11	5	1	5	*	1	*	*	*	*	*
7 Teleconferencing	13	15	5	1	*	*	*	*	*	*	*	*
8 Telephones	3	3	1	*	*	1	*	1	*	11	12	4

H=Horticulture College.
M=Mechanical Engineering and Automation College
T=Teacher Training College

All three colleges had regular experience using cable, public broadcast, satellite dishes (downlink), and teletext. When all three experience levels were included, the Mechanical Engineering and Automation College had no experience at all using Video Teleconferencing, and the Teacher Training College likewise had no experience using commercial broadcast, microwave (ITFS), satellite uplinks, slow scan, video teleconferencing, and videotex television technologies (Table 67).

All three colleges had regular experience using personal computers and printers. When all three experience levels were combined, all colleges had experience in every computertechnology except the following: at the Horticulture College - modems, and at the Teacher Training College - fiber optics and modems (Table 68).

TABLE 67

TELEVISION TECHNOLOGY EXPERIENCE (FREQUENCIES)

	NO EXPERIENCE			1-3 TIMES			4-6 TIMES			AT LEAST 1/MON		
QUESTIONS/TECHNOLOGIES	H	M	T	H	M	T	H	M	T	H	M	T
10 Cable	3	4	1	2	2	2	1	1	2	8	9	1
11 Closed-Captioned	4	11	3	1	4	*	2	1	1	7	*	*
12 Closed-Circuit	4	8	3	6	5	*	3	*	3	1	2	*
13 Commercial Broadcast	2	11	4	5	3	*	4	1	*	3	1	*
14 Microwave (ITFS)	11	14	4	2	1	*	*	*	*	*	*	*
15 Public Broadcast	1	11	2	5	3	2	2	1	1	7	1	1
16 Sat. Dishes Downlink	4	10	3	1	2	1	3	1	*	6	3	1
17 Satellite Uplinks	11	13	5	1	1	*	1	2	*	1	*	*
18 Satellites	7	11	4	1	3	*	2	*	1	4	2	*
19 Slow Scan	12	14	5	1	1	*	1	*	*	*	1	*
20 Teletext	5	7	3	5	4	*	2	*	1	2	5	1
21 Video Teleconference	13	16	5	1	*	*	*	*	*	*	*	*
22 Videotape Cam/Record	4	3	2	6	9	2	3	2	3	1	2	*
23 Videotex	12	14	5	1	1	*	1	*	*	*	1	*

H=Horticulture College.
M=Mechanical Engineering and Automation College
T=Teacher Training College

TABLE 68

COMPUTER TECHNOLOGY EXPERIENCE (FREQUENCIES)

	NO EXPERIENCE			1-3 TIMES			4-6 TIMES			AT LEAST 1/MON		
QUESTIONS/TECHNOLOGIES	H	M	T	H	M	T	H	M	T	H	M	T
25 Animation	13	10	4	1	4	2	*	*	*	*	2	*
26 Comp Asst Design CAD	11	5	3	3	3	1	*	2	*	*	6	*
27 Comp Asst Instru CAI	8	6	4	4	5	1	2	1	1	1	4	*
28 Comp Asst Learn CAL	8	7	4	4	4	1	2	*	1	*	5	*
29 Comp Mngd Instru CMI	12	11	4	2	2	1	*	*	*	*	2	*
30 Database Searching	5	13	3	8	1	1	1	2	*	*	*	*
31 Electronic Mail	13	12	4	1	2	1	*	1	*	*	1	*
32 Fiber Optics	13	14	5	1	2	*	*	*	*	*	*	*
33 Graphics	6	7	3	6	5	1	1	3	3	1	1	*

TABLE 68 (CONTINUED)

	NO EX-PERIENCE			1-3 TIMES			4-6 TIMES			AT LEAST 1/MON		
QUESTIONS/TECHNOLOGIES	H	M	T	H	M	T	H	M	T	H	M	T
34 Mainframes	7	6	4	7	6	2	1	4	*	*	*	*
35 Minicomputers	5	5	4	4	4	1	4	5	*	1	2	*
36 Modems	12	8	5	*	3	*	*	3	*	*	1	*
37 Multi-Media	10	7	5	2	6	*	1	*	*	*	3	1
38 Networks (LAN)	10	3	5	3	6	1	1	1	*	*	5	*
39 Personal Computers	4	2	1	2	1	2	4	*	1	5	13	3
40 Printers	4	3	1	4	*	1	2	3	1	4	10	3

H=Horticulture College.
M=Mechanical Engineering and Automation College
T=Teacher Training College

At all three colleges, there was regular experience using desktop publishing, spreadsheets, and word processors. When all three experience levels were combined, the Teacher Training College had no experience at all in artificial intelligence, courseware design, experts systems, and hypermedia computer software technologies. No college had experience using Hypercard (Table 69).

At all three colleges, there was regular experience using 35mm slides, charts, facsimile, field trips, filmstrips, manipulatives, maps, models, overhead transparencies, posters, print correspondence, and videotape cassettes. Regular strength was found at all three colleges in the use of charts, manipulatives, and overhead transparencies. When all three experience levels were combined, all colleges had experience using every visual

TABLE 69

COMPUTER SOFTWARE TECHNOLOGY EXPERIENCE (FREQUENCIES)

	NO EXPERIENCE			1-3 TIMES			4-6 TIMES			AT LEAST 1/MON		
QUESTIONS/TECHNOLOGIES	H	M	T	H	M	T	H	M	T	H	M	T
42 Artif. Intelligence	10	13	5	3	1	*	1	1	*	*	1	*
43 Communications Soft.	11	8	4	1	6	1	2	*	1	*	1	*
44 Courseware Design	12	11	5	3	*	*	*	3	*	*	2	*
45 Data Processing	5	6	3	2	3	2	5	2	*	3	5	*
46 Database Management	7	10	3	4	2	1	3	2	*	*	1	*
47 Desktop Publishing	8	7	3	4	2	2	*	3	*	2	4	1
48 Expert Systems	11	12	4	2	2	*	1	*	*	*	2	*
49 Hypercard	14	15	4	*	*	*	*	*	*	*	*	*
50 Hypermedia	14	14	4	*	1	*	1	*	*	*	*	*
51 Programmed Instruct	9	13	2	4	2	1	1	*	2	*	*	1
52 Simulations	12	8	3	1	4	1	*	1	*	1	3	*
53 Spreadsheets	5	8	2	3	2	1	3	2	1	3	4	1
54 Word Processors	4	4	1	5	2	3	2	3	*	2	7	3

H=Horticulture College.
M=Mechanical Engineering and Automation College
T=Teacher Training College

technology except the following: the Horticulture College had no experience using puppets and the Teacher Training College had no experience using optical data disks and virtual reality technologies (Table 70).

Data Analysis - Knowledge

At all three colleges (remember, "college" means one or more individuals at the college), there was a high level of knowledge of all technologies except at the Mechanical Engineering and Automation College (of teleconferencing) and at the Teacher Training College (of mobile cellular phones,

TABLE 70

VISUAL SOFTWARE TECHNOLOGY EXPERIENCE (FREQUENCIES)

	NO EXPERIENCE			1-3 TIMES			4-6 TIMES			AT LEAST 1/MON		
QUESTIONS/TECHNOLOGIES	H	M	T	H	M	T	H	M	T	H	M	T
56 16 MM Film	6	4	1	4	7	*	2	4	5	2	1	*
57 35 MM Slides	2	2	*	1	3	*	2	7	5	10	4	1
58 Bulletin Boards	11	14	5	2	2	1	1	*	*	*	*	*
59 Charts	1	*	1	3	1	1	1	1	2	11	14	2
60 Electr. Blackboards	12	14	3	2	2	1	*	*	*	*	*	*
61 Facsimile (FAX)	3	4	1	5	5	1	3	2	2	5	5	2
62 Field Trips	*	3	1	5	4	*	5	7	5	5	2	1
63 Filmstrips	1	3	*	2	7	*	5	3	4	8	3	2
64 Games	4	3	1	7	7	*	4	2	5	*	4	*
65 Globes	4	7	1	4	3	1	6	3	2	*	3	1
66 Manipulatives	*	*	1	1	1	*	5	5	2	9	10	4
67 Maps	2	8	2	4	2	*	5	3	1	5	3	3
68 Mock-Ups	4	3	2	3	5	2	4	5	2	3	3	*
69 Models	3	3	1	3	5	1	6	3	2	2	5	2
70 Optical Data Disks	10	13	5	*	1	*	2	2	*	1	*	*
71 Overhead Transpar	*	*	*	2	2	*	1	5	2	13	9	5
72 Posters	5	3	2	3	6	1	3	4	2	4	3	1
73 Print Correspondenc	6	4	2	2	4	*	4	4	1	3	4	2
74 Puppets	14	11	2	*	4	*	*	1	2	*	*	2
75 Teletypewriters	6	13	3	4	*	1	2	2	1	3	1	*
76 Video Disks	12	14	4	3	1	*	*	1	*	*	*	1
77 Videotape Cassettes	*	1	*	3	1	1	9	5	3	4	9	3
78 Virtual Reality	8	12	4	1	2	*	*	*	*	5	*	*

H=Horticulture College.
M=Mechanical Engineering and Automation College
T=Teacher Training College

speech synthesizers, and teleconferencing technologies). When all three knowledge levels were combined, at least one individual at each college was knowledgeable of every audio technology (Table 71).

TABLE 71

AUDIO TECHNOLOGY KNOWLEDGE (FREQUENCIES)

	NO EXPERIENCE			1-3 TIMES			4-6 TIMES			AT LEAST 1/MON		
QUESTIONS/TECHNOLOGIES	H	M	T	H	M	T	H	M	T	H	M	T
1 Audio Cass Recorders	*	*	*	2	*	*	7	5	2	6	11	5
2 Audio Cassettes	*	*	*	2	1	*	9	4	2	5	11	4
3 Mobile Cellular Phone	5	3	2	3	4	2	5	4	1	2	4	*
4 Radios	1	2	*	1	1	*	6	3	4	6	10	3
5 Short-Wave Radios	5	3	3	3	2	*	5	5	1	3	6	1
6 Speech Synthesizers	14	3	2	*	8	2	*	3	1	1	2	*
7 Teleconferencing	8	4	2	2	5	2	3	6	1	1	*	*
8 Telephones	2	1	1	1	*	*	5	3	1	7	12	3

H=Horticulture College.
M=Mechanical Engineering and Automation College
T=Teacher Training College

At all three colleges, there were high levels of knowledge of all technologies except the following: at the Horticulture College (microwave (ITFS), slow scan, and videotex), at the Mechanical Engineering and Automation College (video teleconferencing) and at the Teacher Training College (commercial broadcast, microwave (ITFS), satellite uplinks, slow scan, video teleconferencing, and videotex technologies). If all three knowledge levels were combined, the Teacher Training College had no knowledge of microwave (ITFS) and slow scan technologies (Table 72).

At all three colleges, there was a high level of knowledge of mainframes, personal computers, and printers. In addition, the Horticulture College had strong knowledge in CAL, electronic mail, minicomputers, modems, and LANs.

TABLE 72

TELEVISION TECHNOLOGY KNOWLEDGE (FREQUENCIES)

	NO KNOWLEDGE			VERY LITTLE			SOME			A LOT		
QUESTIONS/TECHNOLOGIES	H	M	T	H	M	T	H	M	T	H	M	T
10 Cable	1	*	*	3	4	*	6	5	3	6	7	3
11 Closed-Captioned	4	4	1	1	4	*	3	4	3	7	4	1
12 Closed-Circuit	2	3	1	4	4	*	4	5	4	5	4	1
13 Commercial Broadcast	2	4	2	5	3	1	5	5	2	3	4	*
14 Microwave (ITFS)	11	8	5	3	4	*	*	2	*	*	1	*
15 Public Broadcast	1	*	2	3	3	*	8	10	2	4	3	2
16 Sat. Dishes Downlink	3	1	1	2	6	*	6	4	1	4	5	3
17 Satellite Uplinks	7	6	3	3	7	1	3	2	1	2	1	*
18 Satellites	3	3	1	5	3	1	6	5	2	1	5	1
19 Slow Scan	10	10	5	4	3	*	1	2	*	*	1	*
20 Teletext	3	*	1	3	5	*	5	7	3	4	4	1
21 Video Teleconference	4	7	3	6	7	2	4	2	*	1	*	*
22 Videotape Cam/Record	*	*	1	5	2	1	7	10	3	3	4	2
23 Videotex	6	5	3	5	4	1	4	5	1	*	2	*

H=Horticulture College.
M=Mechanical Engineering and Automation College
T=Teacher Training College

The Mechanical Engineering and Automation College had strong knowledge levels of all computer technologies except database searching. The Teacher Training College had no high levels of knowledge of other computer technologies. If all three knowledge levels were combined, all three colleges had knowledge of all computer technologies (Table 73).

At all three colleges, there was a high level of knowledge of word processors. The Mechanical Engineering and Automation College had a high level of knowledge in every computer software technology except Hypercard; the Horticulture College had a high level of knowledge in

TABLE 73

COMPUTER TECHNOLOGY KNOWLEDGE (FREQUENCIES)

	NO KNOWLEDGE			VERY LITTLE			SOME			A LOT		
QUESTIONS/TECHNOLOGIES	H	M	T	H	M	T	H	M	T	H	M	T
25 Animation	6	2	2	5	6	3	4	5	1	*	3	*
26 Comp Asst Design CAD	3	2	2	9	5	1	3	3	2	*	6	*
27 Comp Asst Instru CAI	1	3	1	11	3	2	4	7	3	*	3	*
28 Comp Asst Learn CAL	4	4	1	5	3	2	5	5	3	1	4	*
29 Comp Mngd Instru CMI	7	4	1	4	5	3	3	5	1	*	1	*
30 Database Searching	4	4	1	7	7	3	4	5	*	*	*	*
31 Electronic Mail	8	7	3	5	3	3	*	4	*	2	2	*
32 Fiber Optics	8	3	4	5	9	*	2	1	1	*	3	*
33 Graphics	3	2	1	7	7	2	5	3	4	*	4	*
34 Mainframes	2	3	1	10	3	3	2	7	1	2	3	1
35 Minicomputers	2	2	2	7	6	1	5	5	2	1	3	*
36 Modems	8	7	4	4	2	1	*	2	*	1	4	*
37 Multi-Media	7	3	3	6	6	1	1	5	2	*	2	*
38 Networks (LAN)	3	3	1	10	3	2	1	7	3	1	2	*
39 Personal Computers	2	1	1	5	2	2	6	6	3	2	7	1
40 Printers	2	3	1	5	1	2	6	8	4	1	4	*

H=Horticulture College.
M=Mechanical Engineering and Automation College
T=Teacher Training College

desktop publishing and spreadsheets, and the Teacher Training College in programmed instruction. If all three knowledge levels were combined, the Teacher Training College had no knowledge of Hypercard or hypermedia technologies. The other colleges had knowledge of all computer software technologies (Table 74).

TABLE 74

COMPUTER SOFTWARE TECHNOLOGY KNOWLEDGE (FREQUENCIES)

	NO KNOW-LEDGE			VERY LITTLE			SOME			A LOT		
QUESTIONS/TECHNOLOGIES	H	M	T	H	M	T	H	M	T	H	M	T
42 Artif. Intelligence	7	4	2	7	7	3	1	4	*	*	1	*
43 Communications Soft.	5	6	1	8	4	4	2	4	1	*	1	*
44 Courseware Design	7	7	2	6	3	3	3	4	*	*	2	*
45 Data Processing	1	4	1	6	3	2	7	8	2	*	1	*
46 Database Management	3	4	1	8	6	2	4	4	*	*	1	*
47 Desktop Publishing	3	3	1	5	2	1	6	7	4	1	4	*
48 Expert Systems	8	5	3	5	7	2	2	1	*	*	3	*
49 Hypercard	14	12	5	*	3	*	1	1	*	*	*	*
50 Hypermedia	14	11	5	1	3	*	*	1	*	*	1	*
51 Programmed Instruct	6	8	1	5	6	2	5	1	2	*	1	1
52 Simulations	5	4	3	8	5	*	2	4	1	*	3	*
53 Spreadsheets	3	2	3	6	5	1	4	7	1	2	2	*
54 Word Processors	2	2	1	6	2	1	5	6	4	1	6	1

H=Horticulture College.
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T=Teacher Training College

At all three colleges, there was a high level of knowledge of all visual technologies except: electronic blackboards at the Horticulture College and 16mm films, bulletin boards, electronic blackboards, games, mock-ups, optical data disks, teletypewriters, and virtual reality at the Teacher Training College. The Mechanical Engineering and Automation College had high levels of knowledge in all visual technologies. High knowledge level strengths at all three colleges were found in 35mm slides, charts, field trips, filmstrips, globes, manipulatives, maps, overhead transparencies, and videotape cassettes. If all three knowledge levels were combined, all three colleges had knowledge of all visual technologies (Table 75).

TABLE 75

VISUAL TECHNOLOGY KNOWLEDGE (FREQUENCIES)

	NO KNOW-LEDGE			VERY LITTLE			SOME			A LOT		
QUESTIONS/TECHNOLOGIES	H	M	T	H	M	T	H	M	T	H	M	T
56 16 MM Films	3	2	*	4	4	2	6	7	4	2	3	*
57 35 MM Slides	1	2	*	1	2	1	6	5	2	7	7	3
58 Bulletin Boards	6	4	3	6	6	*	2	4	3	1	2	*
59 Charts	*	*	1	4	*	1	4	6	1	7	10	3
60 Electr. Blackboards	6	5	2	6	4	1	3	5	1	*	2	*
61 Facsimile (FAX)	1	1	*	4	2	1	6	9	4	4	4	1
62 Field Trips	*	*	1	1	3	*	8	7	3	6	6	3
63 Filmstrips	1	1	*	1	3	*	7	6	4	7	6	2
64 Games	3	2	1	2	*	*	6	10	5	4	4	*
65 Globes	3	1	1	*	1	*	7	6	2	5	8	3
66 Manipulatives	*	*	1	1	*	1	9	8	1	5	8	4
67 Maps	1	1	1	1	1	1	9	8	2	5	6	2
68 Mock-Ups	1	*	1	4	*	1	6	9	4	4	7	*
69 Models	1	*	1	2	*	1	7	10	3	5	6	1
70 Optical Data Disks	6	4	3	3	6	1	4	4	1	1	2	*
71 Overhead Transpar	*	*	*	1	1	*	4	5	5	11	10	2
72 Posters	1	1	2	2	*	*	7	7	3	5	8	1
73 Print Correspondence	3	2	2	2	1	*	4	9	2	6	4	1
74 Puppets	6	4	2	3	5	*	2	4	1	3	3	3
75 Teletypewriters	2	3	2	5	5	2	6	4	1	2	4	*
76 Video Disks	6	6	4	5	6	*	4	1	1	*	3	*
77 Videotape Cassettes	*	1	*	2	1	1	8	7	5	6	7	1
78 Virtual Reality	7	5	3	3	7	1	*	1	*	5	1	*

H=Horticulture College.
M=Mechanical Engineering and Automation College
T=Teacher Training College

In the previous section, a broader perspective was gained. In Part 3, majority and significant non-majority opinions were taken more into account. The "highest" valid percentage values from previous tables were extracted and assigned abbreviations for ease of discussion. By examining these "highest" assigned levels, general accessibility, experience, and knowledge conditions may be inferred on the respective non-surveyed college faculty/staff populations.

Part 3 - Data Analysis Rationale

Assigned Highest Accessibility Levels

In the "highest level of accessibility" tables, both valid percentages and accessibility level assignments are shown. These were extracted from previous tables for easier overall descriptions of findings across colleges. In the findings below, only the assigned levels from the tables were examined, even though the highest valid percentage for each technology was included. Valid percentage findings were described earlier, so that will not be repeated.

In these tables, the following abbreviations were assigned:

DEPT - In the Department
COLL - In the College
AREA - In the Area
NOT - Not Accessible
DE/CO - Tie Between Department and College
DE/AR - Tie Between Department and Area
CO/AR - Tie Between College and Area

For accessibility assignment levels to be included in the tables, they had to represent the highest valid percentage found for a particular technology.

Frequencies of levels were used to determine percentages. In case of ties between levels (i.e., DE/CO, DE/AR or CO/AR), each was counted separately. For example, in the Highest Level of Accessibility - Audio Technologies table, there were 14 DEPT level assignments (where one comes from the DE/CO tie). There are a total of 26 Levels (24 plus 2 extra from the 2 ties). Therefore, 14/26(100)=54%. These accessibility level frequency averages give a broader picture of how technology categories were distributed across colleges. Since all three colleges will be collaborating on distance learning program development, it was anticipated that their combined technology inventories (as well as what they had access to outside the college) would be made available for joint-use and program development. Since there was no way of knowing how much equipment there was access to or the times they were available (from accessibility responses), all level assignments must be considered, on average, to represent the range of possibilities of equipment number and availability. By averaging these Levels across technologies within levels, an average set of conditions were expected.

Assigned Highest Experience Levels

The inclusion of assigned experience levels followed the same rationale as for the accessibility data, and levels were given similar equal weightings. Experience level assignment averages yielded a broader picture of experience across colleges. Since training of planners will be necessary for any distance learning program development, knowing the overall experience of the respondents gave a better indication of the level where training must begin and what degree of depth was required. In the absence of contrary information, it would be reasonable to assume that the experience levels of the respondents (planners) were similar to the three faculties/staffs combined. Since distance learning programs impact others besides the intitial planners, and training will be necessary for these as well, knowing the broad experience levels will prove useful as a starting point for direction and training. The assigned abbreviations in the experience tables include:

ONCE - Used at Least Once a Month

FOUR - Used 4-6 Times

ONE - Used 1-3 Times

NONE - No Experience

ALL - Tie Between All Four Levels

1/ONC - Tie Between Used 1-3 Times and Used at Least Once a Month

4/ONC - Tie Between Used 4-6 Times and Used at Least Once a Month

13/46 - Tie Between Used 1-3 Times and Used 4-6 Times

Assigned Highest Knowledge Levels

The inclusion of assigned knowledge levels follows the same rationale as for the accessibility and experience data, and levels were given similar equal weightings. Knowledge level averages yield a broader picture of knowledge across colleges. Training needs can also be better determined if the knowledge level of any technology is determined beforehand. These broader knowledge levels are a good starting point for future planning, and are therefore useful as a first attempt to determine local conditions. And as with overall experience levels, it was reasonable to assume that the broader knowledge levels noted here would be indicative of the broader faculty/staffs of the combined colleges.

The assigned abbreviations found in the knowledge tables include:

ALOT - A Lot

SOME - Some

VERY - Very Little

NONE - No Knowledge

ALL - Tie Between All Levels

LO/SO - Tie Between a Lot and Some

LO/VL - Tie Between Very Little and a Lot

SO/VL - Tie Between Some and Very Little

The reader is reminded of the three research questions:

1. What is the accessibility of the infrastructure, i.e., hardware and software for planning and implementing distance education technologies within programs?

2. What is the knowledge of the planners about distance education technologies?

3. What experience do the planners have in using distance education technologies?

Data Analysis - Highest Accessibility

At all three colleges combined, 54% (14/26) of the combined audio technologies were found at the department level, 15% (4/26) at the college level, 23% (6/26) in the area, and 8% (2/26) were not accessible. Overall, 69% (18/26) of the technologies were internally accessible, and 23% (6/26) were externally accessible (Table 76).

TABLE 76

HIGHEST LEVEL OF ACCESSIBILITY - AUDIO TECHNOLOGIES

	HORTICULTURE		MECH ENGR		TEACHER TRNG	
QUESTIONS/ TECHNOLOGIES	H.L	H.V.%	H.L.	H.V%	H.L	H.V%
1 Audio Cass Recorders	DEPT	60.0	DEPT	87.5	DEPT	71.4
2 Audio Cassettes	DEPT	75.0	DEPT	81.3	DEPT	100.0
3 Mobile Cellular Phone	AREA	20.0	AREA	33.3	AREA	20.0
4 Radios	DEPT	40.0	DEPT	68.8	DEPT	83.3
5 Short-Wave Radios	COLL	33.3	DEPT	37.5	DE/CO	20.0
6 Speech Synthesizers	COLL	14.3	CO/AR	18.8	NOT	100.0
7 Teleconferencing	AREA	21.4	AREA	6.7	NOT	100.0
8 Telephones	DEPT	71.4	DEPT	87.5	DEPT	66.7

H.L.=Highest Level; H.V.%=Highest Valid Percent
DEPT=IN THE DEPARTMENT; COLL=IN THE COLLEGE; AREA=IN THE AREA; NOT=NOT ACCESSIBLE; CO/AR=COLL and AREA; DE/CO=DEPT and COLL

At all three colleges combined, 8% (4/48) of the combined television technologies were found at the department level, 38% (18/48) at the college level, 46% (22/48) in the area, and 8% (4/48) were not accessible. Overall, 46% (22/48) of the technologies were internally accessible, and 46% (22/48) were externally accessible (Table 77).

TABLE 77

HIGHEST LEVEL OF ACCESSIBILITY - TELEVISION TECHNOLOGIES

	HORTICULTURE		MECH ENGR		TEACHER TRNG	
QUESTIONS/ TECHNOLOGIES	H.L	H.V.%	H.L.	H.V%	H.L	H.V%
10 Cable	COLL	42.9	CO/AR	37.5	DE/CO	33.3
11 Closed-Captioned	COLL	35.7	AREA	43.8	AREA	20.0
12 Closed-Circuit	CO/AR	21.4	AREA	31.3	COLL	16.7
13 Commercial Broadcast	AREA	71.4	AREA	50.0	COLL	20.0
14 Microwave (ITFS)	AREA	25.0	AREA	7.7	NOT	100.0
15 Public Broadcast	AREA	40.0	AREA	46.7	COLL	33.3
16 Sat. Dishes Downlink	COLL	35.7	AREA	37.5	DEPT	20.0
17 Satellite Uplinks	AREA	14.3	AREA	31.3	NOT	100.0
18 Satellites	COLL	21.4	AREA	31.3	DEPT	20.0
19 Slow Scan	CO/AR	14.3	CO/AR	6.7	NOT	100.0
20 Teletext	COLL	35.7	AREA	43.8	COLL	20.0
21 Video Teleconference	AREA	28.6	AREA	6.3	NOT	100.0
22 Videotape Cam/Record	COLL	78.6	COLL	56.3	DE/CO	42.9
23 Videotex	COLL	21.4	AREA	35.7	AREA	20.0

H.L.=Highest Level; H.V.%=Highest Valid Percent
DEPT=IN THE DEPARTMENT; COLL=IN THE COLLEGE; AREA=IN THE AREA; NOT=NOT ACCESSIBLE; CO/AR=COLL and AREA; DE/CO=DEPT and COLL

At all three colleges combined, 32% (19/60) of the combined computer technologies were found at the department level, 41% (25/60) at the college level, 25% (15/60) in the area, and 2% (1/60) were not accessible. Overall, 72% (73/60) of the technologies were internally accessible, and 25% (15/60) were externally accessible (Table 78).

TABLE 78

HIGHEST LEVEL OF ACCESSIBILITY - COMPUTER TECHNOLOGIES

	HORTICULTURE		MECH ENGR		TEACHER TRNG	
QUESTIONS/ TECHNOLOGIES	H.L	H.V.%	H.L.	H.V%	H.L	H.V%
25 Animation	CO/AR	28.6	CO/AR	25.0	COLL	66.7
26 Comp Asst Design CAD	DE/CO	30.8	DEPT	56.3	COLL	60.0
27 Comp Asst Instru CAI	DEPT	40.0	DEPT	50.0	COLL	33.3
28 Comp Asst Learn CAL	COLL	35.7	DE/CO	33.3	COLL	50.0
29 Comp Mngd Instru CMI	AREA	21.4	DE/AR	14.3	CO/AR	20.0
30 Database Searching	DEPT	35.7	AREA	33.3	CO/AR	25.0
31 Electronic Mail	CO/AR	21.4	AREA	20.0	COLL	20.0
32 Fiber Optics	AREA	21.4	AREA	20.0	NOT	100.0
33 Graphics	DEPT	28.6	DEPT	37.5	COLL	57.1
34 Mainframes	COLL	78.6	AREA	40.0	COLL	50.0
35 Minicomputers	DEPT	57.1	DEPT	35.7	COLL	40.0
36 Modems	CO/AR	16.7	DE/CO	15.4	COLL	20.0
37 Multi-Media	DE/AR	16.7	CO/AR	20.0	COLL	33.3
38 Networks (LAN)	COLL	57.1	DEPT	42.9	COLL	83.3
39 Personal Computers	DEPT	64.3	DEPT	81.3	COLL	57.1
40 Printers	DEPT	73.3	DEPT	87.5	DEPT	57.1

H.L.=Highest Level; H.V.%=Highest Valid Percent
DEPT=IN THE DEPARTMENT; COLL=IN THE COLLEGE; AREA=IN THE AREA; NOT=NOT ACCESSIBLE; DE/AR=DEPT and AREA; CO/AR=COLL and AREA; DE/CO=DEPT and COLL

At all three colleges combined, 30% (18/42) of the combined computer software technologies were found at the department level, 42% (25/42) at the college level, 25% (15/42) in the area, and 0% (0/42) were not accessible. Overall, 72% (43/42) of the technologies were internally accessible, and 25% (15/42) were externally accessible (Table 79).

TABLE 79

HIGHEST LEVEL OF ACCESSIBILITY - COMPUTER SOFTWARE TECHNOLOGIES

	HORTICULTURE		MECH ENGR		TEACHER TRNG	
QUESTIONS/ TECHNOLOGIES	H.L	H.V.%	H.L.	H.V%	H.L	H.V%
42 Artif. Intelligence	COLL	21.4	COLL	20.0	NOT	100.0
43 Communications Soft	COLL	35.7	AREA	23.1	NOT	100.0
44 Courseware Design	CO/AR	26.7	DEPT	26.7	NOT	100.0
45 Data Processing	DEPT	53.3	DEPT	56.3	COLL	40.0
46 Database Management	COLL	57.1	DE/CO	20.0	AREA	50.0
47 Desktop Publishing	DEPT	35.7	DEPT	50.0	DEPT	33.3
48 Expert Systems	CO/AR	21.4	COLL	33.3	NOT	100.0
49 Hypercard	AREA	14.3	NOT	100.0	NOT	100.0
50 Hypermedia	AREA	15.4	AREA	14.3	NOT	100.0
51 Programmed Instruct	AREA	35.7	COLL	7.7	ALL	16.7
52 Simulations	COLL	30.8	DEPT	40.0	DEPT	25.0
53 Spreadsheets	DEPT	42.9	DEPT	43.8	DEPT	40.0
54 Word Processors	DEPT	69.2	DEPT	87.5	DEPT	85.7

H.L.=Highest Level; H.V.%=Highest Valid Percent
DEPT=IN THE DEPARTMENT; COLL=IN THE COLLEGE; AREA=IN THE AREA; NOT=NOT ACCESSIBLE; CO/AR=COLL and AREA; DE/CO=DEPT and COLL; ALL-all four levels

At all three colleges combined, 41% (30/73) of the combined visual technologies were found at the department level, 44% (32/73) at the college level, 14% (10/73) in the area, and 1% (1/73) were not accessible. Overall, 85% (62/73) of the technologies were internally accessible, and 14% (10/73) were externally accessible (Table 80).

TABLE 80

HIGHEST LEVEL OF ACCESSIBILITY - VISUAL TECHNOLOGIES

	HORTICULTURE		MECH ENGR		TEACHER TRNG	
QUESTIONS/ TECHNOLOGIES	H.L	H.V.%	H.L.	H.V%	H.L	H.V%
56 16 MM Films	COLL	64.3	COLL	43.8	COLL	83.3
57 35 MM Slides	DEPT	71.4	COLL	43.8	COLL	66.7
58 Bulletin Boards	AREA	42.9	AREA	46.7	AREA	16.7
59 Charts	DEPT	62.5	DEPT	93.8	DEPT	66.7
60 Electr. Blackboards	AREA	42.9	AREA	33.3	COLL	25.0
61 Facsimile (FAX)	COLL	81.3	COLL	81.3	COLL	83.3
62 Field Trips	DEPT	60.0	COLL	50.0	COLL	57.1
63 Filmstrips	DEPT	68.8	COLL	43.8	DEPT	66.7
64 Games	DE/CO	28.6	COLL	33.3	DEPT	50.0
65 Globes	COLL	33.3	COLL	40.0	COLL	66.7
66 Manipulatives	DEPT	73.3	DEPT	80.0	DEPT	71.4
67 Maps	DEPT	68.8	COLL	53.3	COLL	66.7
68 Mock-Ups	DE/CO	35.7	DEPT	50.0	COLL	50.0
69 Models	DEPT	57.1	DEPT	50.0	COLL	50.0
70 Optical Data Disks	AREA	25.0	CO/AR	28.6	COLL	20.0
71 Overhead Transpar	DEPT	87.5	DEPT	87.5	DEPT	71.4
72 Posters	DEPT	40.0	DEPT	66.7	DEPT	50.0
73 Print Correspondence	DEPT	46.7	DEPT	50.0	COLL	40.0
74 Puppets	AREA	28.6	AREA	46.7	DEPT	50.0
75 Teletypewriters	COLL	66.7	COLL	46.7	COLL	60.0
76 Video Disks	COLL	30.8	COLL	23.1	COLL	20.0
77 Videotape Cassettes	DEPT	62.5	DEPT	75.0	DEPT	57.1
78 Virtual Reality	DEPT	42.9	CO/AR	16.7	NOT	100.0

H.L.=Highest Level; H.V.%=Highest Valid Percent
DEPT=IN THE DEPARTMENT; COLL=IN THE COLLEGE; AREA=IN THE AREA; NOT=NOT ACCESSIBLE; CO/AR=COLL and AREA; DE/CO=DEPT and COLL

Data Analysis - Highest Experience

At all three colleges combined, respondents had experience using 41% (11/27) of the audio technologies, 15% (4/27) 4-6 times, 30% (8/27) 1-3 times, and 15% (4/27) not at all. Overall, 85% (23/27) of these technologies were used by respondents, and 15% (4/27) were not (Table 81).

TABLE 81

HIGHEST LEVEL OF EXPERIENCE - AUDIO TECHNOLOGIES

QUESTIONS/ TECHNOLOGIES	HORTICULTURE		MECH ENGR		TEACHER TRNG	
	H.L	H.V.%	H.L.	H.V%	H.L	H.V%
1 Audio Cass Recorders	ONCE	46.7	ONCE	68.8	FOUR	57.1
2 Audio Cassettes	ONCE	43.8	ONCE	62.5	FOUR	50.0
3 Mobile Cellular Phone	ONE	14.3	ONE	33.3	NONE	100.0
4 Radios	ONCE	60.0	ONCE	50.0	ONE	42.9
5 Short-Wave Radios	ONCE	26.7	1/ONC	33.3	13/46	20.0
6 Speech Synthesizer	13/46	7.1	ONE	31.3	NONE	100.0
7 Teleconferencing	ONE	7.1	NONE	100.0	NONE	100.0
8 Telephones	ONCE	78.6	ONCE	75.0	ONCE	66.7

H.L.=Highest Level; H.V.%=Highest Valid Percent
ONCE=USED AT LEAST ONCE A MONTH; FOUR=USED 4-6 TIMES; ONE= USED 1-3 TIMES; NONE=NO EXPERIENCE; 1/ONC=ONE and ONCE; 13/46=ONE and FOUR

At all three colleges combined, respondents had experience using 25% (13/52) of the television technologies, 19% (10/52) 4-6 times, 40% (21/52) 1-3 times, and 16% (8/52) not at all. Overall, 84% (44/52) of these technologies had been used by respondents, and 16% (8/52) had not (Table 82).

TABLE 82

HIGHEST LEVEL OF EXPERIENCE - TELEVISION TECHNOLOGIES

QUESTIONS/ TECHNOLOGIES	HORTICULTURE		MECH ENGR		TEACHER TRNG	
	H.L	H.V.%	H.L.	H.V%	H.L	H.V%
10 Cable	ONCE	57.1	ONCE	56.3	13/46	33.3
11 Closed-Captioned	ONCE	50.0	ONE	25.0	FOUR	25.0
12 Closed-Circuit	ONE	42.9	ONE	33.3	FOUR	50.0
13 Commercial Broadcast	ONE	35.7	ONE	18.8	NONE	100.0

TABLE 83

HIGHEST LEVEL OF EXPERIENCE -
COMPUTER TECHNOLOGIES

	HORTICULTURE		MECH ENGR		TEACHER TRNG	
QUESTIONS/ TECHNOLOGIES	H.L	H.V.%	H.L.	H.V%	H.L	H.V%
25 Animation	ONE	7.1	ONE	25.0	ONE	33.3
26 Comp Asst Design CAD	ONE	21.4	ONCE	37.5	ONE	25.0
27 Comp Asst Instru CAI	ONE	26.7	ONE	31.3	13/46	16.7
28 Comp Asst Learn CAL	ONE	28.6	ONCE	31.3	13/46	16.7
29 Comp Mngd Instru CMI	ONE	14.3	1/ONC	13.3	ONE	20.0
30 Database Searching	ONE	57.1	FOUR	12.5	ONE	25.0
31 Electronic Mail	ONE	7.1	ONE	12.5	ONE	20.0
32 Fiber Optics	ONE	7.1	ONE	12.5	NONE	100.0
33 Graphics	ONE	42.9	ONE	31.3	FOUR	42.9
34 Mainframes	ONE	46.7	ONE	37.5	ONE	33.3
35 Minicomputers	13/46	28.6	FOUR	31.3	ONE	20.0
36 Modems	NONE	100.0	13/46	20.0	NONE	100.0
37 Multi-Media	ONE	15.4	ONE	37.5	ONCE	16.7
38 Networks (LAN)	ONE	21.4	ONE	40.0	ONE	16.7
39 Personal Computers	ONCE	33.3	ONCE	81.3	ONCE	42.9
40 Printers	1/ONC	28.6	ONCE	62.5	ONCE	50.0

H.L.=Highest Level; H.V.%=Highest Valid Percent
ONCE=USED AT LEAST ONCE A MONTH; FOUR=USED 4-6 TIMES;
ONE= USED 1-3 TIMES; NONE=NO EXPERIENCE; 1/ONC=ONE and
ONCE; 13/46=ONE and FOUR

At all three colleges combined, respondents had experience using 32% (29/92) of the visual technologies, 34% (31/92) 4-6 times, 28% (26/92) 1-3 times, and 6% (6/92) not at all. Overall, 94% (86/92) of these technologies were used by respondents, and 6% (6/92) were not (Table 85).

Data Analysis - Highest Knowledge

At all three colleges combined, respondents had a lot of knowledge of 44% (12/27) of audio technologies, some of 37%

TABLE 84

HIGHEST LEVEL OF EXPERIENCE -
COMPUTER SOFTWARE TECHNOLOGIES

	HORTICULTURE		MECH ENGR		TEACHER TRNG	
QUESTIONS/ TECHNOLOGIES	H.L	H.V.%	H.L.	H.V%	H.L	H.V%
42 Artif. Intelligence	ONE	21.4	ALL	6.3	NONE	100.0
43 Communications Soft.	FOUR	14.3	ONE	40.0	13/46	16.7
44 Courseware Design	ONE	20.0	FOUR	18.8	NONE	100.0
45 Data Processing	FOUR	33.3	ONCE	31.3	ONE	40.0
46 Database Management	ONE	28.6	13/46	13.3	ONE	25.0
47 Desktop Publishing	ONE	28.6	ONCE	25.0	ONE	33.3
48 Expert Systems	ONE	14.3	1/ONC	12.5	NONE	100.0
49 Hypercard	NONE	100.0	NONE	100.0	NONE	100.0
50 Hypermedia	FOUR	6.7	ONE	6.7	NONE	100.0
51 Programmed Instruct	ONE	28.6	ONE	13.3	FOUR	33.3
52 Simulations	1/ONC	7.1	ON	25.0	ONE	25.0
53 Spreadsheets	ALL	21.4	ONCE	25.0	ALL	20.0
54 Word Processors	ONE	38.5	ONCE	43.8	1/ONC	42.9

H.L.=Highest Level; H.V.%=Highest Valid Percent
ONCE=USED AT LEAST ONCE A MONTH; FOUR=USED 4-6 TIMES;
ONE=USED 1-3 TIMES; NONE=NO EXPERIENCE; ALL=all four
levels; 1/ONC=ONE and ONCE; 13/46=ONE and FOUR

TABLE 85

HIGHEST LEVEL OF EXPERIENCE -
VISUAL TECHNOLOGIES

	HORTICULTURE		MECH ENGR		TEACHER TRNG	
QUESTIONS/ TECHNOLOGIES	H.L	H.V.%	H.L.	H.V%	H.L	H.V%
56 16 MM Film	ONE	28.6	ONE	43.8	FOUR	83.3
57 35 MM Slides	ONCE	66.7	FOUR	43.8	FOUR	83.3
58 Bulletin Boards	ONE	14.3	ONE	12.5	ONE	16.7
59 Charts	ONCE	68.8	ONCE	87.5	4/ONC	33.3
60 Electr. Blackboards	ONE	14.3	ONE	12.5	ONE	25.0
61 Facsimile (FAX)	1/ONC	31.3	1/ONC	31.3	4/ONC	33.3
62 Field Trips	ALL	33.3	FOUR	43.8	FOUR	71.4
63 Filmstrips	ONCE	50.0	ONE	43.8	FOUR	66.7
64 Games	ONE	46.7	ONE	43.8	FOUR	83.3
65 Globes	FOUR	42.9	ALL	18.8	FOUR	40.0
66 Manipulatives	ONCE	60.0	ONCE	62.5	ONCE	57.1

TABLE 85 (CONTINUED)

	HORTICULTURE		MECH ENGR		TEACHER TRNG	
QUESTIONS/ TECHNOLOGIES	H.L	H.V.%	H.L.	H.V%	H.L	H.V%
67 Maps	4/ONC	31.3	4/ONC	18.8	ONCE	50.0
68 Mock-Ups	FOUR	28.6	13/46	31.3	13/46	33.3
69 Models	FOUR	42.9	1/ONC	31.3	4/ONC	33.3
70 Optical Data Disks	FOUR	15.4	FOUR	12.5	NONE	100.0
71 Overhead Transpar	ONCE	81.3	ONCE	56.3	ONCE	71.4
72 Posters	ONCE	26.7	ONE	37.5	FOUR	33.3
73 Print Correspondence	FOUR	26.7	ALL	25.0	ONCE	40.0
74 Puppets	NONE	100.0	ONE	25.0	4/ONC	33.3
75 Teletypewriters	ONE	26.7	FOUR	12.5	13/46	20.0
76 Video Disks	ONE	20.0	13/46	6.3	ONCE	20.0
77 Videotape Cassettes	FOUR	56.3	ONCE	56.3	4/ONC	42.9
78 Virtual Reality	ONCE	35.7	ONE	14.3	NONE	100.0

H.L.=Highest Level; H.V.%=Highest Valid Percent
ONCE=USED AT LEAST ONCE A MONTH; FOUR=USED 4-6 TIMES; ONE= USED 1-3 TIMES; NONE=NO EXPERIENCE; ALL=all four levels; 1/ONC=ONE and ONCE; 4/ONC=FOUR and ONCE; 13/46=ONE and FOUR

(10/27), and very little of 19% (5/27)1. Overall, respondents knew of 100% (27/27) of these technologies (Table 86).

At all three colleges combined, respondents had a lot of knowledge of 17% (9/53) of the television technologies, some of 49% (26/53), very little of 28% (15/53), and none of 6% (3/53). Overall, respondents knew of 94% (50/53) of these technologies, and not of 6% (3/53) of the technologies (Table 87).

TABLE 86

HIGHEST LEVEL OF KNOWLEDGE - AUDIO TECHNOLOGIES

	HORTICULTURE		MECH ENGR		TEACHER TRNG	
QUESTIONS/ TECHNOLOGIES	H.L	H.V.%	H.L.	H.V%	H.L	H.V%
1 Audio Cass Recorders	SOME	46.7	ALOT	68.8	ALOT	71.4
2 Audio Cassettes	SOME	56.3	ALOT	68.8	ALOT	66.7
3 Mobile Cellular Phone	SOME	33.3	SO/VL	26.7	VERY	40.0
4 Radios	LO/SO	42.9	ALOT	62.5	SOME	57.1
5 Short-Wave Radio	SOME	31.3	ALOT	37.5	LO/SO	20.0
6 Speech Synthesizers	ALOT	6.7	VERY	50.0	VERY	40.0
7 Teleconferencing	SOME	21.4	SOME	40.0	VERY	40.0
8 Telephones	ALOT	46.7	ALOT	75.0	ALOT	60.0

H.L.=Highest Level; H.V.%=Highest Valid Percent
ALOT=A LOT; SOME=SOME; VERY=VERY LITTLE; LO/SO=ALOT and SOME; SO/VL=SOME and VERY LITTLE

TABLE 87

HIGHEST LEVEL OF KNOWLEDGE -
TELEVISION TECHNOLOGIES

	HORTICULTURE		MECH ENGR		TEACHER TRNG	
QUESTIONS/ TECHNOLOGIES	H.L	H.V.%	H.L.	H.V%	H.L	H.V%
10 Cable	LO/SO	37.5	ALOT	43.8	LO/SO	50.0
11 Closed-Captioned	ALOT	46.7	ALL	25.0	SOME	60.0
12 Closed-Circuit	ALOT	33.3	SOME	31.3	SOME	66.7
13 Commercial Broadcast	SO/VL	33.3	SOME	31.3	SOME	40.0
14 Microwave (ITFS)	VERY	21.4	VERY	26.7	NONE	100.0
15 Public Broadcast	SOME	50.0	SOME	62.5	LO/SO	33.3
16 Sat. Dishes Downlink	SOME	40.0	VERY	37.5	ALOT	60.0
17 Satellite Uplinks	SO/VL	20.0	VERY	43.8	SO/VL	20.0
18 Satellites	SOME	40.0	LO/SO	31.3	SOME	40.0
19 Slow Scan	VERY	26.7	VERY	18.8	NONE	100.0
20 Teletext	SOME	33.3	SOME	43.8	SOME	60.0
21 Video Teleconference	VERY	40.0	VERY	43.8	VERY	40.0
22 Videotape Cam/Record	SOME	46.7	SOME	62.5	SOME	42.9
23 Videotex	VERY	33.3	SOME	31.3	SO/VL	20.0

H.L.=Highest Level; H.V.%=Highest Valid Percent; ALOT=A LOT; SOME=SOME; VERY=VERY LITTLE; NONE=NO KNOWLEDGE; ALL=all levels; LO/SO=ALOT and SOME; SO/VL=SOME and VERY LITTLE

At all three colleges combined, respondents had a lot of knowledge of 6% (3/50) of computer technologies, some of 40% (20/50), and very little of 54% (27/50). Overall, respondents knew of 100% (50/50) of these technologies (Table 88).

TABLE 88

HIGHEST LEVEL OF KNOWLEDGE - COMPUTER TECHNOLOGIES

	HORTICULTURE		MECH ENGR		TEACHER TRNG	
QUESTIONS/ TECHNOLOGIES	H.L	H.V.%	H.L.	H.V%	H.L	H.V%
25 Animation	VERY	33.3	VERY	37.5	VERY	50.0
26 Comp Asst Design CAD	VERY	60.0	ALOT	37.5	SOME	40.0
27 Comp Asst Instru CAI	VERY	68.8	SOME	43.8	SOME	50.0
28 Comp Asst Learn CAL	SO/VL	33.3	SOME	31.3	SOME	50.0
29 Comp Mngd Instru CMI	VERY	28.6	SO/VL	33.3	VERY	60.0
30 Database Searching	VERY	46.7	VERY	43.8	VERY	75.0
31 Electronic Mail	VERY	33.3	SOME	25.0	VERY	50.0
32 Fiber Optics	VERY	33.3	VERY	56.3	SOME	20.0
33 Graphics	VERY	46.7	VERY	43.8	SOME	57.1
34 Mainframes	VERY	62.5	SOME	43.8	VERY	50.0
35 Minicomputers	VERY	46.7	VERY	37.5	SOME	40.0
36 Modems	VERY	30.8	ALOT	26.7	VERY	20.0
37 Multi-Media	VERY	42.9	VERY	37.5	SOME	33.3
38 Networks (LAN)	VERY	66.7	SOME	46.7	SOME	50.0
39 Personal Computers	SOME	40.0	ALOT	43.8	SOME	42.9
40 Printers	SOME	42.9	SOME	50.0	SOME	57.1

H.L.=Highest Level; H.V.%=Highest Valid Percent
ALOT=A LOT; SOME=SOME; VERY=VERY LITTLE; SO/VL=SOME and VERY LITTLE

At all three colleges combined, respondents had a lot of knowledge of 2% (1/45) of computer software technologies, some of 36% (16/45), very little of 58% (26/45), and none of 4% (2/45). Overall, respondents knew of 96% (43/45) of these technologies, and not of 4% (2/45) (Table 89).

TABLE 89

HIGHEST LEVEL OF KNOWLEDGE -
COMPUTER SOFTWARE TECHNOLOGIES

	HORTICULTURE		MECH ENGR		TEACHER TRNG	
QUESTIONS/ TECHNOLOGIES	H.L	H.V.%	H.L.	H.V%	H.L	H.V%
42 Artif. Intelligence	VERY	46.7	VERY	43.8	VERY	60.0
43 Communications Soft.	VERY	53.3	SO/VL	26.7	VERY	66.7
44 Courseware Design	VERY	37.5	SOME	25.0	VERY	60.0
45 Data Processing	SOME	50.0	SOME	50.0	SO/VL	40.0
46 Database Management	VERY	53.3	VERY	40.0	VERY	66.7
47 Desktop Publishing	SOME	40.0	SOME	43.8	SOME	66.7
48 Expert Syqtems	VERY	33.1	VERY	43.8	VERY	40.0
49 Hypercard	SOME	6.7	VERY	18.8	NONE	100.0
50 Hypermedia	VERY	6.7	VERY	18.8	NONE	100.0
51 Programmed Instruct	SO/VL	31.3	VERY	37.5	SO/VL	33.3
52 Simulations	VERY	53.3	VERY	31.3	SOME	25.0
53 Spreadsheets	VERY	40.0	SOME	43.8	SO/VL	20.0
54 Word Processors	VERY	42.9	LO/SO	37.5	SOME	57.1

H.L.=Highest Level; H.V.%=Highest Valid Percent
SOME=SOME; VERY=VERY LITTLE; NONE=NO KNOWLEDGE;
LO/SO=ALOT and SOME; SO/VL=SOME and VERY LITTLE

Part 4 - Section 1 - Data Analysis Rationale

Frequency Data

At all three colleges combined, respondents had a lot of knowledge of 28% (22/78) of visual technologies, some of 54% (42/78), and very little of 18% (14/78). Overall, respondents knew of 100% (78/78) of these technologies (Table 90).

When frequency data were combined within levels for each college across the broad technology categories, a lot of detail was certainly lost. But these are included below to

TABLE 90

HIGHEST LEVEL OF KNOWLEDGE -
VISUAL TECHNOLOGIES

	HORTICULTURE		MECH ENGR		TEACHER TRNG	
QUESTIONS/ TECHNOLOGIES	H.L	H.V.%	H.L.	H.V%	H.L	H.V%
56 16 MM Films	SOME	40.0	SOME	43.8	SOME	66.7
57 35 MM Slides	ALOT	46.7	ALOT	43.8	ALOT	50.0
58 Bulletin Boards	VERY	40.0	VERY	37.5	SOME	50.0
59 Charts	ALOT	46.7	ALOT	62.5	ALOT	50.0
60 Electr. Blackboards	VERY	40.0	SOME	31.3	SO/VL	25.0
61 Facsimile (FAX)	SOME	40.0	SOME	56.3	SOME	66.7
62 Field Trips	SOME	53.3	SOME	43.8	LO/SO	42.9
63 Filmstrips	LO/SO	43.8	LO/SO	37.5	SOME	66.7
64 Games	SOME	40.0	SOME	62.5	SOME	83.3
65 Globes	SOME	46.7	ALOT	50.0	ALOT	50.0
66 Manipulatives	SOME	60.0	LO/SO	50.0	ALOT	57.1
67 Maps	SOME	56.3	SOME	50.0	LO/SO	33.3
68 Mock-Ups	SOME	40.0	SOME	56.3	SOME	66.7
69 Models	SOME	46.7	SOME	62.5	SOME	50.0
70 Optical Data Disks	SOME	28.6	VERY	37.5	SO/VL	20.0
71 Overhead Transpar	ALOT	68.8	ALOT	62.5	SOME	71.4
72 Posters	SOME	46.7	ALOT	50.0	SOME	50.0
73 Print Correspondence	ALOT	40.0	SOME	56.3	SOME	40.0
74 Puppets	LO/VL	21.4	VERY	31.3	ALOT	50.0
75 Teletypewriters	SOME	40.0	VERY	31.3	VERY	40.0
76 Video Disks	VERY	33.3	VERY	37.5	SOME	20.0
77 Videotape Cassettes	SOME	50.0	LO/SO	43.8	SOME	71.4
78 Virtual Reality	ALOT	33.3	VERY	50.0	VERY	25.0

H.L.=Highest Level; H.V.%=Highest Valid Percent
ALOT=A LOT; SOME=SOME; VERY=VERY LITTLE; LO/SO=ALOT and SOME; LO/VL=VERY and ALOT; SO/VL=SOME and VERY

render a broader picture of accessibility, experience and knowledge levels. The frequencies below were extracted from previous tables and added for all technologies within technology categories for easier comparison.

The reader is reminded of the three research questions:

1. What is the accessibility of the infrastructure, i.e., hardware and software for planning and implementing distance education technologies within programs?
2. What is the knowledge of the planners about distance education technologies?
3. What experience do the planners have in using distance education technologies?

Data Analysis - Overall Accessibility

At all three colleges, within the broader context of complete technology categories, there is further evidence to suggest accessibility to most of the technologies included. Even though the survey respondents numbered differently at each of the three colleges, there was still a broad indication that taken together, accessibility was generally good, both internally and externally. When compared to one another, the Teacher Training College had consistently less access to the technologies, overall, when compared to either the Horticulture or Mechanical Engineering and Automation Colleges (Table 91).

Data Analysis - Overall Experience

The frequencies indicate that there was ample experience in general for the broader technology categories if all three colleges combined were considered. The Teacher Training College for the most part had less experience

TABLE 91

OVERALL TECHNOLOGY ACCESSIBILITY (FREQUENCY TOTALS)

	NOT ACCESS			IN THE AREA			IN THE COLL			IN THE DEPT		
CATEGORY	H	M	T	H	M	T	H	M	T	H	M	T
Audio	41	43	19	13	15	1	23	8	4	41	60	21
Television	87	111	53	45	68	3	50	24	10	13	14	8
Computer	85	88	37	25	34	4	53	42	39	58	77	11
Software	77	86	41	28	15	3	44	33	7	32	59	13
Visual	71	73	36	42	56	2	92	102	53	132	119	43

H=Horticulture College.
M=Mechanical Engineering and Automation College
T=Teacher Training College

overall than the other colleges in all technology categories (Table 92).

TABLE 92

OVERALL TECHNOLOGY EXPERIENCE
(FREQUENCY TOTALS)

	NO EX- PERIENCE			1-3 TIMES			4-6 TIMES			AT LEAST 1/MON		
CATEGORY	H	M	T	H	M	T	H	M	T	H	M	T
Television	87	111	53	45	68	3	50	24	10	13	14	8
Audio	50	42	21	12	20	5	16	17	10	39	46	9
Television	93	147	49	38	39	7	25	9	12	40	27	4
Computer	141	119	59	52	54	16	19	25	7	12	55	7
Software	122	129	43	32	27	12	19	17	4	11	30	6
Visual	114	139	42	64	75	11	70	69	48	93	83	32

H=Horticulture College.
M=Mechanical Engineering and Automation College
T=Teacher Training College

Data Analysis - Overall Knowledge

According to the frequency data, in general across the broader technology categories, the three colleges taken together had good knowledge levels. The Teacher Training had consistently less knowledge in the broader context of technology categories than the other two colleges (Table 93).

TABLE 93

OVERALL TECHNOLOGY KNOWLEDGE
(FREQUENCY TOTALS)

	NO KNOWLEDGE			VERY LITTLE			SOME			A LOT		
CATEGORY	H	M	T	H	M	T	H	M	T	H	M	T
Audio	35	16	10	14	21	6	40	33	13	31	56	16
Television	57	51	29	52	59	7	62	68	25	40	45	14
Computer	70	53	29	105	71	31	51	78	30	11	51	2
Software	78	72	29	71	56	21	42	52	15	4	26	2
Visual	58	45	31	63	58	15	125	142	58	101	121	30

H=Horticulture College.
M=Mechanical Engineering and Automation College
T=Teacher Training College

Part 4 - Section 2 - Data Analysis Rationale

Frequency Data

There were five broad technology categories surveyed - audio, television, computer, computer software, and visual. The researcher chose to select and divide the technologies, where appropriate, into advanced and less advanced categories. Under the television, computer, and computer software categories, there were no less advanced technologies. The breakdowns of audio and visual technology categories were as follows:

AUDIO - ADVANCED

3 Mobile Cellular Phone

6 Speech Synthesizers

7 Teleconferencing

AUDIO - LESS ADVANCED

1 Audio Cass Recorders

2 Audio Cassettes

4 Radios

5 Short-Wave Radios

8 Telephones

VISUAL - ADVANCED

60 Electr. Blackboards

61 Facsimile (FAX)

70 Optical Data Disks

76 Video Disks

78 Virtual Reality

VISUAL - LESS ADVANCED

56 16 MM Films

57 35 MM Slides

58 Bulletin Boards

59 Charts

62 Field Trips

63 Filmstrips

64 Games

65 Globes

66 Manipulatives

67 Maps

68 Mock-Ups

69 Models

71 Overhead Transpar

72 Posters

73 Print Correspondence

74 Puppets

75 Teletypewriters

77 Videotape Cassettes

When looking at the divided frequency totals, further insights are afforded when compared to the undivided technologies. Since the television, computer, and computer software categories were undivided, these data were not repeated again. Prior tables can be examined. There were approximately twice as many less advanced than advanced audio technologies, and approximately four times as many less advanced than advanced visual technologies after division. This information will be used below.

The reader is reminded of the three research questions:

1. What is the accessibility of the infrastructure, i.e., hardware and software for planning and implementing distance education technologies within programs?

2. What is the knowledge of the planners about distance education technologies?

3. What experience do the planners have in using distance education technologies?

Data Analysis - Overall Advanced/Less Advanced - Accessibility

In general for all three colleges, data indicated that the less advanced audio and visual category technologies were more accessible than their advanced counterparts. Under the NOT accessible columns, it may be seen that advanced audio technologies generally were less accessible than the less advanced audio technologies, and that the advanced visual technologies were generally more accessible than the less advanced visual technologies.

Because there were twice as many less advanced than advanced audio technologies, and there were four times as many less advanced than advanced visual technologies, it is necessary to consider doubling and quadrupling the number of advanced audio and visual frequencies, respectively, in order to balance the findings - just in case the numbers of advanced and less advanced technologies within a category were direct causes for the percentages seen. After doing so, all previous findings were still valid, except one: the advanced visual technologies were now less accessible than the less advanced visual technologies (Table 94).

TABLE 94

OVERALL ADVANCED/LESS ADVANCED TECHNOLOGY ACCESSIBILITY (FREQUENCY TOTALS)

	NOT ACCESS			IN THE AREA			IN THE COLL			IN THE DEPT		
CATEGORY	H	M	T	H	M	T	H	M	T	H	M	T
Audio												
Advanced	30	31	14	7	9	1	4	4	0	2	2	0
Less Adv	11	12	5	6	6	0	19	4	4	39	58	21
Visual												
Advanced	28	29	15	14	13	0	19	24	8	8	4	1
Less Adv	43	44	21	28	43	2	73	78	45	124	115	42

H=Horticulture College.
M=Mechanical Engineering and Automation College
T=Teacher Training College

Data Analysis - Overall Advanced/Less Advanced - Experience

There was more experience in general in using less advanced than advanced technologies. Under the No Experience columns, more respondents agreed that advanced visual technologies were generally experienced less than the advanced audio technologies, that less advanced audio technologies were generally experienced more than advanced audio technologies, and that advanced visual technologies were generally experienced more than less advanced visual technologies.

If doubling of the advanced audio technologies and quadrupling of the advanced visual technologies is done again, all previous findings were still valid, except one: that advanced visual technologies were generally experienced less than less advanced visual technologies (Table 95).

TABLE 95

OVERALL ADVANCED/LESS ADVANCED TECHNOLOGY EXPERIENCE (FREQUENCY TOTALS)

	NO EXPERIENCE			1-3 TIMES			4-6 TIMES			AT LEAST 1/MON		
CATEGORY	H	M	T	H	M	T	H	M	T	H	M	T
Audio												
Advanced	35	34	14	4	10	0	2	2	0	1	0	0
less Adv	15	8	7	8	10	5	14	15	10	38	46	9
Visual												
Advanced	45	57	17	11	11	2	5	5	2	11	5	3
less Adv	69	82	25	53	64	9	65	64	46	82	78	29

H=Horticulture College.
M=Mechanical Engineering and Automation College
T=Teacher Training College

Data Analysis - Overall Advanced/Less Advanced - Knowledge

From the frequencies, the respondents had more knowledge in general of the less advanced audio and visual than of their advanced counterparts. Based on the data seen under the no knowledge columns, the respondents agreed that they had more knowledge of less advanced audio technologies than with advanced audio technologies, and that they had more knowledge of less advanced visual technologies than with advanced visual technologies. If advanced audio and advanced visual technologies are doubled and quadrupled, respectively, all previous findings were still valid (Table 96).

TABLE 96

OVERALL ADVANCED/LESS ADVANCED TECHNOLOGY KNOWLEDGE (FREQUENCY TOTALS)

	NO KNOW-LEDGE			VERY LITTLE			SOME			A LOT		
CATEGORY	H	M	T	H	M	T	H	M	T	H	M	T
Audio												
Advanced	27	10	6	5	17	6	8	13	3	4	6	0
Less Adv	8	6	4	9	4	0	32	20	10	27	50	16
Visual												
Advanced	26	21	12	21	25	4	17	20	7	10	12	1
Less Adv	32	24	19	42	33	11	108	122	51	91	109	29

H=Horticulture College.
M=Mechanical Engineering and Automation College
T=Teacher Training College

Part 4 - Section 3 - Data Analysis Rationale

Valid Percentage Averages

The averages shown below were determined by averaging all valid percentage values of technologies for each college within the major survey categories: accessibility, experience, and knowledge. Averages are very general in nature, and the reader is cautioned that much detail is eliminated when dealing with such figures. But they do give a fairly accurate report of the broader picture of accessibility, experience, and knowledge potential. For each category average table below, both combined (advanced and less advanced), advanced, and less advanced audio and visual technologies are shown. The television, computer, and computer software categories could equally be referred to as combined, but they were not. In addition, the averages were ordered from highest to lowest to see if any patterns existed.

The reader is reminded of the three research questions:

1. What is the accessibility of the infrastructure, i.e., hardware and software for planning and implementing distance education technologies within programs?
2. What is the knowledge of the planners about distance education technologies?
3. What experience do the planners have in using distance education technologies?

Data Analysis - Overall Accessibility Averages

In general, the Horticulture and Mechanical Engineering and Automation Colleges had roughly equivalent levels of accessibility to all audio, computer, computer software, and visual technologies. The Horticulture College had higher accessibility than the Mechanical Engineering and Automation College to television technologies, while all three colleges had similar accessibility to all less advanced technologies. The teacher training college had less accessibility to all technologies when compared to the other two colleges, and the distinction was greater for advanced technologies. The accessibility levels from highest to lowest order for all three colleges were the same (with one exception):

LESS ADVANCED audio

LESS ADVANCED visual

COMBINED visual

COMBINED audio

computer

software

television

ADVANCED visual

ADVANCED audio

The exception is that at the Teacher Training College, the accessibility of computer technology was higher than combined audio technology (Table 97).

TABLE 97

OVERALL ACCESSIBILITY CATEGORY AVERAGES

CATEGORY	HORTICULTURE	MECHANICAL	TEACHER
Audio (Comb)	64.59	65.24	53.63
Audio (Adv)	30.00	32.37	6.67
Audio (Less Adv)	85.34	84.96	81.80
Television	54.96	48.21	25.41
Computer	60.87	62.71	56.54
Software	57.18	53.77	32.31
Visual (Comb)	78.02	78.04	69.84
Visual (Adv)	58.26	56.84	33.00
Visual (Less Adv)	83.51	83.93	80.07

Data Analysis - Overall Experience Averages

In general, the Horticulture College had more overall experience in using the television and advanced visual technologies; the Mechanical Engineering and Automation College had more experience in using all audio and computer technologies; the Horticulture and Mechanical Engineering and Automation Colleges had comparable experience in using computer software (though the Horticulture College was slightly higher) and less advanced visual technologies; all three colleges had comparable experience using visual technologies (combined and less advanced); the Teacher Training College had comparable experience with the Horticulture College in using computer technologies, comparable experience with the Mechanical Engineering and Automation College in using television and advanced visual technologies, and no experience in using advanced audio technologies (Table 98). The accessibility levels from highest to lowest order for all three colleges follows:

HORTICULTURE COLLEGE

LESS ADVANCED audio

LESS ADVANCED visual

COMBINED visual

COMBINED audio

television

software

computer

ADVANCED visual

ADVANCED audio

MECHANICAL ENGINEERING AND AUTOMATION COLLEGE

LESS ADVANCED audio

LESS ADVANCED visual

COMBINED audio

COMBINED visual

computer

software

television

ADVANCED visual

ADVANCED audio

TEACHER TRAINING COLLEGE

LESS ADVANCED visual

LESS ADVANCED audio

COMBINED visual

COMBINED audio

computer

software

television

ADVANCED visual

ADVANCED audio

TABLE 98

OVERALL EXPERIENCE CATEGORY AVERAGES

CATEGORY	HORTICULTURE	MECHANICAL	TEACHER
Audio (Comb)	56.13	65.76	47.25
Audio (Adv)	16.67	25.97	0.00
Audio (Less Adv)	79.80	89.64	75.60
Television	52.14	33.70	28.31
Computer	36.38	52.93	31.42
Software	41.63	36.05	29.67
Visual (Comb)	65.35	61.74	65.06
Visual (Adv)	36.30	26.60	25.66
Visual (Less Adv)	73.42	71.50	76.01

Data Analysis - Overall Knowledge Averages

In general, the Mechanical Engineering and Automation College had higher knowledge levels of all technologies except the following, which it shared comparable levels with the horticulture college: television, software, and visual (combined and less advanced) technologies. The Teacher Training College had higher knowledge levels of advanced audio than the Horticulture College (Table 99). The accessibility levels from highest to lowest order for all three colleges follows:

HORTICULTURE COLLEGE

LESS ADVANCED audio

LESS ADVANCED visual

COMBINED visual

television

COMBINED audio

computer

ADVANCED visual

software

ADVANCED audio

MECHANICAL ENGINEERING AND AUTOMATION COLLEGE

LESS ADVANCED audio

LESS ADVANCED visual

COMBINED visual

COMBINED audio

computer

ADVANCED audio

television

ADVANCED visual

software

TEACHER TRAINING COLLEGE

LESS ADVANCED audio

LESS ADVANCED visual

COMBINED audio

COMBINED visual

computer

ADVANCED audio

television

software

ADVANCED visual

TABLE 99

OVERALL KNOWLEDGE CATEGORY AVERAGES

CATEGORY	HORTICULTURE	MECHANICAL	TEACHER
Audio (Comb)	70.58	87.11	75.00
Audio (Adv)	38.77	78.17	60.00
Audio (Less Adv)	89.66	92.48	84.00
Television	72.53	76.98	59.69
Computer	69.93	78.91	67.00
Software	60.32	65.05	54.41
Visual (Comb)	82.96	87.56	74.33
Visual (Adv)	64.74	72.84	47.00
Visual (Less Adv)	88.02	91.65	81.92

Part 4 - Section 4 - Data Analysis Rationale

In this final section, the technology category averages from the three average charts above were averaged for a final look at overall comparisons between the three colleges with respect to accessibility, experience, and knowledge. The combined values from above were used for calculations, not the advanced and less advanced. Again, detail is sacrificed in order make a final generalized statement.

The reader is reminded of the three research questions:

1. What is the accessibility of the infrastructure, i.e., hardware and software for planning and implementing distance education technologies within programs?
2. What is the knowledge of the planners about distance education technologies?
3. What experience do the planners have in using distance education technologies?

Data Analysis - Overall Category Averages

In general, the Horticulture and Mechanical Engineering and Automation Colleges were roughly equivalent in accessibility to and experience with the 74 technologies surveyed on the instrument. The Mechanical Engineering and Automation College had more knowledge of the 74 technologies than either, and the Teacher Training and Horticulture Colleges had roughly equal knowledge of these technologies. The Teacher Training College had less accessibility to and experience with these technologies when compared to the other two colleges (Table 100).

TABLE 100

OVERALL SURVEY CATEGORY AVERAGES

CATEGORY	HORTICULTURE	MECHANICAL	TEACHER
Accessibility	63.12	61.59	47.55
Experience	50.33	50.04	40.34
Knowledge	71.26	79.12	66.09

Qualitative Assessment

Overview

In this section, answers to open-ended questions asked in the survey (Questions 80 - 85) were examined. Prior to each of the six groups of tables, the findings are described. These comments provide insights into current local conditions in Hungary on a variety of topics. All quotes are translations from Hungarian comments into English (with grammar corrections).

Data Analysis - Use of Distance Education in Work Assignments

Question 80 reads: Using the above definition, how would you use distance education in your work assignments?

The use of distance learning technologies and techniques were envisioned by the respondents to serve a variety of instructional/learning functions and in a variety of disciplines: disseminating theoretical materials, conducting surveys, helping students with exercises, previewing lessons, demonstrating various techniques, attending seminars, preparing lessons and practice exercises, summarizing, getting feedback on chapter assignments/readings, watching foreign professors, instructing professional lessons and practical exercises, training, suggesting reference materials, transferring data directly, monitoring tests, and answering students' questions.

Many kinds of courses/programs were envisioned: intensive, preparatory, college entrance exam, didactics teaching, across border courses taught in the Hungarian language, correspondence, management, and even a series on horticultural topics to be aired via local broadcasters.

The use of various technologies and media were envisioned: these included: written text, video cassettes, audio cassettes, television programming, training packages, local broadcasters, telephones, telefax, tape recorders, slides, posters, personal computers, educational and training films, simulations, computer programs, and cable television. Many respondents believed local and national television broadcasters could play a crucial role in distance learning.

The greatest concern raised by many respondents was the fact that teacher - student interaction was necessary to maintain. Some believed that distance learning would hinder or eliminate this important exchange process, while others believed technology could be used in part to supplement and/or enhance communication. Keeping in touch through technology included the use of a central computer network for home computer connections, electronic mail, telephone, and radio telephone communications (Table 101).

TABLE 101

RESPONSES TO QUESTION 80 - USE OF DISTANCE EDUCATION IN YOUR WORK ASSIGNMENTS

1. As a first step, courses have to be organized by the local television station. 2. Education over the borders in Hungarian language by video, tape recorder (and preparations).
3. Assembling written and audio-visual auxiliary products.
4. Beside the well-known subject matter of instruction, lecture notes made with this method, collection of exercises, audio-visual materials, telefax, and keeping in contact with students by computers - but personal contact is not negligible.
5. By correspondence.
6. By preparing education/training films, computer programs.
7. By the aid of cable television in the city. 8. Broadcasting times could be arranged to accommodate the requirements of students.
9. By the aid of video and audio cassettes, and by computers perhaps. 10. Computer simulation programs, video, written texts, figures, posters, slides, films, television.
11. Education would be possible by computer or TV system at a certain time. 12. To keep connection by the aid of telephone or UHR (radio - ultra short wave).

TABLE 101 (CONTINUED)

13. For enlarging and supplementing consultation with programs (computer) written with the aim of this and with video films.

---

14. For example, I could give instructions during professional exercises/practices, and I could also summarize daily problems (with active contact).

---

15. For example, lectures by internationally known professors.

---

16. For preliminary study which could help students gain entry to college (i.e. entrance exam in math and physics).

---

17. For the attainment of theoretical subject matter of instruction, and to solve some simple practical exercises.

---

18. Horticultural series through local broadcasting (TV).

---

19. In correspondence education: telephones, telefax, perhaps computer programs.
20. Distances in Hungary are not big/important - so it is easier to keep personal contact, and it is cheaper, as well, if many problems have to be discussed.

---

21. In Hungary, since distances are not important/significant, I like to obtain/acquire my knowledge directly through personal contact. But in case there is a possibility in the college to obtain direct experience, then I can offer some methods

---

22. In the case of my discipline, I think distance education wouldn't be really effective. But of course, distance education is not guilty of this. The character of my subject needs personal, live contact between student and teacher.

---

23. It could be used in management courses organized in this form.

---

24. It is difficult to imagine since I teach empirical subjects.
25. Having the proper technical conditions, it can be used for previewing material, and afterwards, I'd substitute this method with practical demonstrations, theoretical classes, and seminars.

TABLE 101 (CONTINUED)

26. It would be necessary to have a central computer network with telephone lines leased from the Post, through which a student could connect his/her computer at home.
27. Or the student should be supplied with the necessary basic software (very expensive).

---

28. Theoretical education would be possible by video or TV technique, or rather electronic mail connection should be ensured by all means between student and teacher.

---

29. It would be possible in my subjects with the aid of high level visual technology.

---

30. It would be possible to make the correspondence section function more effectively at our college as well, with the aid of notes written especially with this aim, or perhaps with the aid of realistic types of multi-media.

---

31. It would provide the possibility for the communication and controlling of knowledge.
32. The importance of demonstration is not so high in the subjects I teach.

---

33. Part of instruction/training - video cassettes, computer programs.

---

34. Telephone connection between student and college.
35. Radio telephone between student and college.

---

36. To keep in contact with students by correspondence and telephone.
37. To send instructional subject-matter by Post (chapter materials).
38. To ask for reactions after each chapter, to answer questions, and to give further literature (reference lists), etc.

---

39. To prepare a program for distance education - printed materials, exercise papers, audio and video cassettes computer disks.
40. For direct data transfer; there are no technical conditions available on the part of the receiver.

---

41. Town broadcasting and district/zonal television broadcasting could help.

---

42. Training package, television, survey materials, occasional intensive courses (living-in system), control tests.

TABLE 101 (CONTINUED)

43.Use of cable television, computer programs, preparation of exercises, application of personal computers - they would function as communication systems.
44.Use of computer, video, slides, figures.
45.Video films and TV programs.
46.Video films, educational packages in teaching didactics.
47.With foundations and preparatory character - with continuation character.
48.With the aid of written material or by audio-cassettes and video cassettes.

Data Analysis - Use of Distance Education in College or Geographic Area

Question 81 reads: What do you envision using distance education for in your college or geographic area?

Respondents had many ideas on programs/courses that were needed in their colleges or geographic areas. Some not covered already included: "after-school education", time-independent materials, basic education in various fields where practice was not an important element, consulting, agricultural courses for farmers (at home and abroad), "first and second diplomas", and especially "graduate and postgraduate education" - for elementary and kindergarten teachers, languages, and others in general.

Other applications included courses/programs for: mechanical engineering teachers' final year of studies, technology experts, prospective study-abroad students (etiquette, proper dress, serving food), mothers at home with infants, agricultural producers, working professionals, advisors, new job seekers (specific training in needed fields)(Table 102).

TABLE 102

RESPONSES TO QUESTION 81 - USE OF DISTANCE EDUCATION IN YOUR COLLEGE OR GEOGRAPHIC AREA

1. After-school education. 2. Training for adults learning a new profession.
3. Because of the underdeveloped state of the telecommunications infrastructure, it would be limited to Kecskeme't, otherwise there would be an enormous interest in the education of Hungarian people living abroad, if the infrastructure helped us (e.g, Duna television).
4. Correspondence education. 5. Postgraduate education. 6. Assistance in studying materials/subjects where timing is not important.
7. Courses for farmers, especially for Hungarians over the borders.
8. Especially for correspondence section courses.
9. First of all in the education of languages and social sciences.
10. For education of management and business subjects.
11. For education of theoretical subjects, where practical work such as instrument measurements and experiments are not commonly used.
12. For irritation.
13. For obtaining a second diploma. 14. To organize courses and postgraduate education.
15. For organization of after-school instruction based on individual schedules.
16. For postgraduate education. 17. For language postgraduate education.

TABLE 102 (CONTINUED)

18. For pedagogical postgraduate education.

---

19. For processing special themes/topics, narrow professional fields, or for demonstrating the newest international scientific results.
20. For education of certain basic branches of science.

---

21. For supplementation of compensatory education.

---

22. Graduate and postgraduate training of elementary and kindergarten teachers.
23. For after-school instruction.

---

24. In correspondence education.

---

25. In graduate and postgraduate education.
26. In different special courses (NC, CNC machines, programming), CAM, CIM systems.

---

27. In the case of certain subjects, for consultation.
28. For example, in the social sciences for examination preparation.

---

29. In the education of, for example, mathematics and economics where practice is not required as much.

---

30. In the education of subjects where exact description is possible and the material is understandable, even without too many logical skills. Distance education technologies could make the education of these subjects more colorful.

---

31. It can be used for lectures and for subjects requiring not too many tools.
32. It can be used in the last year of education of mechanical engineering teachers, and in the case where a student has computer and would get the necessary programs and books, then in the education of the informatic expert.

---

33. It could be used in all of education if technical conditions existed for the sending and receiving of information.
34. It could be used for some people to test their suitability to basic education (first stage of study).
35. For postgraduate education.
36. For the teaching of trades for those who need different work.

TABLE 102 (CONTINUED)

18. For pedagogical postgraduate education.

---

19. For processing special themes/topics, narrow professional fields, or for demonstrating the newest international scientific results.
20. For education of certain basic branches of science.

---

21. For supplementation of compensatory education.

---

22. Graduate and postgraduate training of elementary and kindergarten teachers.
23. For after-school instruction.

---

24. In correspondence education.

---

25. In graduate and postgraduate education.
26. In different special courses (NC, CNC machines, programming), CAM, CIM systems.

---

27. In the case of certain subjects, for consultation.
28. For example, in the social sciences for examination preparation.

---

29. In the education of, for example, mathematics and economics where practice is not required as much.

---

30. In the education of subjects where exact description is possible and the material is understandable, even without too many logical skills. Distance education technologies could make the education of these subjects more colorful.

---

31. It can be used for lectures and for subjects requiring not too many tools.
32. It can be used in the last year of education of mechanical engineering teachers, and in the case where a student has computer and would get the necessary programs and books, then in the education of the informatic expert.

---

33. It could be used in all of education if technical conditions existed for the sending and receiving of information.
34. It could be used for some people to test their suitability to basic education (first stage of study).
35. For postgraduate education.
36. For the teaching of trades for those who need different work.

TABLE 102 (CONTINUED)

37. It would be a useful method in starting postgraduate education and in training for other work.

---

38. It would be possible to impart some part of basic knowledge by this method.
39. To educate people working, for example, in production of horticultural things, trade/turnover, etc., who don't have the proper basic knowledge.

---

40. It would be possible to show/demonstrate new and unavailable technologies to students.

---

41. It would be possible to use for testing their knowledge by audio cassette method, after they've gotten the literature.

---

42. Lectures (etiquette), proper dress, serving food - on the TV screen.

---

43. Most parts of necessary knowledge can be attained by this method.

---

44. Only in the attainment of theoretical material.

---

45. Postgraduate education.
46. Education in one's branch of study, like economics and trade.

---

47. Special branches of the engineering profession (postgraduate education) for engineers already employed.
48. I see it as a real possibility for obtaining a second diploma/degree or for application of postgraduate education, etc.

---

49. Theoretical part of postgraduate education.
50. Courses.
51. To give special advise/consultative assistance.

---

52. To educate, inform, or give advise to people living far or abroad.

---

53. To educate people living abroad.
54. Preparative school for entrance exam.
55. Postgraduate education.

---

56. To obtain a second diploma.
57. For training of adults learning a new profession.
58. For the education of mothers staying at home with their babies.

TABLE 102 (CONTINUED)

59. For the education of languages.

60. To obtain first and second diplomas.

61. To show and teach professional tricks, techniques, e.g. cutting/pruning, grafting, planting, tieing/fastening, packing, preparing articles/goods, organization of work/working process in horticulture sections - then practice.

62. To spread knowledge more efficiently.

Data Analysis - Use of Distance Education In All Work Assignments

Question 82 reads: How would you feel about using distance education for all of your work assignments?

Several themes emerged in response to this question: they either liked it, they did not like it, they believed it was possible, but with conditions, or they were very concerned about the issue of teacher - student contact.

Several respondents could imagine themselves using distance education for all their work, that it could be built into the educational system, or that it was an opportunity to impart more new information. More reserved comments dealt with the necessity to carefully think the entire process out beforehand, that distance learning would be applicable to some parts of education (not all), that a lot of alterations would have to take place before implementation could begin, that more background in distance education technology and techniques were needed, that it was no substitute for practical hands-on exercises, that is was too costly to implement, and that students don't have the necessary attitudes.

Many indicated that contact between teacher and student could not be eliminated, and that distance learning threatened these connections. Comments about contact dealt with the concerns that distance education was impersonal, that the interaction was necessary and could not be excluded, that telephone consultation were still very expensive, or that stays in boarding schools over several days were still necessary in some cases. A positive comment by one respondent was that it would serve as a good contact supplement in those cases where very little teacher - student contact currently existed (Table 103).

TABLE 103

RESPONSES TO QUESTION 82 - USE OF DISTANCE EDUCATION IN ALL YOUR WORK ASSIGNMENTS

1.	I can imagine it.
2.	Certain phases of education can be solved by distance education.
3.	Consultation by telephone can be excluded because it is very expensive in Hungary.
4.	In similar fashion to correspondence education, consultations and residence at boarding schools for a couple of days are necessary here as well.
5.	Distance education alone is not enough for attaining knowledge.
6.	Distance education by itself only is not enough, but combined with consultations, yes.
7.	Distance education can't give a perfect education, but it can help a lot in obtaining qualifications.

TABLE 103 (CONTINUED)

8. Distance education could be used in only part of a teacher's training.

---

9. Distance education is impersonal.

---

10. Economic tasks can be solved very well by computer network (data calls from central databank, organization of working processes, calculation of expenses by the proper software, preparation of business plans, calculations of ... flow, inside and outside market information).

---

11. I believe in the necessity of personal contact between teacher and student for the sake of learning, That's why I wouldn't take part, with pleasure, in distance education programs, neither as a teacher, nor as a student.

12.I can imagine some details of it.

---

13. I don't believe that education will become impersonal.
14. I'd be able to impart much more new information.

---

15. I teach courses where personal contact is very important.

---

16. I think distance education equipment can't absolutely exclude personal contact between teacher and student.

---

17. I think it is not possible to do by distance education. Some practical classes are necessary to keep. Perhaps in the case of a very high level of visual technology, it is possible.

---

18. I think it is only for supplementation - personal contact is very important.

---

19. I wish for the country to be so rich to solve my tasks by distance education.

---

20. In my opinion, it is possible to build it into our present educational system, and it is applicable.

---

21. In the case when the infrastructure reaches a desirable level, it will be possible to introduce this kind of education - although personal contact between teacher and student has to be preserved/maintained.

---

22. It can be solved only to a small extent.

TABLE 103 (CONTINUED)

23.	It can be used to a certain extent, for processing specialized materials.
24.	It could be solved in part.
25.	It could be used for the education of constructive and technical subjects, but not exclusively by distance education. It is necessary to have laboratory work/practice for the acquirement of knowledge at the practical level.
26.	It could help, but not solve it.
27.	It could solve it, but I'd miss personal contact very much.
28.	It is difficult to imagine, given the attitude of students at the moment, and also because of the high financial and equipment requirements of computer technical education (computer, software, books).
29.	It is good to get/attain information/knowledge through distance education, but not for the acquirement of pedagogical practice.
30.	It is possible in part, especially in the case of encyclopedia materials. I teach a technical subject, so I need personal contact for the solution of practical tasks.
31.	It is possible to realize step-by-step.
32.	It would be a more intensive connection/contact with students (with some feedback).
33.	It would be a pleasure for me to do, if technical conditions were available.
34.	It would be beneficial to spread knowledge in this way in the future.
35.	It would be very good.
36.	It would well complete the occasional personal contact.
37.	Lack of personal contact gives you indifferent information/picture about the level of knowledge.

TABLE 103 (CONTINUED)

38. Only the suitable subjects can be involved in distance education.
39. For example, experimental physics, because of its character, can be educated only in part by using distance education.

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40. Positive.

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41. Subject-matter of instruction should be revised.
42. Theoretical and practical education should be adjusted to distance education after an example where distance education that functions well can be seen.
43. It would be necessary to take part in courses dealing with distance education technology, and to exchange experiences with others.

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44. The idea is good, but it has to be thought out thoroughly which material is suitable and which is not - for such kind of education.

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45. With the above mentioned equipment and methods, it would be applied and used effectively in Hungary, especially through simulation programs.

Data Analysis - Degree of Support for Distance Education

Question 83 reads: What is the degree of support you perceive exists NOW for the use of distance education?

A tally of the responses was: YES - 7, No - 19, MAYBE - 12, UNDECIDED - 1.

Those who believed there was good support for distance education had various reasons for their reactions: that it represented a new and interesting solution to a problem, that it would be supported even more due to the high costs of education, that it was a modern direction, that it held hope for reducing the high unemployment rate, or that the nation's youth would embrace it.

Most of the "no" and "maybe" responses were conditional - that people would support it if they knew more about it, and if the infrastructure was there. There was not enough knowledge about it and no tradition in Hungary. Some believed that support depended on whether or not benefits could be realized, or that many people had no opinion at all - due to a lack of information

Some purely negative responses were based on reasons not given, that correspondence education had already been eliminated in many places, that Hungary was too small of a country, or that it would simply cost too much (Table 104).

TABLE 104

RESPONSES TO QUESTION 83 - DEGREE OF SUPPORT FOR DISTANCE EDUCATION AT THIS TIME

1.	After more experience with it, they will support it.
2.	At a relatively low rate.
3.	Because of lack of knowledge in this field, people have an aversion to it.
4.	Experiences in this field are poor. Having more information about these methods would probably help - then they would support it.
5.	I think here in Hungary, this is not an accepted and supported form of education. Therefore, many people have an aversion to it. If its introduction will be successful it will have many followers.
6.	I think in Hungary not at all, but in Australia, yes.
7.	I think people would support it, especially those interested in new and interesting solutions.
8.	If it concerns them closely, they will help it.

TABLE 104 (CONTINUED)

9. Information is not enough, so it is not supported.

10. It doesn't have a tradition, but I know about trials.

11. It is changeable. It would be necessary to know much more about the methods.

12. It is not known enough.

13. It is not known enough.

14. It is not known, so two reactions are possible - they are afraid of it or have an aversion to it, or it is refused.

15. It is not supported (and will not be) because it is not known.

16. It is not supported. Many institutes have stopped correspondence education.

17. Probably will not be supported because of the financial load on the people who require education - they wouldn't be able to ensure technical conditions for it.

18. It will be supported more and more because of the costs of education.

19. Many people don't know about it. People who know about it support this method.

20. Most of the people don't know the possibilities, so they don't have opinion. It would probably be popular in attaining general interest knowledge or school material.

21. Most of the people support it - it is a fashionable direction.

22. Most of the people would support it for sure, if they knew the methods and benefits of distance education.

23. My knowledge is quite limited in this field.

24. Not so much, because there is no tradition. There isn't a developed system, and conditions are not suitable for it.

25. People are averse to it and don't support it.

TABLE 104 (CONTINUED)

26. People don't have enough knowledge, and so they have no opinions about it (me as well).

27. People don't know it enough. They have to be informed about these new methods.

28. People have an aversion to it.

29. People in Hungary don't know about distance education, so they probably wouldn't support it.

30. People know it, but few of them take part in it. It is still very new. Some time is needed until it will have a role in the education of a nation.

31. People working in education are very distrustful. Most of the people have no knowledge about it.

32. People would support it, but no money is available.

33. People would support it, but they will stay away because of financial reasons.

34. People's knowledge of distance education is very much limited.

35. Probably a lot of them because of the high rate of unemployment (about 750,000).

36. Technical possibilities are not available at the moment. People don't know this term.

37. Theoretically, many people support it. In practice, it depends on individual interests (which can be perhaps financial problems).

38. Theoretically, yes, but without technical possibilities an knowledge about it - no.

39. This area is quite new to Hungary. The youth will like it.

Data Analysis - Political Role in Distance Education

Question 84 reads: What role does the political "picture" have on the use of distance education?

Of the responses, 21 answered YES, 14 NO, and 2 undecided. Of the NO responses, the respondents either believed that it was not a political decision, that it should not be a political decision, or that it was more a matter of finances and economics that determined support. Of the YES responses, government support would increase if they had more distance education experts among the ranks, that their support would come in time, that political influence was so important that it required the influence of local television stations to make it happen, that the unemployment rate would increase political support, that the government should supply money for it, that politics could play a decisive role in gathering support, or that politics both supported and hindered it (Table 105).

TABLE 105

RESPONSES TO QUESTION 84 - POLITICAL INFLUENCE ON DISTANCE EDUCATION

1.	A government containing experts would probably give more support for its development.
2.	After a while, it (policy) will be more and more interested in it. But nowadays, they have other problems.
3.	Economic life determines it, rather.
4.	Enormous. The local tv or a channel of national tv are suitable for this, very much.
5.	Financial influence.
6.	I don't know.
7.	I don't see any influence.

TABLE 105 (CONTINUED)

8.	I don't think that it would influence it.
9.	If the government supports it, this form is very important in the education of unemployed.
10.	If they think it important, they have to provide money for it.
11.	In my opinion, it is not important.
12.	In our country, it' a question of investment.
13.	In the case of democratic policy, it doesn't influence it.
14.	Indifferent.
15.	It could be one way of treating unemployment, so financial support depends on the interest. It can reduce the expense of education at colleges or universities - and in other fields of interest.
16.	It depends on the political conditions - how many students can continue their studies after secondary school, and how much money can be provided for education.
17.	It doesn't depend on political life - I think.
18.	It is an important factor to spread and have the method known - this concerns both for propaganda and support.
19.	It is essential, because of financial aid and technical requirements.
20.	It is forbidden to mix policy with education, but anyway - in the regions where a lot of unemployed are living, they could get some new possibilities of help with this method; people's general feelings would change, which would influence political life, as well.
21.	It is not probable that policy will influence education.
22.	It must not (should not) be a political question.
23.	Modernization of economic life is the interest of the government. The number of unemployed can be reduced by educating them for another profession, and therefore

TABLE 105 (CONTINUED)

	strained relations/tensions will decrease in the society. To train a large number of people for a new profession is possible only in the distance education method.
24.	No influence at all.
25.	No influence - I think. They can make it compulsory at the same time.
26.	Perhaps it will prosper in the future.
27.	Political life has to keep it distance education important at different levels of education/postgraduate education.
28.	Political life in an open country, in a democracy, doesn't influence the usage of distance education. But the financial state of a country determines essentially, if this education form is applicable or not.
29.	Politicians shouldn't be asked about this - I don't know.
30.	Possibilities of education over the borders are very much dependent on political relations.
31.	Spreading can be initiated by it - providing proper financial conditions exist.
32.	The influence is big, for money is delivered only on the basis of some political interest. If some lobby gets money for it, they can establish a financial basis for its position and spreading.
33.	The influence is high - in good and not so good directions.
34.	The present/current "view-change/shift" - I think - would support distance education.
35.	There is the possibility of manipulation.
36.	They can support if they want a new mentality.
37.	They have to recognize its importance, then they will support it.

Data Analysis - Barriers to Implementing Distance Education

Question 85 reads: If you had the funds for technology, what would be the biggest barrier to implementing distance education in your school?

Many barriers were cited as impediments to the implementation of distance education, even if the funds were available for technology. These included a lack of knowledge of distance education methods, technologies, and practices, a shortage of experts in the field, the need to train experts, little student accessibility to equipment, a lack of conviction among potential users, that a diploma obtained via distance education was not believed to be as important as one obtained through traditional instruction, that it would take a lot of rework and preparation of existing traditional materials, the poor infrastructure, low levels of creative thinking, that teachers feared losing their jobs, that people had a natural aversion to new things, that there were misconceptions about the technology, that people could be closed-minded, or that many teachers did not accept new ideas and methods (Table 106).

TABLE 106

RESPONSES TO QUESTION 85 - BIGGEST BARRIER TO IMPLEMENTING DISTANCE EDUCATION IN YOUR SCHOOL

1. "In general" - there wouldn't be obstacles. Difficulties could occur in certain areas, depending on the characteristics of special areas like medical education, education of engineers, etc.

TABLE 106 (CONTINUED)

2.	"Ways of looking" - people's views are difficult to change.
3.	A general way of looking - prejudices.
4.	A traditional educational way of looking will strongly maintain/live further.
5.	After establishment of technical conditions, a very intensive advertisement/announcement is necessary because people don't know it.
6.	After financial problems - when the system of technical equipment and software will be available, and also well-trained teachers (with changed minds) - it will be a question of time - as well.
7.	Besides money - technology and students. Hungarians over the borders would be happy to get help as well as the unemployed people here at home. The way of thinking has to change as well. The neighboring countries (political leadership) perhaps wouldn't see it with pleasure, like Romania, Serbia, the Ukraine, Slovakia, and they would even hinder it.
8.	First of all, the infrastructure has to be established. There are no traditions here for this educational form. Teachers can be afraid of losing their jobs.
9.	I don't see other obstacles at the moment.
10.	I think it wouldn't be possible, to me, in all fields. It depends on the character of the particular subject.
11.	I think this would be a new thing in Hungary, therefore a lack of information and experience could hinder distance education.
12.	Intellectual capacity has to be refreshed! Although distance education will not solve as well, many problems, it is a kind of technical possibility. It requires another kind of thinking.
13. 14.	It is not well known - having an aversion to new things. It is technical problem, so money will solve it.
15.	It would ne necessary to have more experience and knowledge in connection with this field.

TABLE 106 (CONTINUED)

16. Lack of experience.
17. Lack of important equipment, devices, and experienced lecturers/teachers. The way of looking has to be changed - it has to become more opened. Then it would be easier to introduce a new form or method and have it accepted.
18. Lack of infrastructure, e.g. telephone, electronic mail.
19. Lack of interest, although possibilities of distance education are sometimes really attractive. But the size of our country and the distances between institutes don't give reasons for wide-range spreading of distance education.
20. Lack of technical and pedagogical/methodological knowledge of distance education could hinder it.
21. Lack of well-educated training team who knows the possibilities of distance education and who can use. 22. Some traditional teachers would be opposed to it for sure. 23. Is there any requirement for it in Hungary? 24. Even students with a diploma obtained by full-time studying can't get a job - at least in technical fields. 25. Is it possible to attain knowledge only by distance education?
26. Lack of wide-ranging knowledge of distance education.
27. Limited number of teachers doing distance education and the low level of their education in this field. Their training, however, can be made perfect only during such activities.
28. Low rate or urbanization (luckily) can make introduction more difficult - probably it will be easier to introduce among alienated/estranged citizens.
29. Not all students have the technical conditions for it, and not all teachers accept new things.
30. Nothing (any obstacle). If money will be available for preparing graphics and software with proper quality and content, and we'll have the equipment for sending information, and the receiver will be able to accept

TABLE 106 (CONTINUED)

them. And also the possibility for control will be available, and the relating data bank will be processed and accessible - distance education will be possible to introduce. I think Hungary is too small of a country to make it worth-while to use every effort to introduce distance education.

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31. Nothing else.

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32. People don't know their possibilities in this area.

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33. People's way of looking at things.

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34. Personal problems - I don't know too many experts who have the proper knowledge and have methods, as well, for the introduction of this kind of education. As a first step, teachers have to be chosen who could attain knowledge of educational technologies, and they would have to rework/revise the subjects in this form (tests, simulation) programs, electronic note, etc).

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35. Preparation of professional materials are time-consuming processes. Conviction/belief is missing still, so it is doubtful that someone will sacrifice the time on it.

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36. Preparing experts.

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37. Students have an aversion to it, because they are afraid their diplomas will not be accepted. Perhaps it will be considered not so valuable when compared to a diploma obtained traditionally. Distance education is a very effective form of education. Many students can be educated by a few teachers. That's why teachers - being afraid of losing their jobs - don't support it. It doesn't have a tradition in Hungary, therefore people have an aversion to it, as to all new things. Preconditions of successful distance education included: good subject-matter of instruction, efficient preparation and planning, and a technological infrastructure (e.g. a good telephone network). These conditions are missing, and to establish them takes about 4-5 years. There are no experts at home in distance education.

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38. Telephone supply in Hungary is still quite bad, especially in the case of students coming to our college (countryside, villages, suburbs). People have to know what distance education is. The computer supply is poor.

TABLE 106 (CONTINUED)

39. The knowledge of people in this field is not enough - popularization would be necessary.
40. The underdeveloped telecommunications system of the country (telephone, television, data transfer), low level of education of teachers with respect to using technical equipment, and the people's way of thinking. First of all, it would be necessary to clear up wrong ideas/notions, and clarify - why is this educational form modern and useful? Other problems include accessibility of technical equipment for students and lack of knowledge - so, how are they used?
41. We don't have enough practice in it, and I think the most important problems are the financial ones.
42. Young colleagues have to be educated by all means! Obstacle - will they be allowed?

Chapter Summary Accessibility

Audio Technologies

At all three colleges, based on frequency data, all audio technologies were accessible at some level, except for speech synthesizers and teleconferencing at the Teacher Training College.

At all three colleges, respective majorities of respondents agreed that audio cassette recorders, audio cassettes, and telephones were accessible in the department, and that mobile cellular phones, speech synthesizers, and teleconferencing technologies were not accessible. At the Mechanical Engineering and Automation and Teacher Training Colleges, respective majorities agreed that radios were accessible in the department, and that short-wave radios were not accessible.

According to the accumulated frequency data, at all three colleges, audio cassette recorders, audio cassettes, and telephones were heavily accessible in the department, with the weaker short-wave radio technology found at the same level. Mobile cellular phones and speech synthesizer technologies were accessible at both the Horticulture and Mechanical Engineering and Automation Colleges in the department level. When compared to the Teacher Training College, the other two colleges had more connections and therefore higher accessibilities to technologies in the area.

The Horticulture College was strong in teleconferencing technologies, the Mechanical Engineering and Automation College had external access to this same technology (its weakest), and the Teacher Training College had external accessibility to its weaker technology, mobile cellular phones, but not to its weaker speech synthesizers and teleconferencing technologies.

Based on the highest valid percentage data, at all three colleges combined, 54% (14/26) of the combined audio technologies were found at the department level, 15% (4/26) at the college level, 23% (6/26) in the area, and 8% (2/26) were not accessible. Overall, 69% (18/26) of the technologies were internally accessible, and 23% (6/26) were externally accessible.

Television Technologies

At all three colleges, based on frequency data, all television technologies were accessible at some level, except for microwave (ITFS), satellite uplinks, slow scan, and video teleconference technologies at the Teacher Training College.

At all three colleges, respective majorities agreed that satellite uplinks, microwave (ITFS), satellites, and slow scan were not accessible, that video teleconferencing and videotex technologies were not accessible at the Horticulture College, and that closed-captioned, closed-circuit, commercial broadcast, satellite dishes (downlink), teletext, video teleconference, and videotex technologies were not accessible at the Teacher Training College.

Majorities agreed that commercial broadcast and videotape cameras/recorders were accessible at the Horticulture College in the area and in the college, respectively, that videotape cameras/recorders were accessible in the college at the Mechanical Engineering and Automation College, and that cable, public broadcast, and videotape cameras/recorders were accessible to the Teacher Training College at one or more levels.

According to accumulated frequency data, at all three colleges, cable, satellite dishes (downlink), and videotape cameras/recorders were accessible at the department, cable, closed-circuit, public broadcast, satellite dishes (downlink), teletext, and videotape cameras/recorders were internally accessible, and microwave (ITFS) and video teleconference technologies were not internally accessible. The Teacher Training College had no internal accessibility to closed-captioned, satellite uplinks, slow scan, or videotex technologies, and the Mechanical Engineering and Automation College to commercial broadcast and satellite uplinks.

The Horticulture and Mechanical Engineering and Automation Colleges had good accessibility to every television technology, and the Teacher Training College had outside accessibility to closed-captioned, public broadcast, and videotex technologies. Both the Horticulture and Mechanical Engineering and Automation Colleges had external accessibility to all of their weakest technologies, while the Teacher Training College maintained no external accessibility to its other weaker technologies: microwave (ITFS), satellite uplinks, slow scan, and video teleconferencing.

Based on the highest valid percentage data, at all three colleges combined, 8% (4/48) of the combined television technologies were found at the department level, 38% (18/48) at the college level, 46% (22/48) in the area, and 8% (4/48) were not accessible. Overall, 46% (22/48) of the technologies were internally accessible, and 46% (22/48) were externally accessible.

Computer Technologies

At all three colleges, based on frequency data, all computer technologies were accessible at some level except for fiber optics technology at the Teacher Training College.

At all three colleges, respective majorities agreed that electronic mail, fiber optics, and modems were not accessible. At the Horticulture College, LANs and mainframes were accessible in the department, minicomputers, personal computers, and printers were accessible in the department, and multi-media, CMI, and database searching were not accessible. At the Teacher Training College, personal computers, LANs, graphics, animation, and CAD were accessible in the college, printers were accessible in the department, and multi-media and CMI were not accessible.

According to the accumulated frequency data, at all three colleges, graphics, minicomputers, personal computers, and printers were accessible in the department, and they had internal accessibility to all technologies except fiber optics (found internally at the Mechanical Engineering and Automation College).

The Horticulture and Mechanical Engineering and Automation Colleges had strong department level accessibility to CAD, CAI, CAL, graphics, minicomputers, personal computers, and printers, and accessibility in the area to most computer technologies.

The Teacher Training College had outside accessibility to CAL, CAI, CMI, and database searching technologies, and internal strength in personal computers and printers, while the Mechanical Engineering and Automation had department strength in LAN technologies. Both were weak in fiber optics technology, while the Horticulture College had external accessibility to it.

Based on the highest valid percentage data, at all three colleges combined, 32% (19/60) of the combined computer technologies were found at the department level, 41% (25/60) at the college level, 25% (15/60) in the area, and 2% (1/60) were not accessible. Overall, 72% (73/60) of the technologies were internally accessible, and 25% (15/60) were externally accessible.

Computer Software Technologies

At all three colleges, based on frequencies, all computer software technologies were accessible at some level except for Hypercard technologies at the Mechanical Engineering and Automation College, and data processing, desktop publishing, programmed instruction, spreadsheets, and word processors at the Teacher Training College.

According to respective majorities at all three colleges, artificial intelligence, Hypercard, and hypermedia technologies were not accessible, and word processors were accessible at department levels. At the Horticulture and Teacher Training Colleges, expert systems and simulation technologies were not accessible. At the Horticulture College, data processing and database management technologies were accessible in the department and college levels, respectively. At the Mechanical Engineering and Automation College, data processing technologies were accessible in the department, and programmed instruction was not accessible. At the Teacher Training College, both communications software and courseware design technologies were not accessible.

According to the accumulated frequency data, all three colleges had department accessibility to data processing, desktop publishing, spreadsheets, and word processor technologies, further internal accessibility to programmed instruction and simulations, and no internal accessibility to hypermedia.

The Teacher Training College had no internal accessibility to artificial intelligence, communications software, courseware design, and expert systems technologies, while both the other two colleges had internal accessibility to all computer software technologies except Hypercard, which was not internally accessible at the Horticulture College.

The Horticulture College had external accessibility to hypermedia, and the Mechanical Engineering and Automation and Teacher Training Colleges had none to Hypercard. The Teacher Training College had external accessibility to database management and programmed instruction technologies, but to none of the remaining technologies it had no internal access to: artificial intelligence, communications software, courseware design, expert systems, and hypermedia.

Based on the highest valid percentage data, at all three colleges combined, 30% (18/42) of the combined computer software technologies were found at the department level, 42% (25/42) at the college level, 25% (15/42) in the area, and 0% (0/42) were not accessible. Overall, 72% (43/42) of the technologies were internally accessible, and 25% (15/42) were externally accessible.

Visual Technologies

At all three colleges, based on frequency data, all visual technologies were accessible at some level.

At all three colleges, respective majorities agreed that charts, faxes, manipulatives, overhead transparencies, videotape cassettes, and maps were accessible in either the college or department levels, though mainly the department level. At both the Mechanical Engineering and Automation and Teacher Training Colleges, video disks, virtual reality, and electronic blackboard technologies were not accessible.

At the Horticulture and Teacher Training Colleges, teletypewriters and 16 mm films were accessible in the college, filmstrips were accessible in the department, and

35 mm slides and field trips were accessible at the department and college levels, respectively. At the Horticulture College, models and puppets were accessible in the department and not at all, respectively.

At the Mechanical Engineering and Automation College, posters and puppets were accessible in the department and not at all, respectively. At the Teacher Training College, globes were accessible in the college, and both optical data disks and bulletin boards were not accessible.

According to the accumulated frequency data, all three colleges had department accessibility to all visual technologies except bulletin boards, electronic blackboards, facsimile, optical data disks, puppets, teletypewriters, video disks, and virtual reality technologies, further internal accessibility to electronic blackboards, facsimile, and video disks, and accessibility strength in 35 mm slides, charts, field trips, filmstrips, manipulatives, overhead transparencies, posters, print correspondence, and videotape cassettes.

The Horticulture and Mechanical Engineering and Automation Colleges had internal accessibility to bulletin boards and virtual reality, the Mechanical Engineering and Automation not to puppets, and the Teacher Training College not to bulletin boards and virtual reality technologies.

While the Horticulture College had the most accessibility strength to virtual reality technologies, the

Mechanical Engineering and Automation College had external accessibility to puppets, and the Teacher Training College to bulletin boards, but not to virtual reality.

Based on the highest valid percentage data, at all three colleges combined, 41% (30/73) of the combined visual technologies were found at the department level, 44% (32/73) at te college level, 14% (10/73) in the area, and 1% (1/73) were not accessible. Overall, 85% (62/73) of the technologies were internally accessible, and 14% (10/73) were externally accessible.

Experience

Audio Technologies

Based on respective majorities (and/or highest valid percentage values) at each of the three colleges, all colleges had regular experience using telephones, radios, audio cassette recorders, and audio cassette. No one had experience using mobile cellular phones, speech synthesizers, and teleconferencing technologies. At the Mechanical Engineering and Automation College, no one indicated a lack of experience using audio cassette recorders or audio cassettes. At the Horticulture and Teacher Training Colleges, experience using short-wave radios was some and none, respectively. The combined frequency data supports the above findings completely.

At all three colleges combined, respondents had experience using 41% (11/27) of the audio technologies on a regular basis, 15% (4/27) 4 - 6 times, 30% (8/27) in 1 - 3 times, and 15% (4/27) not at all. Overall, 85% (23/27) of these technologies had been used by respondents, and 15% (4/27) had not.

Television Technologies

Based on respective majorities (and the highest values seen) at each of the three colleges, all colleges had regular experience using cable (highest was at the Mechanical Engineering and Automation College) and satellite dishes (downlink). The Mechanical Engineering and Automation College had regular experience using closed-circuit, satellites, videotape cameras/recorders, and teletext technologies, the Horticulture College with public broadcast and closed-captioned, and the Teacher Training College with teletext and public broadcast.

At the Horticulture College, a majority had no experience using slow scan, satellite uplinks, video teleconference, microwave (ITFS), and videotex technologies. At the Mechanical Engineering and Automation College, a majority of respondents had no experience using any of the technologies except cable, teletext, and videotape cameras/recorders. At the Teacher Training College, no one had experience using commercial broadcast, video teleconferencing, videotex, satellite uplinks, microwave

(ITFS), or slow scan technologies. A majority had no experience using satellites, closed-captioned, satellite dishes (downlink), and teletext technologies.

The combined frequency data indicates that the Mechanical Engineering and Automation College had regular experience with teletext. The rest of the findings were supported. At all three colleges combined, respondents had experience using 25% (13/52) of the television technologies on a regular basis, 19% (10/52) 4-6 times, 40% (21/52) in 1-3 times, and 16% (8/52) not at all. Overall, 84% (44/52) of these technologies were used by respondents, and 16% (8/52) were not.

Computer Technologies

At the Horticulture College, a majority of respondents had no experience using the computer technologies except database searching, graphics, mainframes, minicomputers, personal computers, and printers, at the Mechanical Engineering and Automation College - animation, computer managed instruction (CMI), electronic mail, fiber optics, and modems, and at the Teacher Training College, all but graphics, personal computers, and printers. At the Teacher Training College, no one had experience using fiber optics or modems.

Based on highest valid percentages, all three colleges had regular experience using personal computers and printers, with additional regular use by the Mechanical

Engineering and Automation College with computer assisted design (CAD), LANs, and computer assisted learning (CAL), and at the Teacher Training College with multi-media technologies.

According to the combined frequency data, all three colleges had experience in every computer technology except the following: at the Horticulture College - modems, and at the Teacher Training College - fiber optics and modems. At all three colleges combined, respondents had experience using 19% (10/54) of the computer technologies on a regular basis, 13% (7/54) 4-6 times, 63% (34/54) 1-3 times, and 5% (3/54) not at all. Overall, 95% (51/54) of these technologies had been used by respondents, and 5% (3/54) had not.

Computer Software Technologies

At the Horticulture College, a majority of respondents had no experience using the computer software technologies except data processing, database management, spreadsheets, and word processors, at the Mechanical Engineering and Automation College with artificial intelligence, communications software, courseware design, database management, expert systems, Hypercard, hypermedia, and programmed instruction technologies, and at the Teacher Training College with communications software, data processing, database management, and simulation technologies. No one had experience using artificial intelligence, courseware design, expert systems, and hypermedia technologies at the Teacher Training College. No college had experience with Hypercard.

Regular experience strengths were in spreadsheets, data processing, word processors, and desktop publishing at the Horticulture College, in word processors, data processing, desktop publishing, and spreadsheets at the Mechanical Engineering and Automation College, and in word processors, spreadsheets, desktop publishing, and programmed instruction at the Teacher Training College.

According to the combined frequency data, all of the above findings were supported. At all three colleges combined, respondents had experience using 19% (10/53) of the computer software technologies on a regular basis, 19% (10/53) 4 - 6 times, 43% (23/53) 1 - 3 times, and 19% (10/53) not at all. Overall, 81% (43/53) of these technologies had been used by respondents, and 19% (10/53) had not.

Visual Technologies

At the Horticulture College, a majority of respondents had no experience with bulletin boards, electronic blackboards, optical data disks, puppets, video disks, and virtual reality technologies, with bulletin boards, electronic blackboards, optical data disks, puppets, teletypewriters, video disks, and virtual reality technologies at the Mechanical Engineering and Automation

Colleges, and with bulletin boards, electronic blackboards, teletypewriters, or video disks at the Teacher Training College.

At the Horticulture College, no one lacked experience with field trips, manipulatives, overhead transparencies, and videotape cassettes, and with charts, manipulatives, or overhead transparencies at the Mechanical Engineering and Automation College. No one had experience with puppets at the Horticulture College, and no one with optical data disks or virtual reality technologies at the Teacher Training College. All colleges had regular experience using overhead transparencies and manipulatives, and in addition at the Horticulture College, charts, 35 mm slides, and filmstrips, with charts and videotape cassettes at the Mechanical Engineering and Automation College, and with maps, videotape cassettes, and print correspondence at the Teacher Training College.

The combined frequency data indicated that all three colleges had regular experience using 35 mm slides, charts, facsimile, field trips, filmstrips, manipulatives, maps, models, overhead transparencies, posters, print correspondence, and videotape cassettes. At all three colleges combined, respondents had experience using 32% (29/92) of the visual technologies on a regular basis, 34% (31/92) 4-6 times, 28% (26/92) 1-3 times, and 6% (6/92) not at all. Overall, 94% (86/92) of these technologies had been used by respondents, and 6% (6/92) had not.

Knowledge

Audio Technologies

At the Horticulture College, a majority of respondents had no knowledge of speech synthesizers and teleconferencing, and at the Teacher Training College of short-wave radios. At both the Horticulture and Mechanical Engineering and Automation Colleges, no one lacked knowledge of audio cassette recorders and audio cassettes.

Based on the top valid percentages, the Horticulture College had knowledge strength in telephones, radios, and audio cassette recorders, the Mechanical Engineering and Automation College additionally in audio cassettes, and the Teacher Training College additionally in short-wave radios.

The combined frequency data indicated that at all three colleges, there was a high level of knowledge of all technologies except at the Mechanical Engineering and Automation College (teleconferencing) and at the Teacher Training College (mobile cellular phones, speech synthesizers, and teleconferencing technologies). When all three knowledge levels were combined, all three colleges had were knowledge of every audio technology. At all three colleges combined, respondents had high levels of knowledge of 44% (12/27) of the audio technologies, 37% (10/27) some, and 19% (5/27) very little. Overall, respondents knew about 100% (27/27) of these technologies.

Television Technologies

At all three colleges, a majority of respondents had no knowledge of microwave (ITFS) and slow scan technologies, and at the Teacher Training Colleges, of satellite uplinks, video teleconferencing, and videotex technologies. At the Horticulture and Mechanical Engineering and Automation Colleges, no one indicated a lack of knowledge of videotape cameras/recorders, and of cable, public broadcast, and teletext at the Mechanical Engineering and Automation College.

Knowledge strength at the Horticulture College included closed-captioned, cable, closed-circuit, teletext, satellite dishes (downlink), and public broadcast technologies, in cable, satellite dishes (downlink), satellites, closed-captioned, closed-circuit, commercial broadcast, teletext, and videotape cameras/recorders at the Mechanical Engineering and Automation College, and in satellite dishes (downlink), cable, and public broadcast technologies at the Teacher Training College.

According to the combined frequency data, at the Teacher Training College, no one had knowledge of microwave (ITFS) and slow scan technologies. At all three colleges combined, respondents had high levels of knowledge of 17% (9/53) of the television technologies, 49% (26/53) some, 28% (15/53) very little, and 6% (3/53) not at all. Overall, respondents knew about 94% (50/53) of these technologies, and 6% (3/53) not.

Computer Technologies

At the Horticulture College, a majority of respondents reported a lack of knowledge of electronic mail, fiber optics, and modems, and at the Teacher Training College with fiber optics and modems. A majority of respondents indicated knowledge of all computer technologies at the Mechanical Engineering and Automation College.

Knowledge strengths at the Horticulture College were of electronic mail, personal computers, and mainframes, of personal computers, computer assisted design (CAD), modems, computer assisted learning (CAL), graphics, and printers at the Mechanical Engineering and Automation College, and of mainframes and personal computers at the Teacher Training College.

The combined frequency data shows, additionally, high levels of knowledge of all computer technologies except database searching at the Mechanical Engineering and Automation College, of CAL, electronic mail, minicomputers, modems, and lans at the Horticulture College. The data further showed that the Teacher Training College had no high levels of knowledge in its remaining computer technologies. If all three knowledge levels were combined, all three colleges had knowledge of all computer technologies.

At all three colleges combined, respondents had high levels of knowledge of 6% (3/50) of the computer technologies, 40% (20/50) some, and 54% (27/50) very little. Overall, respondents knew of 100% (50/50) of these technologies.

Computer Software Technologies

At the Horticulture College, a majority of respondents had no knowledge of expert systems, and at all three colleges, of Hypercard and hypermedia technologies (no one had any knowledge of these two technologies at the Teacher Training College). In addition, a majority of respondents had no knowledge of expert systems, simulations, or spreadsheet technologies at the Teacher Training College.

Knowledge strengths at the Horticulture College were of spreadsheets, word processors, and desktop publishing, of word processors, desktop publishing, expert systems, simulations, courseware design, and spreadsheets at the Mechanical Engineering and Automation College, and of programmed instruction and word processors at the Teacher Training College.

The combined frequency data showed that the Mechanical Engineering and Automation College had a high level of knowledge in every computer software technology except Hypercard. All colleges had knowledge of all computer software technologies, except where indicated earlier. At all three colleges combined, respondents had high levels of knowledge of 2% (1/45) of the computer software technologies, 36% (16/45) some, 58% (26/45) very little, and 4% (2/45) not at all. Overall, respondents knew about 96% (43/45) of these technologies, and 4% (2/45) not.

Visual Technologies

At the Horticulture College, no one lacked knowledge of charts, field trips, manipulatives, overhead transparencies, or videotape cassettes, and of charts, field trips, manipulatives, mock-ups, models, and overhead transparencies at the Mechanical Engineering and Automation College. A majority of respondents had some level of knowledge in all visual technologies at both the Horticulture and Mechanical Engineering and Automation Colleges, while at the Teacher Training College, a majority of respondents indicated a lack of knowledge of optical data disks, video disks, or virtual reality technologies.

Knowledge strengths at the Horticulture College were of overhead transparencies, 35 mm slides, charts, filmstrips, field trips, and posters, of charts, overhead transparencies, globes, manipulatives, posters, 35 mm slides, mock-ups, and videotape cassettes at the Mechanical Engineering and Automation College, and of manipulatives, 35 mm slides, charts, globes, puppets, and field trips at the Teacher Training College.

The combined frequency data showed high levels of knowledge of all visual technologies except: electronic blackboards at the Horticulture College, and 16 mm films, bulletin boards, electronic blackboards, games, mock-ups, optical data disks, teletypewriters, and virtual reality at the Teacher Training College. As well, high knowledge level strengths were shown (where not already indicated) for all three colleges of field trips, filmstrips, globes, manipulatives, maps, overhead transparencies, and videotape cassettes. If all three knowledge levels were combined, all three colleges had knowledge of all visual technologies.

At all three colleges combined, respondents had high levels of knowledge of 28% (22/78) of the visual technologies, 54% (42/78) some, and 18% (14/78) very little. Overall, respondents knew about of 100% (78/78) of these technologies.

Qualitative Data

Use of Distance Education in Work Assignments

The use of distance learning technologies and techniques were envisioned by the respondents to serve a variety of instructional and learning functions and in a variety of disciplines using different arrangements of technologies. A concern raised with this question dealt with the loss or reduction of teacher - students interaction. Some rejected the idea of distance education because of these communications problems, while others offered suggestions on how the technology could be used to supplement these perceived losses. According to many respondents, the success of distance education programs depended very much on a positive role of local television stations.

Use of Distance Education in College or Geographic Area

Ideas from Question 81 were further developed, or new ones offered. Many of the envisioned distance learning programs dealt with applications needed on a more personal or local level. A wide variety of programs were offered using various arrangements of technology. A large number of these programs involved continuing and postgraduate education.

Use of Distance Education in All Work Assignments

The responses here varied. Some were very much in favor of the possibility of using distance learning for all of their work assignments, while others were against it, or were conditionally interested. The conditional comments of support were based on concerns of poor infrastructure, that technology could not deliver effective hands-on instruction/experiences, that a lot of preparation would be necessary to convert traditional materials, that money was not available, that few knew of the possibilities or successes, or that teacher-student communication would be harmed.

Degree of Support for Distance Education

The majority response was that there was no support for distance education programs. The main reason was because people were simply unaware of the possibilities - that there was no tradition for these methods in Hungary. Other reasons given for negative support centered around costs, the country's small size, and that correspondence education had a bad reputation already. Those who felt there was support for distance learning based their opinions primarily on the need for Hungary to move forward, or that it represented new approaches to solving problems in education and society.

Political Role in Distance Education

The majority opinion was that politics played a key role in the process. Those who saw this role believed that political forces could be used to support it, that it could hamper progress, and that it was essential to find and nurture the political forces at various levels within the country. They saw many ways that could be used to gain this needed influence. The "no" respondents either believed that it was not a political decision, that it should not be a political decision, or that it was more a matter of finances and economics that determined support.

Barriers to Implementing Distance Education

Cited barriers dealt mainly with the lack of knowledge of distance education, experts, money, interest, fear of losing jobs, questionable success and acceptance of "distance education" graduates, or the enormous preparation and effort that would be required. A key component to many of these comments had to do with people's attitudes, prejudices and unwillingness to become involved in new things.

CHAPTER V

CONCLUSIONS AND RECOMMENDATIONS

Findings

The rectors at the three colleges (Horticulture College, Mechanical Engineering and Automation College, and Teacher Training College) in Kecskemét, Hungary were asked to select 10 - 15 planners from their faculty and staff that would likely be involved in the planning, development, and implementation of distance learning programs in the future. No other conditions were set for the selection of these participants. At predetermined times, the researcher met with the participants and interpreter to administer the instrument. The same interpreter was used throughout the process, and was involved in necessary changes to the instrument when problems arose. After each session, the pages of the survey were coded in case they became separated during analyses. The data from the survey were analyzed using SPSSX. The number of respondents were as follows: Horticulture College (N=16), Mechanical Engineering and Automation (N=16), and Teacher Training College (N=7).

In the survey, respondents were asked to rate their accessibility to, experience with, and knowledge of various technologies that could be used in distance learning programs. These 74 technologies were divided into five major technology categories: audio, television, computer, computer software and visual. Responses were to be circled on Likert scales next to each technology. In the second and third parts of the instrument, respondents were asked to answer open-ended and demographic questions, respectively. In the main part of the survey, each respondent was asked to make 222 responses - a very time consuming ordeal requiring a lot of thought and effort.

When the data was analyzed using SPSSX, the generated results were staggering - i.e. information overload. The key to analysis was to choose the right data to analyze, always keeping in mind the limitations of interpreting these kinds of survey responses. For example, asking non-technology experts about the accessibility of technology presented many interesting problems. Clearly, everyone had limitations to their experiences, and in most cases, very few agreed with one another. However, the importance to such a broad-based survey of informed (and not so informed) individuals was that one can get a better feel for what is really out there. Each respondent, in his or her own right, has seen many things and has had many varied experiences throughout their education and careers. Tapping into this potential was seen to be very important - even though it was known beforehand that responses would probably widely vary.

In analyzing this accessibility data, it was decided to look simply at frequencies and valid percentages. There was ample room to determine local conditions from this data.

The experience and knowledge data were much easier to analyze. Even though respondents were asked to rate themselves, the data indicated that they were likely very honest in self-analysis. In many cases, respondents rated themselves very low in some in the more basic technologies surveyed. Their answers to the open-ended questions were equally supportive of this belief that an accurate and honest picture of the local conditions had emerged.

In the analysis, care was taken to accurately show the findings. At the same time, it was necessary to perform certain analyses that would no doubt show conflicting results. When the misconceptions, individual responses, and majority opinions were collected and summarized, a very accurate picture emerged. The combined brainpower and experiences of the respondents yielded useful information that could be used, if needed, to guide planners in Kecskemét who are serious about the development, implementation, and evaluation of distance education programs.

In Part 1 of the Data Analysis, frequencies of responses of the individual technologies were examined at the most basic levels - within colleges within technology categories. In Part 2, these frequencies were reorganized at a higher level in order to compare data between colleges. In Part 3, the analyses changed from comparing frequencies to looking at majority and otherwise significant opinions. This was done for several reasons. During both visits in Kecskemét, the researcher visited each of the three colleges on several occasions, toured the facilities, and therefore had a general idea of what technologies were and were not accessible. In the first two parts of the Data Analysis, conflicts between responses were noted. This seemed to indicate that the respondents were unaware of what was really accessible - even inside their own institutions - a fact very common in American schools and universities. Therefore, it was necessary to look at majority opinions to see if any of the discrepancies were eliminated. This was the reason for the analyses chosen in Part 3.

Some of the problems disappeared, some remained, and more were created. It was apparent that a holistic means was necessary to accurately describe local conditions - which required taking into account both informed and uninformed individual opinions, as well as informed and uninformed majority opinions. As the analyses moved towards the broader picture where overall and average tables were developed, the details of earlier tables were lost - a natural expectation. The details could still be found at the lower levels of the Data Analysis, and they became progressively blurred as one moved up the chain of analyses.

Whereas each table was preceded by a summary of findings, they were separate and disconnected. At the end of Chapter IV can be found a summary of all data from every table in the data analysis. To prepare this major summary, the individual table summaries were collected and compared for similarities and differences. Very few inconsistencies were found, and when they were, they were indicated. The point here is that even though there were misconceptions among the respondents, the choice of analyses yielded consistent results. So, there is room and excuse to collect data from a wide variety of people, despite their levels of experience and knowledge, and end up with a fair and accurate description of local conditions - assuming one puts careful thought into analyses chosen.

In this part of the summary, it is unnecessary to restate the summary already found at the end of Chapter IV. Rather, several tables that were not included in that summary will be used here. These are more broadly based, and yield an overall picture of current local conditions in Kecskemét at the three colleges. When the planners begin discussions on the development of distance education programs, the details found in the earlier tables should be extremely useful in guiding their work. The latter tables are broader and less useful to planners - more so to an audience that wishes to know "in general" what was discovered. These broader tables are summarized below.

Accessibility

In terms of the broader technology categories (audio, television, computer, computer software and visual), there was accessibility to most technologies found within at all three colleges. With all three colleges working together on identification and use of needed technologies, accessibility is generally good, both internally and externally. Taken individually, and given that only the external sources of respective respondents will be utilized, the Teacher Training College had consistently less access to the technologies, when compared to the others.

When audio and visual technologies were divided into advanced and less advanced technologies, the advanced technologies are less accessible to all three colleges - and less so for the advanced audio technologies. As well, the advanced visual technologies were generally more accessible than the less advanced visual technologies. There were twice as many less advanced than advanced audio technologies, and four times as many less advanced than advanced visual technologies. If frequencies were doubled and quadrupled for the number of advanced audio and visual frequencies, respectively, in order to balance the findings, the same findings resulted (except one) - that is, the advanced visual technologies were now less accessible than the less advanced visual technologies.

When valid percentages were averaged together within technology categories, both the Horticulture and Mechanical Engineering and Automation Colleges had roughly equivalent levels of accessibility to all audio, computer, computer software, and visual technologies. The Horticulture College had higher accessibility than the Mechanical Engineering and Automation College to television technologies, while all three colleges hade similar accessibility to all less advanced technologies.

The Teacher Training College had less accessibility to all technologies when compared to the other two colleges, and the distinction was greater for advanced technologies.

Accessibility levels from highest to lowest order for all three colleges was the same (with one exception - that at the Teacher Training College, the accessibility of computer technology was higher than combined audio technology. These were, in order from most accessible to least accessible:

Less Advanced Audio

Less Advanced Visual

Combined Visual

Combined Audio

Computer

Software

Television

Advanced Audio

Experience

In terms of the broader technology categories (audio, television, computer, computer software, and visual), there was combined experience (all three colleges together) in using most of the technologies found within. Individually, in isolation from the other two colleges, the Teacher Training College had less experience overall in these technology categories.

There was more experience in general in using less advanced than advanced technologies. There was agreement among respondents that advanced visual technologies were experienced less than the advanced audio technologies, that less advanced audio technologies were generally experienced more than advanced audio technologies, and that advanced visual technologies were generally experienced more than less advanced visual technologies.

When the advanced technology frequencies were doubled and quadrupled as before, the above findings were still valid, except one: that advanced visual technologies were generally experienced less than less advanced visual technologies.

The Horticulture College had more experience using television and advanced visual technologies, and the Mechanical Engineering and Automation College had more in all audio and computer technologies. Both the Horticulture and Mechanical Engineering and Automation Colleges had comparable experience in using computer software (though the Horticulture College was slightly higher) and less advanced visual technologies. All three colleges had comparable experience using visual technologies (combined and less advanced), while the Teacher Training College had comparable experience with the Horticulture College in using computer technologies, had comparable experience with the Mechanical Engineering and Automation College in using television and advanced visual technologies, and had no experience in using advanced audio technologies.

The accessibility levels from highest to lowest order for all three colleges follows:

Horticulture College

- Less Advanced Audio
- Less Advanced Visual
- Combined Visual
- Combined Audio
- Television
- Software
- Computer
- Advanced Visual
- Advanced Audio

Mechanical Engineering and Automation College

- Less Advanced Audio
- Less Advanced Visual
- Combined Audio

Combined Visual

Computer

Software

Television

Advanced Visual

Advanced Audio

Teacher Training College

Less Advanced Visual

Less Advanced Audio

Combined Visual

Combined Audio

Computer

Software

Television

Advanced Visual

Advanced Audio

Knowledge

In terms of the broader technology categories (audio, television, computer, computer software and visual), there was combined knowledge (all three colleges together) of most of the technologies found within. Individually, in isolation from the other two colleges, the Teacher Training College had less knowledge overall in these technology categories.

In general, respondents had more knowledge of the less advanced audio and visual than with these same category advanced technologies. Respondents agreed that they had more knowledge of less advanced audio technologies than with advanced audio technologies, and that they had more knowledge of less advanced visual technologies than with advanced visual technologies. If the advanced audio and visual technologies were doubled and quadrupled again, no findings above changed.

The Mechanical Engineering and Automation College had higher knowledge levels of all technologies except the following, which it shared comparably with the Horticulture College: television, software, and visual (combined and less advanced) technologies. The Teacher Training College had higher knowledge levels of advanced audio than the Horticulture College.

The accessibility levels from highest to lowest order for all three colleges follows:

Horticulture College

Less Advanced Audio

Less Advanced Visual

Combined Visual

Television

Combined Audio

Computer

Advanced Visual

Software

Advanced Audio

Mechanical Engineering and Automation College

Less Advanced Audio

Less Advanced Visual

Combined Visual

Combined Audio

Computer

Advanced Audio

Television

Advanced Visual

Software

Teacher Training College

Less Advanced Audio

Less Advanced Visual

Combined Audio

Combined Visual

Computer

Advanced Audio

Television

Software

Advanced Visual

The overall summary above is broad in scope, yet yields an accurate display of findings which are of more use to the casual viewer who is interested in knowing, "in general," the local conditions of accessibility to, experience with, and knowledge in the distance education technologies surveyed at the three colleges in Kecskemét. For a more detailed view, the reader is highly encouraged to study the numerous tables contained in Chapter IV. In order to move one step forward and answer the question "So what?" to all the data that was collected and analyzed, the remainder of this chapter is devoted to Conclusions and Recommendations.

Conclusions

1. The Horticulture and Mechanical Engineering and Automation Colleges were roughly equivalent in accessibility to and experience with the 74 technologies surveyed on the instrument.
2. The Mechanical Engineering and Automation College had more knowledge of the 74 technologies than either of the other two colleges.
3. The Teacher Training and Horticulture Colleges had roughly equal knowledge of these 74 technologies.
4. The Teacher Training College had less accessibility to and experience with these 74 technologies when compared to the other two colleges.
5. The surveyed respondents (and likely those not surveyed) had definite strengths and weakness regarding experience using and knowledge of the various technologies that can be used in distance learning programs.
6. For the purposes of identifying external sources of technology and expertise, AREA responses made by participants means that they had some knowledge of

accessibility - even if it did not fall within the traditional boundaries of their college campuses. Since they know of accessibility, it is assumed they probably have a chance of knowing those people in charge of the technologies, or those who have access themselves - and the respondents may have current access personally, or have had it in the past.

7. The nature of the survey prevented giving descriptions of the different technologies in the instrument - it was necessary to know their knowledge levels without prejudicing them beforehand. It was assumed that those with experience would be familiar with the technologies, so no descriptions were necessary. For those who need general descriptions of some of the technologies found in the instrument, Chapter 1 lists them in the same order as found in the survey instrument. Literature is readily available which can describe the technologies, their uses, limitations, and benefits in much more detail.
8. It was also necessary to leave the selection of the respondents to the college rectors. They would be expected to make initial choices of planners anyway. By giving them the freedom to choose their own people for the survey, the makeup was more likely to mimic what the actual planners would be like. By

not heavily inundating the ranks with technology people, the respondents were also more likely to represent the general levels of accessibility to, experience with, and knowledge of the technologies as the rest of the unsurveyed faculty and staff members who will be impacted by distance education programs. As well, since faculty and staff members that do become involved in distance education programs are not limited to teachers and technology experts, the potential inclusion of administrative personnel will make the mix of participants even more realistic. Administrators do have needs and demands that may not be of prime concern to those in the trenches, so it is always wise to keep the team well-informed or sufficiently represented by administration.

Recommendations

1. As a first step in identifying the best experts found internally, the earlier tables of this case study should be examined carefully, with close attention paid to frequencies in the DEPARTMENT and COLLEGE columns (for accessibility), in the USED AT LEAST ONCE A MONTH columns (for experience), and in the A LOT columns (for knowledge). Once these experts have been found, then their networking experiences should be utilized to the best degree

possible. If necessary, move left in the columns until a sufficient number of participants can be found.

2. Use the experience and knowledge frequencies found in the tables as a guide to determine the likely levels of training that will be required for the initial planning teams and for the rest of the involved faculty and staff members.

3. Planners and interested participants should not rely as heavily on the broader conclusions drawn from the study, but rather the narrower details found deep within the tables. In an attempt to describe the current local conditions, it was necessary to look at individual and group majority responses. As a more practical matter, it is more important to identify those individuals with the best accessibility, experience levels, and knowledge levels who are eager and willing to become involved. The broader conclusions are meant as a "general" overview.

4. In order to gain the best advantage in developing, implementing, and evaluating future distance education programs, the three colleges must work closely with one another to gain access to the technologies intimated by the individual respondents. As well, every effort must be made to

secure the help and personally-known accessibility to technologies from the other faculty and staff members who were not surveyed.

5. These people must be identified and encouraged to join in the process, especially in the beginning, when the identification of planners begins. The combined experience and knowledge of the surveyed members (and those not surveyed) should be discussed openly in order to choose the best possible teams who will need to develop and carry out training programs for other faculty and staff members at all three colleges.
6. These AREA people have the potential of widening the circle of technologies that could be made accessible for future cooperative distance education projects between the three colleges, or in conjunction with other donor or participating institutions or individuals. Make use of these connections and insights. Do not solely rely on the efforts of just your technology people.

A lot of issues were raised in the open-ended questions. The following is an attempt to address as many as possible. The only limitation to these recommendations is that they may not fit exactly into Kecskemét conditions. They are an attempt to address how some of these same problems are addressed here, how they might be addressed there, or in some cases, to take issue with some of what was stated in the responses. It is useful to read the appropriate tables for each question where respondents' comments were collected, before reading the corresponding recommendations. It will make them more meaningful.

Question 80 - Use of Distance Education in Your Work Assignments

7. A lot of very interesting applications were raised here. Many of the respondents intimated that there were various technologies that could be used to design distance learning programs. The greatest possible chance to have ideas put to use will occur if planners know about ALL the technologies and are able to weigh the advantages and disadvantages. Relying on vendors to give the best advice is not always wise. The more the planning team knows, the better the end results, even if they must work within time, money, and/or pedagogical constraints.
8. Some expressed the need to get local television stations involved in the process. This can be very advantageous and may result in reaching wider audiences for the least amount of money. It has the added potential of reaching wider audiences with the least amount of upgrading of technology in the homes of students. During several visits to Kecskemét television station, it was apparent that the

director there was eager to get involved in programming with the colleges and schools. It is the planners' task to get the station interested in select projects.

9. Several comments were made with reference to Hungary not being a big country, and that distance education was not necessary. Distances do not have to be large for distance education to become popular. Students are involved in our university (and many other places) who live only miles from the campus. The key is "accessibility." People pay money for convenience, as Hungarians do when they use public transportation, telephones, or personal cars to carry children to school. The prices that can be asked of consumers for "convenience" have to be discovered best there, but it is reasonable to point out that many people can be persuaded to exchange money for time saved. They may be required to work during regular school hours, which leaves them available at other more convenient times to attend or participate in distance education classes. They must be willing to sacrifice the time and effort that future potential holds for them - in exchange for payment for the convenience to attend quality distance education classes.

10. Many raised the issue of teacher - student contact, and what distance learning would do to these important connections. Distance learning does not have to eliminate contact - it can be used to improve it, initiate it, or in the case of poorly planned programs, it can also hurt it. Some research shows that distance education students may be more motivated to learn than other students, which means they can be expected to work better alone. But this is not always the case. Careful screening and preparation of the students will alleviate some of these difficulties. Initially, it is probably better to attract interested students to the entire notion of distance learning than to make it mandatory. Once the word spreads that a good program is ongoing, then this word-of-mouth advertisement will likely bring in more students. In any case, the needs of the students and teachers must be taken into account so that the teacher - student contacts are sufficient and qualitative. In the case where tuition money is a problem, the benefits of bartering for goods and services should not be overlooked. Students may not be able to pay of a course, but they may be able to donate some time fixing cars, volunteering at schools, tutoring, etc. Since these are direct monetary benefits and

assets to a college or public school, it might prove a useful way to involve some in an otherwise unavailable program.

11. In cases where support can be found for the use of facilities or accessible technologies, it might be possible to field-test distance learning programs developed by motivated teachers. If schools are not quite ready to make a commitment to a full-scale distance education program, perhaps rectors can be persuaded to allow some freedom to explore. Both will gain experience from the process, and it may turn into a viable option in the near future.

Question 81 - Use of Distance Education in College or Geographic Area

12. As with the last question, a lot of colorful applications for distance learning programs were described. To better determine which ones hold the most promise, interested faculty and staff members should devise a list of all the possible programs that might be of interest to the people in Kecskemét or surrounding areas - even in Budapest. There is no reason why distance learning programs cannot be conducted in Budapest as weekend programs when many teachers return home for the weekend. The infrastructure and support may be better there - as well as more students with money. Since distance

education has the potential to operate from "distances", programs developed in Kecskemét can be aimed at Budapest or other cities and towns. Pass out the survey, and provide for open-ended responses. This may be a better way to determine the market needs. As well, find out the specific hours and days that they are not actively involved in work or school - these will be the times when the programming and contact must take place.

13. In those cases where hands-on experience is a necessary part of the curriculum, it is important to keep in mind that distance learning program techniques do not have to replace the entire course - perhaps only applicable parts. With money shortages as they are in Hungary, becoming involved in smaller distance learning experiences might be the best place to begin.

Question 82 - Use of Distance Education in All Work Assignments

14. Consultations by phones may be expensive, but there may be other alternatives. Businesses or schools may be persuaded to allow students to use phones during non-business hours for scheduled and perhaps lengthy consultations. The exchange can take many forms - either in recognition for being actively involved in education programs (good politics and

advertisement), barter for services, etc. Since many businesses have porters on duty in the evenings, this may be a good place to begin looking for active education - business partnerships.

15. Unlike the responses for the first two questions, these were more "hostile" towards the idea of distance education. The question was purposely worded this way in order to draw out deeper concerns - and it did. In the first two questions, distance education programs were not described as being used for "all" work assignments. When it was in this case, the responses were much harsher. As before, distance education programs need not do away with the teacher - student interaction. It can be used in a variety of ways to supplement these connections. In the future, distance education, according to many proponents, will take on a very significant role in education - as convenience and economics demand more freedom. It may be worth attempting several intensive all-technology programs to test the market for total immersion. In this way, one is better prepared for a teaching/learning method that may be inevitable later on.

16. Choosing the right course to apply distance education techniques to is very important. If one or more technologies are not effective for some or

all aspects of the program, then other techniques and technologies can be tried.

Question 83 - Degree of Support for Distance Education

17. Many of the responses described how a lack of knowledge of distance education was the cause for distrust and non-acceptance. That is why in a properly designed distance education program, information, training, and advertisement are important. As some respondents indicated, when the word gets out, people will be able to make informed decisions on whether or not they approve. In the case of the comment that correspondence education had been discontinued at many institutions, it is only fair to point out that distance learning does not equal correspondence education, and vice versa. It is one form of it, not the necessary equivalent. It was even suggested that distance education had a potential for success in some areas of education and continuing education, merely because it offered a new and innovative approach to traditional methods. Research is available that supports this idea - and the technology can be very exciting to use as well.

18. It is well worth the effort to recognize that the high unemployment rate may be a means of getting distance education programs started - assuming one has a good product that can deliver what it promises

- and that it will make a marked difference in lowering the unemployment rate. Other social conditions can be very instrumental in getting such programs started - but careful planning is always a key to success. One comment was that the youth would like it - so this market should be targeted as well.

Question 84 - Political Influence on Distance Education

19. Some respondents suggested that there may be both political and economic forces at work here, and that they may be one in the same, or reasons for one another. Many decisions concerning funding of education are made under the influence of politics and self-interest. In the case of distance education programs, some American educators also feel that such use of technology is a threat to jobs. This may be the case, but if a need is not being fulfilled, and distance learning can fill it, then it is justified - assuming again that it is well planned, implemented, and meets educational needs.

20. Political parties (national or local) can be instrumental in pushing distance education, as well as businesses and citizens. Find out who the players are how they stand on the issues.

Question 85 - Biggest Barrier to Implementing Education in Your School

21. Barriers are financial, personal, a lack of popularity and accurate information, shortages of available experts, existing training programs, pedagogical considerations, etc. These have been addressed earlier.

22. One comment worth noting was that diplomas obtained through distance education methods would not be as valuable as those obtained through the traditional means. Unless this comment was meant to apply to the earlier question of the use in "all work assignments," then the comment may be cause for concern - especially in a system that relied heavily in the past on correspondence education for many programs. If the future sees total use of distance learning, then time will solve the problems of "inferior" diplomas.

23. And one final comment about "attitude" and "conviction." These are the same problems faced in the United States - in all facets of education. For the technology skeptic, time is ticking away - technology is here and more is inevitable. Educators should make the most use of it while input is still possible. Otherwise, market forces are likely to overtake tradition and force the

acceptance of vendor-designed programs. Pedagogists can and must bring enormous weight to bear on the quality and proper functioning of distance education programs - now, not later. It has been the case here in the United States with the use of technology in education - teachers have been forced into action, and they are generally unsatisfied with the capabilities of the products handed to them. Inaction does have its consequences.

Further Research

1. Research can be expanded to other colleges and universities throughout Hungary. If respondents and institutions are chosen at random, then inferences are possible.
2. The survey can be tested in other Eastern European countries undergoing similar political and social changes. Comparisons can be made between institutions.
3. Comparative studies between similar institutions in both the Unites States and Hungary can be made to see how conditions differ.
4. Prepare a detailed survey for property managers at the institutions to determine what technologies actually exist - and compare that with the responses by their respective faculty/staff members using the survey instrument used in this study.

5. Survey businesses, factories, government agencies and ministries, citizens, and other institutions to determine technology capabilities, needs, and desire for joint projects with schools.

<u>Executive Summary</u>

Over the past two summers, the researcher was able to travel to Hungary to conduct research in Kecskemét, a small town southeast of Budapest, where three colleges were discussing plans to establish a new university and develop some programs using distance education technologies. Each college rector was asked to choose 10-15 faculty/staff members to take the survey, with respondents selected based on the strong likelihood that they would be called upon in the future to design, implement, and evaluate future distance education programs. The case study was designed to determine these planners' levels of accessibility of, knowledge of, and experience with 74 different technologies that could be used in distance education programs.

Results revealed that, in general, both the Horticulture and Mechanical Engineering and Automation Colleges were roughly equivalent in accessibility of and experience with the 74 technologies surveyed on the instrument, the Mechanical Engineering and Automation College had more knowledge of the technologies than either of the other two colleges, the Teacher Training and Horticulture Colleges had roughly equal knowledge of these technologies, and the Teacher Training College had less accessibility of and experience with these technologies when compared to the other two colleges.

Even though no final joint decisions have been made on institutional/program consolidation or distance education program development, this case study represented an attempt to gather useful data which could be used to enable these planners in their decision making. No attempts were made to promote distance education. Because of the magnitude of data analyzed, it was necessary to move from the very detailed to more general perspectives. Irregardless of the ultimate outcome of these case study efforts, it is certain that much was and can be gained by working closely with Hungarians educators in projects of joint concern. In this age where collaboration between East and West is needed, this case study represents an example where collaboration is possible, rewarding, and enlightening.

This case study lends itself well to comparative studies of similar colleges in both Eastern Europe and Western countries, expansions to more inferential studies, and many variations with regards to college type, respondents chosen, technology inclusions, time periods, etc. It is also recommended that correlations be made between respondents' perceptions and actual inventories of technologies. Future planners need to compare which technologies are being used in their facilities, what teaching/learning activities are being supported, and the level of experience and knowledge of non-surveyed faculty/staff members. Whatever additional research is planned, further insights represent data that can be used by these future planners.

Making decisions to conduct this and other kinds of research in Hungary require time, consideration, and thorough planning. American researchers will quickly learn how wonderfully generous and accommodating the Hungarian people really are. Hopefully, the political and economic barriers which once kept our two cultures apart will never occur again. This researcher's experience in Hungary was so personally and professionally enriching that plans are underway to create interest on both sides for the establishment of a research Liaison Office inside Hungary. It is necessary for many reasons - there are still many social, economic, and historical barriers to conducting sustained joint research there.

Historically, teaching and research in Hungary have been separated, with only a select few having access to the funds and opportunities required to conduct research. Hungarian higher education reformers point out the need to address this problem. Partly because of the strong need to meet short proposal submission deadlines, many American and West Europeans have been discouraged in their attempts to work with their Hungarian colleagues. Both of these barriers can be overcome with the establishment of a research Liaison Office in Hungary. There, researchers on both sides will have a mechanism which will afford them the greatest possible chances of success. What is needed is a more efficient, rapid, and continuous system through which both

Hungarian and American researchers, educators, and students can channel their needs, collect their data, meet deadlines, and pursue future research together.

Funds are scarce. It is equally true that an incomplete and inefficient research base prevents access to these funds by a majority of educators. The Liaison Office represents a unique opportunity to meet the barriers face-to-face, freely admit the shortcomings, negotiate both scope and function of the office, and act accordingly. American-Hungarian educational research has a future if we act together.

APPENDICES

APPPENDIX A

COVER LETTER & SURVEY (ENGLISH VERSION)

Dear Survey Takers,

I wish to express my appreciation in advance for your assistance in helping me complete my dissertation data collection. As you know, there are efforts currently underway in Kecskemt for the planning and establishment of a new university. Some of the programs to be offered there may involve the use of distance education technologies. I am involved in the collection of background data that will hopefully be used to inform planners before a decision is made to use these technologies - and if so, which ones.

I asked your college director to select fifteen faculty/staff members who would likely be asked to assist in the planning, establishment, and implementation of these distance education programs at the new university. You were selected. As you know, the proper planning of any educational program requires careful study and the gathering of information.

Since I need a current and accurate record of your knowledge and experience, please do not consult any outside sources for the answers you provide. Studying about distance education technologies or talking with other colleagues will bias the answers you give. So, please rely on you memories and experience only.

You are asked to give your name and other personal data in this survey. Although the results will be published and available to educational professionals, your identity will not be divulged. If you would like an unbound final copy of the completed dissertation and survey results, please write your full name and address on the back of this page, and be sure to include this page in the returned survey package.

Again, thank you for your assistance. Your help is greatly needed.

Sincerely,

Richard A. Dietzel
Dr. Larry Hudson (Committee Chair)

Survey Overview

In PART I, you are asked to provide data on your experience with and knowledge of distance education technologies, and to what degree these technologies are available.

The possible responses will be:

Knowledge	Experience	Accessibility
0-none	0-none	0-not
1-very little	1-used 1-3 times	1-in area
2-some	2-used 4-6 times	2-in college
3-a lot	3-used at least monthly	3-in department

In PART II, several open-ended questions are provided for your comments. Use additional paper if necessary.

In PART III, you will be asked to provide demographic information. Your identity will remain confidential.

NOTE: It might be much easier to fill in the column labeled KNOWLEDGE for items 1 - 79, then move to the next column labeled EXPERIENCE, then ACCESSIBILITY - but it is your choice.

PART I: TECHNOLOGIES DATA

Directions: Please circle the correct response. The response rates possible are shown at the top of each page.

****

A. AUDIO

Category/Items	Knowledge	Experience	Accessibility
	0-none 1-very little 2-some 3-a lot	0-none 1-used 1-3 times 2-used 4-6 times 3-used at least once a month	0-not 1-in area 2-in college 3-in department
1. Audio-Cassette Recorders	0 1 2 3	0 1 2 3	0 1 2 3
2. Audio-Cassettes	0 1 2 3	0 1 2 3	0 1 2 3
3. Mobile Cellular Phones	0 1 2 3	0 1 2 3	0 1 2 3
4. Radios	0 1 2 3	0 1 2 3	0 1 2 3
5. Short-Wave Radios	0 1 2 3	0 1 2 3	0 1 2 3
6. Speech Synthesizers	0 1 2 3	0 1 2 3	0 1 2 3
7. Teleconferencing	0 1 2 3	0 1 2 3	0 1 2 3
8. Telephones	0 1 2 3	0 1 2 3	0 1 2 3

Other (Please list and rate)

9. ________________	0 1 2 3	0 1 2 3	0 1 2 3

B. TELEVISION

10. Cable	0 1 2 3	0 1 2 3	0 1 2 3
11. Closed-Captioned	0 1 2 3	0 1 2 3	0 1 2 3
12. Closed-Circuit	0 1 2 3	0 1 2 3	0 1 2 3
13. Commercial Broadcast	0 1 2 3	0 1 2 3	0 1 2 3
14. Microwave (ITFS)	0 1 2 3	0 1 2 3	0 1 2 3
15. Public Broadcast	0 1 2 3	0 1 2 3	0 1 2 3
16. Satellite Dishes (Downlink)	0 1 2 3	0 1 2 3	0 1 2 3
17. Satellite Uplinks	0 1 2 3	0 1 2 3	0 1 2 3
18. Satellites	0 1 2 3	0 1 2 3	0 1 2 3
19. Slow Scan	0 1 2 3	0 1 2 3	0 1 2 3
20. Teletext	0 1 2 3	0 1 2 3	0 1 2 3
21. Video Teleconferencing	0 1 2 3	0 1 2 3	0 1 2 3
22. Videotape Cameras/Recorders	0 1 2 3	0 1 2 3	0 1 2 3
23. Videotex	0 1 2 3	0 1 2 3	0 1 2 3

Other (Please list and rate)

24. ________________	0 1 2 3	0 1 2 3	0 1 2 3

C. COMPUTERS

Category/Items

	Knowledge	Experience	Accessibility
	0-none 1-very little 2-some 3-a lot	0-none 1-used 1-3 times 2-used 4-6 times 3-used at least once a month	0-not 1-in area 2-in college 3-in department
25. Animation	0 1 2 3	0 1 2 3	0 1 2 3
26. Computer Assisted Design (CAD)	0 1 2 3	0 1 2 3	0 1 2 3
27. Computer Assisted Instruction (CAI)	0 1 2 3	0 1 2 3	0 1 2 3
28. Computer Assisted Learning (CAL)	0 1 2 3	0 1 2 3	0 1 2 3
29. Computer Managed Instruction (CMI)	0 1 2 3	0 1 2 3	0 1 2 3
30. Database Searching	0 1 2 3	0 1 2 3	0 1 2 3
31. Electronic Mail	0 1 2 3	0 1 2 3	0 1 2 3
32. Fiber Optics	0 1 2 3	0 1 2 3	0 1 2 3
33. Graphics	0 1 2 3	0 1 2 3	0 1 2 3
34. Mainframes	0 1 2 3	0 1 2 3	0 1 2 3
35. Minicomputers	0 1 2 3	0 1 2 3	0 1 2 3
36. Modems	0 1 2 3	0 1 2 3	0 1 2 3
37. Multi-Media	0 1 2 3	0 1 2 3	0 1 2 3
38. Networks (LAN)	0 1 2 3	0 1 2 3	0 1 2 3
39. Personal Computers	0 1 2 3	0 1 2 3	0 1 2 3
40. Printers	0 1 2 3	0 1 2 3	0 1 2 3

Other (Please list and rate)

41. ____________________	0 1 2 3	0 1 2 3	0 1 2 3

D. Computer Software

Category/Items

	Knowledge	Experience	Accessibility
	0-none 1-very little 2-some 3-a lot	0-none 1-used 1-3 times 2-used 4-6 times 3-used at least once a month	0-not 1-in area 2-in college 3-in department
42. Artificial Intelligence	0 1 2 3	0 1 2 3	0 1 2 3
43. Communications Software	0 1 2 3	0 1 2 3	0 1 2 3
44. Courseware Design	0 1 2 3	0 1 2 3	0 1 2 3
45. Data Processing	0 1 2 3	0 1 2 3	0 1 2 3
46. Database Management	0 1 2 3	0 1 2 3	0 1 2 3
47. Desktop Publishing	0 1 2 3	0 1 2 3	0 1 2 3
48. Expert Systems	0 1 2 3	0 1 2 3	0 1 2 3
49. Hypercard	0 1 2 3	0 1 2 3	0 1 2 3
50. Hypermedia	0 1 2 3	0 1 2 3	0 1 2 3
51. Programmed Instruction	0 1 2 3	0 1 2 3	0 1 2 3
52. Simulations	0 1 2 3	0 1 2 3	0 1 2 3
53. Spreadsheets	0 1 2 3	0 1 2 3	0 1 2 3
54. Word Processors	0 1 2 3	0 1 2 3	0 1 2 3

Other (Please list and rate)

55. ____________________	0 1 2 3	0 1 2 3	0 1 2 3

E. Visual

Category/Items	Knowledge	Experience	Accessibility
	0-none 1-very little 2-some 3-a lot	0-none 1-used 1-3 times 2-used 4-6 times 3-used at least once a month	0-not 1-in area 2-in college 3-in department
56. 16 mm Films	0 1 2 3	0 1 2 3	0 1 2 3
57. 35 mm Slides	0 1 2 3	0 1 2 3	0 1 2 3
58. Bulletin Boards	0 1 2 3	0 1 2 3	0 1 2 3
59. Charts	0 1 2 3	0 1 2 3	0 1 2 3
60. Electronic Blackboards	0 1 2 3	0 1 2 3	0 1 2 3
61. Facsimile (FAX)	0 1 2 3	0 1 2 3	0 1 2 3
62. Field Trips	0 1 2 3	0 1 2 3	0 1 2 3
63. Filmstrips	0 1 2 3	0 1 2 3	0 1 2 3
64. Games	0 1 2 3	0 1 2 3	0 1 2 3
65. Globes	0 1 2 3	0 1 2 3	0 1 2 3
66. Manipulatives	0 1 2 3	0 1 2 3	0 1 2 3
67. Maps	0 1 2 3	0 1 2 3	0 1 2 3
68. Mock-ups	0 1 2 3	0 1 2 3	0 1 2 3
69. Models	0 1 2 3	0 1 2 3	0 1 2 3
70. Optical Data Disks	0 1 2 3	0 1 2 3	0 1 2 3
71. Overhead Transparencies	0 1 2 3	0 1 2 3	0 1 2 3
72. Posters	0 1 2 3	0 1 2 3	0 1 2 3
73. Print Correspondence	0 1 2 3	0 1 2 3	0 1 2 3
74. Puppets	0 1 2 3	0 1 2 3	0 1 2 3
75. Teletypewriters	0 1 2 3	0 1 2 3	0 1 2 3
76. Video Disks	0 1 2 3	0 1 2 3	0 1 2 3
77. Videotape Cassettes	0 1 2 3	0 1 2 3	0 1 2 3
78. Virtual Reality	0 1 2 3	0 1 2 3	0 1 2 3

Other (Please list and rate)

79. ____________________	0 1 2 3	0 1 2 3	0 1 2 3

PART II: OPEN-ENDED QUESTIONS

Definition: Distance education is the use of one or more "technologies" to provide instruction when the instructor and student are at different locations or at different times.

80. Using the above definition, how would you use distance education in your work assignments?

81. What do you envision using distance education for in your college or geographic area?

82. How would you feel about using distance education for all of your work assignments?

83. What is the degree of support you perceive exists NOW for the use of distance education?

84. What role does the political "picture" have on the use of distance education?

85. If you had the funds for technology, what would be the biggest barrier to implementing distance education in your school?

PART III: DEMOGRAPHIC DATA

Directions: Place a check in or write your response in the appropriate spaces provided.

86. Name ____

87. School
a. _____ Teacher Training College
b.. _____ Horticultural College
c. _____ College of Engineering and Automation

88. Years work experience in your present job _____

89. Gender

_____ Male
_____ Female

90. Age _____

91. What will be your role in the design, development, or implementation of the distance education programs?

a. _____ no role
b. _____ unknown
c. _____ written suggestions
d. _____ committee involvement
e. _____ leader
f. _____ teacher

92. What is your highest education completed?

a. _____ High School
b. _____ Vocational
c. _____ College
d. _____ University
e. _____ Doctorate

93. In general, to what degree are you aware of distance education?

a. _____ none at all
b. _____ a little
c. _____ moderate
d. _____ high

APPENDIX B

COVER LETTER & SURVEY (HUNGARIAN VERSION)

Kedves kollegák!

Elöre is köszönöm a segitségüket, hogy támogatnak a disszertációmhoz szükséges adatok gyüjtésében. Ahogyan önök is értesülhettek róla, jelenleg tervezés alatt van egy ũj egyetem megalapitása Kecskeméten. A választható szaktárgyak között valószinüleg lesz olyan ág, mely a távokatatás technológiáját fogja képviselni. Mivel én tagja vagyok az adatgyüjtö csoportnak remélem, hogy e kutatás eredménye segitséget fog nyujtani e program tervezöinek az uj technológia felhasználásában.

A föiskola/egyetem igazgatója kérésemre kiválasztott 15 oktató tanárt, hogy segitséget kapjunk az uj távoktatás tervezésében, kifejlesztésében és alkalmazásában. Az ön segitségére szükségünk van. Mint ahogyan ön is tudja, mindenféle oktatási program kialakitása gondos elökészitést és adatgyüjtést igényel.

A kutatás e részében szeretném kideriteni, hogy önnek milyen elképzelései vannak erröl az oktatási formáról és ezért kérem önt, hogy semmilyen külsö segitséget ne vegyen igénybe a válaszadáskor. Távoktatási technologia tanulmányozása, vagy kollegái véleményének ismerete elönytelenül befolyásolhatja válaszait. Kérem csak a saját véleményére és tapasztalataira hagyatkozzon.

Bár kérdöivünkön kérjük személyes adatainak megadására, az eredmény kiadásakor ezen adatokat nem fogjuk nyilvánosságra hozni. Amennyiben szeretne egy másolatot kapni az összegyüjtött adatok eredményeiröl, irja nevét és pontos cimét a tuloldalra és mellékelje azt válaszaival együtt. Kérem a kitöltött adatlapot a mellékelt boritékban öt munkanapon belül juttassa el a dékáni hivatalba a kutatási csoport vezetöjéhez.

Ismételten köszönöm az ön segitségét, melyre nagyon számitok.

Tisztelettel:

Richard A. Dietzel

Dr. Larry Hudson
(Kutatási csoport igazgató)

Kérdöiv Tartalom

I. A válaszadó ismerete a távoktatás területén, beleértve a távoktatás népszerüségét.

A lehtséges válaszformák a továbbiak:

Tudás	Tapasztalat	Hozzáférhetöség
0 - semmilyen	0 - semmilyen	0 - nincs
1 - nagyon kevés	1 - használtam 1-2 alkalommal	1 - megyében
		2 - egyetemen /föiskolán
2 - közepes	2 - használtam 4-6 alkalommal	3 - tanszéken
3 - kiemelkedö	3 - használom havonta	

II. Több kérdésre várjuk válaszát. Kérem használjon szükség szerint további lapokat.

III. A válaszadó demográfiai adatai. Az ön személye nem fog nyilvánosságra kerülni.

Megjegyzés: A kérdések oszloponkénti megválaszolása megkönnyitheti a válaszadást, (1-79), de a válaszadás sorrendjét önre bizzuk.

I MÁSODIK RÉSZ: TECHNOLÓGIAI ADATOK

Utasitás: Kérem karikázza be a megfelelő választ.

A. AUDIO

	Tudás	Tapasztalat	Hozzáférhetőség
	0 - semmilyen 1 - nagyon kevés 2 - közepes 3 - kiemelkedő	0 - semilyen 1 - használtam 1-3 alkalommal 2 - használtam 4-6 alkalommal 3 - használom	0 - nincs 1 - megyében 2 - egyetemen/ főiskolán 3 - tanszéken havonta
1. kazettás felvevő készülék	0 1 2 3	0 1 2 3	0 1 2 3
2. audio kazetta	0 1 2 3	0 1 2 3	0 1 2 3
3. mobil cellular telefon	0 1 2 3	0 1 2 3	0 1 2 3
4. radió	0 1 2 3	0 1 2 3	0 1 2 3
5. rövidhullámu rádio	0 1 2 3	0 1 2 3	0 1 2 3
6. beszéd szintetizátor	0 1 2 3	0 1 2 3	0 1 2 3
7. telekonferencia	0 1 2 3	0 1 2 3	0 1 2 3
8. telefon	0 1 2 3	0 1 2 3	0 1 2 3

Más (Kérem irjon további adatokat válaszokkal)

9. ________________	0 1 2 3	0 1 2 3	0 1 2 3

B. TELEVIZIÓ

10. kábel TV	0 1 2 3	0 1 2 3	0 1 2 3
11. szövegfeliratos TV adás	0 1 2 3	0 1 2 3	0 1 2 3
12. zárt rendszerü TV	0 1 2 3	0 1 2 3	0 1 2 3
13. reklám TV	0 1 2 3	0 1 2 3	0 1 2 3
14. microwave (ITF)	0 1 2 3	0 1 2 3	0 1 2 3
15. állami TV	0 1 2 3	0 1 2 3	0 1 2 3
16. satellit TV vevö	0 1 2 3	0 1 2 3	0 1 2 3
17. satellit TV adó	0 1 2 3	0 1 2 3	0 1 2 3
18. mühold	0 1 2 3	0 1 2 3	0 1 2 3
19. SCAN	0 1 2 3	0 1 2 3	0 1 2 3
20. teletext	0 1 2 3	0 1 2 3	0 1 2 3
21. video telekonferencia	0 1 2 3	0 1 2 3	0 1 2 3
22. video kamera	0 1 2 3	0 1 2 3	0 1 2 3
23. videotext	0 1 2 3	0 1 2 3	0 1 2 3

Más (Kérem irjon további adatokat válaszokkal)

24. ________________	0 1 2 3	0 1 2 3	0 1 2 3

C. SZÁMITÓGÉP

	Tudás	Tapasztalat	Hozzáférhetöség
	0 - semmilyen 1 - nagyon kevés 2 - közepes 3 - kiemelkedö	0 - semilyen 1 - használtam 1-3 alkalommal 2 - használtam 4-6 alkalommal 3 - használom	0 - nincs 1 - megyében 2 - egyetemen/ föiskolán 3 - tanszéken havonta
25. animació	0 1 2 3	0 1 2 3	0 1 2 3
26. számitógépes tervezés (CAD)	0 1 2 3	0 1 2 3	0 1 2 3
27. számitógépes oktatás (CAI)	0 1 2 3	0 1 2 3	0 1 2 3
28. számitógépes tanulás (CAL)	0 1 2 3	0 1 2 3	0 1 2 3
29. számitógéppel tervezett oktatás (CMI)	0 1 2 3	0 1 2 3	0 1 2 3
30. adatkutatás	0 1 2 3	0 1 2 3	0 1 2 3
31. elektronikus posta	0 1 2 3	0 1 2 3	0 1 2 3
32. fiber optika	0 1 2 3	0 1 2 3	0 1 2 3
33. grafika	0 1 2 3	0 1 2 3	0 1 2 3
34. központi számitógép rendszer	0 1 2 3	0 1 2 3	0 1 2 3
35. mini-számitógép	0 1 2 3	0 1 2 3	0 1 2 3
36. modem	0 1 2 3	0 1 2 3	0 1 2 3
37. multi-media	0 1 2 3	0 1 2 3	0 1 2 3
38. számitógép hálózat	0 1 2 3	0 1 2 3	0 1 2 3
39. számitógép	0 1 2 3	0 1 2 3	0 1 2 3
40. printer	0 1 2 3	0 1 2 3	0 1 2 3

Más (Kérem irjon további adatokat válaszokkal)

41. ________________	0 1 2 3	0 1 2 3	0 1 2 3

D. SZÁMITÓGÉP PROGRAMOK

42. elektronikus intelligencia	0 1 2 3	0 1 2 3	0 1 2 3
43. távhivási progtamok	0 1 2 3	0 1 2 3	0 1 2 3
44. szaktárgy tervezö program	0 1 2 3	0 1 2 3	0 1 2 3
45. adat feldolgozás	0 1 2 3	0 1 2 3	0 1 2 3
46. adatbázis feldolgoás	0 1 2 3	0 1 2 3	0 1 2 3
47. asztali publikációk	0 1 2 3	0 1 2 3	0 1 2 3
48. specialiált rendszerek	0 1 2 3	0 1 2 3	0 1 2 3
49. Hypercard	0 1 2 3	0 1 2 3	0 1 2 3
50. hypermedia	0 1 2 3	0 1 2 3	0 1 2 3
51. programozott oktatás	0 1 2 3	0 1 2 3	0 1 2 3
52. szimulációk	0 1 2 3	0 1 2 3	0 1 2 3
53. adatfeldolgozás	0 1 2 3	0 1 2 3	0 1 2 3
54. szövegszerkesztés	0 1 2 3	0 1 2 3	0 1 2 3

Más (Kérem irjon további adatokat válaszokkal)

55. ________________	0 1 2 3	0 1 2 3	0 1 2 3

E. VIZUÁLIS TECHNOLOGIA

	Tudás	Tapasztalat	Hozzáférhetöség
	0 - semmilyen 1 - nagyon kevés 2 - közepes 3 - kiemelkedõ	0 - semilyen 1 - használtam 1-3 alkalommal 2 - használtam 4-6 alkalommal 3 - használom	0 - nincs 1 - megyében 2 - egyetemen/ föiskolán 3 - tanszéken havonta
56. 16 mm Film	0 1 2 3	0 1 2 3	0 1 2 3
57. 35 mm dia	0 1 2 3	0 1 2 3	0 1 2 3
58. számitógépes hirdetõ tábla	0 1 2 3	0 1 2 3	0 1 2 3
59. ábrák	0 1 2 3	0 1 2 3	0 1 2 3
60. elektronikustábla	0 1 2 3	0 1 2 3	0 1 2 3
61. fax	0 1 2 3	0 1 2 3	0 1 2 3
62. iskolai utazások	0 1 2 3	0 1 2 3	0 1 2 3
63. diafilm	0 1 2 3	0 1 2 3	0 1 2 3
64. játékok	0 1 2 3	0 1 2 3	0 1 2 3
65. globusz	0 1 2 3	0 1 2 3	0 1 2 3
66. minipulálhtó anyagok	0 1 2 3	0 1 2 3	0 1 2 3
67. térképek	0 1 2 3	0 1 2 3	0 1 2 3
68. makettek	0 1 2 3	0 1 2 3	0 1 2 3
69. modellek	0 1 2 3	0 1 2 3	0 1 2 3
70. optikusadatlemez	0 1 2 3	0 1 2 3	0 1 2 3
71. irásvetitõ	0 1 2 3	0 1 2 3	0 1 2 3
72. plakátok	0 1 2 3	0 1 2 3	0 1 2 3
73. nyomtatott levelezés	0 1 2 3	0 1 2 3	0 1 2 3
74. bábuk	0 1 2 3	0 1 2 3	0 1 2 3
75. telexes irógép	0 1 2 3	0 1 2 3	0 1 2 3
76. video lemez	0 1 2 3	0 1 2 3	0 1 2 3
77. video kazetták	0 1 2 3	0 1 2 3	0 1 2 3
78. tulajdonképpeni valóság	0 1 2 3	0 1 2 3	0 1 2 3

Más (Kérem irjon további adatokat válaszokkal)

79. ______________	0 1 2 3	0 1 2 3	0 1 2 3

III HARMADIK RÉSZ: NYITOTT KÉRDÉSEK

Definició: Távoktatás megy végbe ha a technológia segitségével az oktatás ideje alatt a diák és a tanár más helyen vagy idöben vannak.

80. A fenti meghatározásra támaszkodva kérem javasoljon módszereket, hogy hogyan lehetne távoktatást az ön munkájában használni.

81. Az ön elképzelése szerint mire lehetne az ön intézményében a távoktatást használni?

82. Milyen véleménnyel van arról a lehetöségröl, hogy az ön feladatait távoktatással lehetne megoldani.

83. Az ön véleménye szerint milyen mértékben támogatják az emberek a távoktatást jelenleg?

84. Milyen befolyásoló hatása lehet a politikai életnek a távoktatás használatát illetően?

85. Ha meglenne távoktatásra a pénz, milyen más akadályt lát a távoktatás bevezetésére.

III ELSÖ RÉSZ: DEMOGRÁFIAI ADATOK

UTASITÁS: Irja válaszát a kijelölt helyre.

86. Név____

87. Oktatási Intézmény:

a. ____ Tanárképző Főiskola
b. ____ Kertészeti Főiskola
c. ____ Müszaki Egyetem

88. Hány éve dolgozik a jelenlegi állásában? ____

89. Neme

____ Férfi
____ Nö

90. Kora ____

91. Milyen szerepet fog játszani a távoktatás tervezésében, kifejlesztésében és alkalmazásában?

a. ____ nem aktiv
b. ____ még nem ismeretes
c. ____ irott javaslatok
d. ____ bizottsági tag
e. ____ vezetö
f. ____ tanár

92. Legmagasabb végzettsége?

a. ____ Gimnázium
b. ____ Szakiskola
c. ____ Föiskola
d. ____ Egyetem
e. ____ Doktorátus

93. Mennyire tapasztalt a távoktatás területén?

a. ____ nincs tapasztalata
b. ____ kevés
c. ____ közepes
d. ____ nagyon tapasztalt

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