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THE UNIVERSITY OF ALBERTA

THE ROLE OF TECHNOLOGY IN DISTANCE EDUCATION

BY

MARK ANTHONY MURRAY 

A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES AND RESEARCH

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ENTITLED: THE ROLE OF TECHNOLOGY IN DISTANCE EDUCATION

SUBMITTED BY MARK A. MURRAY

IN PARTIAL FULFILLMENT FOR THE DEGREE OF MASTER OF EDUCATION

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ABSTRACT

The major purpose of this study was to investigate the application of technologies in the delivery of adult distance education courses. To achieve this, the study focused on three areas: first, to identify which technologies were presently used in the delivery of the courses; second, what role the technologies played in the delivery of the courses, and third, the instructors' satisfaction with the technologies they used.

Data were collected by means of a questionnaire completed by respondents who had delivered an adult distance education course in the previous academic year. Collection of data was limited to post secondary institutes (excluding universities) in Alberta, Canada. The data provided information related to the respondents and courses in the sample; the technologies used, roles played, and satisfaction attributed to the technologies by the respondents.

Data were analyzed using frequency and percentage distributions to describe the characteristics of courses in the study and the experience the respondents had in the delivery of the courses. Cross tabulation of frequencies was used to place findings related to technologies used into specific program categories. Ranking of satisfaction with technologies used was achieved through the use of a Likert scale.

The following is a summary of the major findings derived from the statistical analysis of the data.

1. The majority of respondents had delivered the surveyed courses at least three times. This indicated a reasonably experienced sample involved with the delivery of adult distance education courses in this study.
2. The courses were categorized into nine program categories by the respondents, providing evidence of numerous disciplines in the field of adult distance education.
3. A total of eighteen types of technologies were used to varying degrees for the delivery of the surveyed courses. These included both traditional and more

recently developed electronic media. Also, the use of multiple technologies was wide spread, with six technologies being the least used by any program category in the delivery of courses.

4 The role of technologies identified in the delivery of courses varied within and across program categories. However, a number of technologies played a dominant role in the delivery of the surveyed courses. Print materials were used most frequently for the delivery of Course Content and Student Evaluation. Telephone, print materials, seminar or tutorial, and audio teleconferencing were used most frequently for the delivery of Student/Teacher Interaction and Student/Student Interaction.

5. The means of responses given on the Likert scales indicated a general satisfaction with the technologies used, although, individual responses to a technology ranged from very satisfied to very unsatisfied in some program categories. The comments provided by respondents in relation to the satisfaction rating they gave a technology tended to be influenced primarily by three factors: first, was the technology being used in a suitable role; second, had the outcomes of using a particular technology matched the instructor's expectations; and third, were student motivation or difficulties inherent in the use of the technology.

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CHAPTER ONE

STATEMENT OF THE PROBLEM AND ITS SIGNIFICANCE

Introduction

In recent years, the field of adult distance education has been greatly influenced by the evolution of new technologies. Technologies such as teleconferencing, electronic mail, facsimile transfer and satellite communications have created possibilities for programming that never existed before. The application of these modern technologies has resulted in expansion in the variety of adult distance education courses now offered and the enhancement of existing courses that previously had relied almost totally on the print medium for information exchange. Further, the widespread use of new technologies in the field of adult distance education has helped to increase the accessibility of educational opportunities for adult students by removing barriers that traditional institutions create. Today, the value of recently developed technologies in the delivery of adult distance education courses is accepted worldwide and their use is becoming more common when availability of resources permits.

In light of the many new technologies used in adult distance education, it would seem appropriate that research is carried out that investigates how the technologies can be effectively applied. To date, much of the research has involved comparative studies that compare, within the same course, "learning gains achieved from one medium with learning gains achieved through another" (Bates, 1985, p.6). According to Bates this type of research has too narrow a focus and has failed to provide knowledge that can be generalized to the practical application of different technologies to teaching. While previous research has led to comprehensive documentation of adult distance education courses and technologies in use, little has been done to identify what role the technologies play and how successful they have been in the delivery of adult educational programs.

Bates (1985) who uses the term media when referring to technology, states, that at present, "research activity to identify the most appropriate roles for different media, and

the conditions necessary for their successful implementation, would seem more than justified" (p. 20). To gain such information, if it is available, would require considerable research activity designed to build the required body of knowledge. Each such project activity would add a piece of knowledge that one day might provide the total picture.

Purpose of This Research

This research study will attempt to provide part of the information by focusing on the following objectives: first, to investigate which technologies are presently used to deliver particular program categories of adult distance education courses; second, to identify the roles that the technologies play in the delivery of the courses within the program categories; and third, to assess the degree of satisfaction that course instructors attribute to the use of the technologies.

The information gained from this study could be used in future adult distance education course development initiatives to achieve more effective matching between course, technology, and role of the technology chosen. Also, in arguing the need for a particular technology it could be demonstrated that previous success has been attained by that technology in a related environment. The overall benefit to adult distance education might possibly be the more efficient use of technologies as an adult distance education tool and an improved teaching/learning process for the adult student.

Statement of the Problem

The problem was to identify within types of technologies, the extent of use and the role played within the various program categories of adult distance education. The instructors' degree of satisfaction with these technologies were also examined.

In order to investigate the stated problem the following sub-problems were addressed in this study:

1. Within the various program categories, what is the extent to which types of technologies are used to deliver adult distance education courses?

2. Within the various program categories, what role do the technologies used play in the delivery of the adult distance education courses?

3. What is the degree of satisfaction with the technologies used in relation to each program category?

The Definition of Terms

Adult

Adult is defined as a person who is eighteen years or over, and has completed or is no longer attending high school.

Adult Distance Education Program Categories

Adult distance education program categories were used to group adult distance education courses into similar families. The program categories used were developed by Employment and Immigration Canada to categorize college and university courses in Canada. Slight modifications were made to these categories to more accurately reflect program offerings in Alberta.

Adult Distance Education Course

An adult distance education course is one in which the student spends the greater part, or all, of his/her study time working on materials without the presence of a teacher. The student's self study can be carried out either on or off campus; geographical separation between student and teacher is not essential. This does not include regularly

scheduled on-campus courses where the student then completes the required course work without the presence of an instructor.

Technologies

Technologies are used for the exchange of information between student and teacher. The principal role of these technologies is to help improve the overall efficiency of the teaching/learning process. Technologies fall into two categories; electronic and non-electronic.

Electronic Technologies

These are involved with electronic, and computer exchanges of information that can be transmitted over distance. They include audio and video, analog and digital signals, and can also be used to transmit two-way, prerecorded, and live programming.

Non-electronic Technologies

Refers to print materials given the students as the core of their course work; they are the materials that enable self learning away from tutor contact.

Non-electronic technologies can also refer to the verbal exchange of information given by teachers who have travelled to remote learning sites (travelling instructors), or to seminars and tutorials arranged to bring students together as part of their overall course objectives.

Assumptions

In this study it is assumed that the questionnaires were completed by the personnel most familiar with the courses surveyed by this study.

Limitations

The accuracy of the number of courses identified was limited by the researcher's ability to gather the necessary data and the reliability of the information obtained from administrative personnel at the institutions surveyed. Further, the data were gathered at one point in time and may not be generalizable to future conditions.

A further limitation was that the institution that offered the largest number of adult distance education courses recorded the lowest return rate of questionnaires.

Delimitations

The scope of the study was delimited to the analysis of adult distance education courses and the technologies used in their delivery at post-secondary institutions (excluding universities) in Alberta, Canada.

Satisfaction with the technologies used focused on the instructional level as perceived by teachers in this study and was analyzed in relation to program categories only.

Organization of the Thesis

This chapter presented an introductory discussion about the area of education that is the focus of the study. The purpose of this research was then discussed followed by a statement of the problem and sub-problems to be addressed. Following, definitions of terms relevant to the study were provided. In the final section of the chapter, the assumptions, limitations and delimitations of the study were outlined.

Chapter 2 presents a review of literature and research related to the problem. In chapter 3, the methodology and instrumentation are discussed. The research design, sample selection, instrumentation and procedures for data analysis are presented.

Chapter 4 presents the results of the data analysis; and chapter 5 presents a summary of findings, conclusions and implications of the study.

CHAPTER TWO

REVIEW OF THE RELATED LITERATURE AND RESARCH

In this chapter the field of adult distance education and the application of technologies used in its delivery will be explored. The discussion will be presented under four headings designed to provide the reader with a more precise understanding of this field of education. The headings are adult distance education program, technologies, relationships and satisfaction with technologies used.

Adult Distance Education Program

"Adult distance education program" is a phrase open to many interpretations. For the purposes of this study it is important that a single interpretation be established. The phrase consists of a number of terms that separately have individual meanings, and together a single meaning. These terms are adult education, distance education, and program. The following discussion of related literature and research will examine these terms and attempt to provide a relevant interpretation so necessary to focus the research of this study.

Adult

To analyze the term adult education, it is necessary to first define what is meant by the concept adult. All adult educational agencies have developed, or accepted, an established definition of the concept adult that categorizes the clientele enrolled in adult education programs. How the definitions were achieved is not always based on the same categories. Verner (1964) cites three possible categories for defining adult: "by age, psychological maturity and social roles" (p. 34). Of these, age and social roles of the students are more commonly used in defining who is an adult for educational purposes.

In Alberta, an adult student is generally defined as a person who is eighteen years of age or over. Occasionally students younger than this will be classified as adult students

provided they have completed their secondary education requirements. Some programs have an adult status with an age requirement higher than eighteen. The Early Childhood Program in Alberta requires students to be at least twenty one. Further, the social role of the adult student is sometimes considered for program eligibility. Examples of this would be programs that cater specifically to women, minorities, married or head of the household. Thus, it is seen that adult status is primarily dependent on age, with some programs also requiring the adult student to be from a particular social background. Schoeder (1964) says that "perhaps the most operational of all definitions (related to social roles) is this one: An adult is anyone who has either discontinued or completed his formal education and is now trying to re-engage in the educational process" (p. 39).

Adult Education

Adult education has been defined in many ways. Some definitions include all learning experiences of the adult while others focus on the narrow and exclusive learning experience. From one definition to another a slightly different approach results in varying definitions. This is not to say that any one definition is right or wrong, but simply that the definition relates to a particular environment and thus might not suit all possible situations. Unlike elementary and high-school education where the educational experience is well defined and understood by most, the adult education scene involves ever changing activities, many of which are related to local needs and "conducted by a multitude of contrasting institutions and agencies each providing according to its own plan (or) method" (Zeigler, 1966, p. 130).

The quotation by Zeigler highlights the difficulty in finding a precise definition for adult education. The Handbook of Adult Education (Smith, Aker, & Kidd, 1970) devotes an entire chapter to this very subject without providing one definition that covers all adult educational experiences. Provided are a number of operational definitions that relate to different perspectives of adult education; all relevant from a certain focus. In the general

sense, Bryson (1936) defined adult education as "all activities with an educational purpose that are carried on by people, engaged in the ordinary business of life" (p. 3). For the purposes of this study, Bryson's (1936) definition will be adopted subject to the activities falling under the definition of program that will be established in this review.

Distance Education

Distance education is a term familiar to many of us, although its actual meaning does lead to some confusion. This arises because distance education is also referred to as correspondence education, home study, independent study, and open learning. Yet whatever name is used it refers to a unique educational environment that has characteristics different from the traditional. Garrison and Shale (cited in Garrison, 1987) suggest three essential criteria that characterize distance education:

> The majority of educational communication between (among) teacher and student(s) occurs noncontiguously.
>
> Involves two-way communication between (among) teacher and student(s) for the purpose of facilitating and supporting the educational process.
>
> Uses technology to mediate the necessary two-way communication.
> (p. 45)

In Canada, it has been one hundred years since a forerunner of the distance education concept began in 1889 with the establishment of a correspondence program at Queen's University in Ontario (Burge, Wilson, & Mehler, 1984, p 2). From its beginnings, distance education was seen as a method of equalizing educational opportunities for people in remote areas by providing programming for people who did

not have access to traditional learning centers. This definition, and focus, served its purpose well for many years. Today the situation is very different and the task of equalizing educational opportunities is far more complex than in previous years.

Canada, and other industrialized nations are now faced with an increasingly older population (Burge, Wilson, & Mehler, 1984). This, together with the social, economic, and technological changes in society, has transformed educational thinking (Long, 1983). The demands placed on educational systems by the increasing numbers of adult students and the constant changes taking place in technologies have changed the focus of education from being a once only affair, to a lifelong pursuit for adults who wish to remain employable and informed in today's society. This change in educational focus to life-long learning is reflected by Hummel (1977) in the following passage:

> Starting from the observation that today the amount of knowledge acquired in school no longer stands up against the wear and tear of time and is therefore insufficient for a whole lifetime, it must be supplemented and brought up to date after reaching adulthood. Retraining and adult education in their various forms have become indispensable. School education must be supplemented by other possibilities and other forms of learning and training. But if all these different educational processes are to be as effective as possible, they must be co-ordinated and integrated in a single, comprehensive education system: lifelong learning. (p. 35)

Hummel's thoughts begin to illuminate the challenge to adult educators in reacting to this task. Educators now have to be responsive to the needs of the adult student who no longer can expect that the initial education/training received will suffice for an entire career. To be productive now requires a continued willingness to upgrade one's knowledge and skills as the demands of technology and society change. Toffler's observations in Future Shock (1970) and The Third Wave (1980), provide insight into the

monumental task that adults and educators are faced with in reacting effectively to a changing society.

Post-secondary educational institutions have accepted the challenge and are now implementing distance education programs that cater to a new adult clientele whose requirements are vastly different from the traditional younger student. These programming initiatives are made possible by provincial governments that have become more willing to reallocate resources to their development (Seabourne & Zuckernick, 1986). This response by educators and government has created a boom in the field of distance education unparalleled in its history. Through the creative use of today's technologies, distance education has become a viable option for an increasing number of educational institutions. According to Coldeway (1986) the field of distance education is now well established and "the question of whether distance education is a viable form of teaching and learning no longer arises" (p. 81). Distance education has become a means of providing education or training that is responsive to its clients' demands regardless of their geographic location; it has made education more accessible.

Accessibility is a key goal in the field of adult distance education. Many of the recent innovations in delivery of distance education are directly related to making the educational institutions more accessible to all interested students regardless of geographic location (Farrell, & Haughey, 1986). Distance, in the term distance education should no longer be taken literally as a separation of student and teacher by a distance that precludes conventional classroom instruction. Farrell and Haughey (1986) state, that from their experience "there are many students who are not geographically remote from educational institutions who use open learning systems that have evolved because, for them, it overcomes other constraints, such as family and work responsibility" (pp. 30-31). Distance is now defined as the learner being separated (not always geographically) from the teacher during most and sometimes all of the time while the learning process is taking place (Holmberg, 1981).

Program

The Random House Dictionary (1987) defines program as "a plan of action to accomplish a specified end" (p.1546). In relation to adult and continuing education, Long (1983) mentioned that "planners . . . use the term program to connote the means by which they bring learners, content, and processes together" (p. 4). Planners in the field of adult distance education look at the concept of program as a basic activity. Adult education agencies, by their very nature, are required to be flexible in both structure and programming to respond to the unique clientele whose needs differ from those of the traditional student who is limited to a face to face instructional setting. Within this environment, adult educational agencies are committed to develop programs that reflect the needs of today's student. Thus, programming is a fundamental activity in adult distance education because successful programming is paramount to an institutions growth and survival. The flexibility of structure and program demonstrated by adult distance educational institutions is what separates them from the traditional institutions (Long, 1983).

Given the importance of programming to adult education, Long (1983) suggests that there still remains an inadequate understanding of how programs develop and mature. A true understanding is hindered somewhat by definitional problems inherent with the term program (Long, 1983). This definitional problem has existed for many years as illustrated by Thomas (1964), cited in Long (1983) who noted, "no term or idea throughout adult education is so widely used, nor quite so elusive in precise meaning" (p. 8)...."The term program is used in adult education with great licence and with limited efforts to require that people agree completely on its use" (p.11). Boyle and Jahns (1970) agree with Thomas (1964) by saying that the term program is one of the more perplexing words in adult educational jargon. It is perplexing because it is used "to communicate many divergent thoughts, ideas and practices" (Boyle and Jahns, 1970, p. 59).

Long (1983), Thomas (1964), Boyle and Jahns (1970), all support the contention that an all encompassing definition of program in the field of adult education has not yet conceptualized. Possibly such a definition is beyond reach given the scope and varied activities that take place in the adult distance educational environment. Many experts in the field of adult education have put forth their own definitions of program to fit certain situations. The following definition by Long (1983), would seem appropriate for purposes in this study:

> An educational program for adults, by necessity, must have an educational objective; otherwise the activity should be labeled as an entertainment or another more appropriate term. Program as used to define merely a plan of action or a scheme to guide further behavior is not consistent with an educational purpose. Program then, as used here, is a specific situation (environment, content, learning activities, and so forth) for learning (p. 11).

Long's (1983) definition of program clearly states that a program must have an educational objective that provides direction in a specific situation for learning. This definition would prove useful in describing adult distance education programs in a generic sense. However it fails to address the common question of how to classify adult education programs by type or area.

The content and specialty of adult education programs have changed a great deal in recent years and continue to change. To maintain a sense of organization and understanding it is necessary to have some schema under which new programs types can be classified. Bryson (1936) and Ziegler (1966) provide typologies of adult education programs. Bryson's typology divides the field of adult education into five fields:"remedial, relational, occupational, liberal education, and political education" (Cited in Long, 1983, p. 12). Ziegler's typology (cited in Schroeder, 1970, pp. 30-31) is long

and attempts to describe all possible situations that, in his view, could be defined as adult education. More recently, Boyle (1981) "has developed a concept of functional program types. His schema defines the following three types of programs in adult and continuing education: (a) developmental, (b) institutional, (c) informational" (cited in Long, 1983, p. 13). Bryson (1936), Ziegler (1966), and Boyle (1970) provide functional classifications for adult education programs. However, to categorize programs it is also necessary to classify programs by subject area.

Numerous publications provide frameworks for identifying programs by area. The 1960 and 1970 editions of the Handbook of Adult Education (Knowles, 1960; Smith, Aker, & Kidd, 1970) are two publications that provide useful examples of typologies that classify programs by area. To administrators in adult distance education both functional definitions and program area schemata are necessary for organizational purposes. The particular schema chosen is determined by the institution. Lord (1980), cited in Long, 1983) provides an example of a program area schema based on five major subject matter or content dimensions. This schema was adopted by the University of Georgia Center for Continuing Education.

To conclude, this section of the literature review has focused on the interpretation of the phrase "adult distance education program". The review attempted to provide as clear an interpretation as possible. The discussion concluded by focusing on the concept of program and the importance of providing a defined framework to classify programs within. A framework for classifying the programs and courses surveyed in this study will be developed based on information provided in this section and further investigation by the researcher.

Technologies

Definition

The technology of adult distance education is too often equated only with the hardware involved (Garrison, 1987). In light of the rapid growth and application of

electronic delivery systems in recent years, it can be understood why the public and educators would make this assumption. Much of the recent boom in adult distance education is directly related to the development of new electronic technologies that have allowed programs to reach a new clientele (Burge et. al.,1984). However, an examination of the role of technologies in adult distance education must not be limited to just electronic developments; this would provide an incomplete picture.

Schwen (1977) cited in Pratt (1987) defines technology "as any means, or vehicle by which instruction is formatted, stored, and delivered to learners" (p. 73). Saettler (1968) states that "the word technology does not necessarily imply the use of machines, as many seem to think, but refers to any practical art using scientific knowledge" (p. 6). Therefore, techniques of teaching, adult learning theories, media such as print and electronic, could all be categorized as educational technologies if used to enhance the teaching/learning process. The understanding of the role that all aspects of educational technology play in the learning process is of prime importance to those involved with developing adult distance education programs (Percival, & Ellington, 1988).

Role of Technology

The principle role of any technology in education is to help improve the overall efficiency of the teaching/learning process (Percival, and Ellington 1988). Technologies used in adult distance education that fail to conform to this definition should be discarded. Some technologies, such as the print media and telephone have long been used effectively in the field of distance education. Even with today's advances in electronic technology the print media still remains the most popular for information exchange (Moore, 1987).

For many years, adult distance education technology remained almost stagnant by today's standards. It was not until the 1950's that real changes were seen in educational technology. B. F. Skinner's work on the stimulus/response mechanism triggered the

programmed learning movement that was the forerunner of today's individualized learning techniques (Percival, & Ellington, 1988).

Malcolm Knowles' work with the concept of adult learning (andragogy) has further enhanced the individualized learning techniques by providing knowledge necessary for adapting them to adult learning styles. According to Knowles (1973, 1980), the characteristics of the adult learner differ from those of youth in a number of significant ways. These include: that adult learners are self directed human beings; that their ever increasing life experiences can be used as a learning resource; that as a person grows, his focus of learning is more apt to be on developing skills that are related to his social role in society; and finally, as the person matures his reasons for pursuing knowledge change from that of delayed application to immediate application (Knowles, 1973). Thus, the adult learner's "orientation towards learning changes from one of subject-centredness to one of problem centredness" (Reiter, 1988, p. 2).

Through the efforts of Malcolm Knowles and other adult learning theorists, distance education programming is being more accurately focused on the needs of adult learners in today's society. Adult learners need flexible programming in order to increase its accessibility to them (Burge, et al., 1984). Two of the most common barriers that exclude access to educational opportunities for adults relate to the time and place that a program is offered (Garrison, 1987). Time and place could refer to geographic deterrents that might limit access to educational opportunities, or that the commitments of an adult to work and family responsibilities limit access to traditional instruction methods. Many of the recent innovations in technological delivery systems have evolved to help remove these barriers (Farrell, & Haughey, 1986; Niemi, & Gooler, 1987). Moore (1986) comments, that the application of modern technology is seen by leaders in the field of distance education as a means that "could be used to free people from constraints on their learning- - the constraints of geographic location, being housebound, being disabled, or having to hold down a job and therefore not being able to study" (p. 22).

To a large degree, recent advances in technological delivery systems designed to increase the flexibility and accessibility of programs have been tied to developments in electronic technology (Shobe, 1986). Although, electronic technologies have become a part of distance education their role appears to remain as a support to traditional delivery methods. This premise is supported by Shobe's (1986) observation, that "in Canada and throughout the world, an overwhelming majority of distance education is still conducted by correspondence methods. Where audio, video or microelectronic communication technologies are used, they almost invariably complement or supplement core, print-based course materials" (p. 215).

However, what the use of electronic technologies is achieving is the ability to create an interactive environment similar to that of a regular classroom (Burge, 1988; Garrison, 1988). What this allows is the application of adult learning theories to the distance education environment because of the interaction that can now be achieved. Garrison (1988) states, that "Today society is awaiting a much-desired marriage: the union of adult education and distance education" (p. 123). This marriage is greatly supported by the developments in two-way communication technologies and the increasing availability of these technologies to reach out to the adult clientele (Garrison, 1988).

Garrison (1988) believes that andragogy and learner-centredness have created the assumption that all adults are capable of judging what is best for them educationally and the teacher is simply the facilitator or another resource to be used at the learner's discretion. Such a view is said to place too narrow a focus on the educational experience. Just because someone is defined as an adult does not automatically imply the capability to make informed educational decisions. Educators must strike a balance between pedagogical and andragogical models based on the abilities of the adult student, a balance between dependence and independence (Knowles, 1980). Pratt (1988) believes that the key to effective teacher-learner relations and thus good teaching incorporates both andragogical and pedagogical approaches.

This delicate balance between pedagogical and andragogical approaches to the learning situation can be enhanced through the use of two-way communication systems. This view is supported by Garrison's (1988) suggestion "that providing opportunity for teacher and student to communicate freely, we are able to establish an appropriate and sometimes delicate balance between dependence (teacher centredness) and independence (student-centredness)" (p. 126). Hence, the development and increased use of two-way communication technologies encourages the use of both conventional and distance education methods in distance educational transactions (Burge, 1988).

Improved communications expand the resources that distance educators can draw on to improve the learning process. The student does not have to remain as an independent learner but can make informed decisions in collaboration with the teacher. Technologies can now be used to improve the overall efficiency of the teaching/learning process and effectively eliminate the need for the distance learner to function independently. In fact, from Garrison's (1988) point of view, the "recent developments in communications technology and the ability to communicate at a distance" (p.125) have meant that the term independent learner has become outdated, for the learner is no longer isolated.

Relationships

Given that communication technologies are drawing the fields of adult and distance education together by allowing the concepts of both to be used in the teaching/learning process, the observation by Shobe (1986) that technological developments are largely used in a supporting role, fails to project the importance that a supporting role can play. Much of the expansion in the field of distance education has been facilitated through the application of new communication technologies to the learning environment. They have allowed the influence of the instructor to extend beyond the confines of the traditional classroom for the purpose of guiding and interacting with the learner during the learning process. The existence of distance education as it stands today, is largely dependent on the

use of new technologies. Therefore it is important that the technologies be understood so their potential can be optimized (Garrison, 1987).

How do the technologies relate to the programs they support? It would be hoped that the use of a particular technology would be based on a positive relationship between it, the program, and the needs of the learner. However, this is often not the case. Frequently, programs are adapted to make use of some new technology with little lasting value, or educators are given a system to use with minimal consideration as to the type of program that will be delivered by the system (Burnham, & Seamons 1987; Garrison, 1987). Educators must realize that the strength of a technology when used in the educational process is related to the learning outcome that will be achieved and not to the newness of the technology (Burnham, & Seamons, 1987). As Heinich, Modenda, and Russel (1982) state, "There is nothing magical about the hardware. The magic, if there is to be magic, stems from the selection of materials according to their usefulness in achieving specific learning objectives and their utilization in ways conducive to applying sound learning principles" (p. 266). This implies, that technology to be correctly applied, must be evaluated in terms of the educational process: how will the use of a particular technology assist the learner in achieving his goals?

The above question must be answered by program developers when selecting technologies for program delivery systems. However, informed decisions are somewhat hampered since little theory exists that relates how a technology can best be used to deliver instruction (Bates, 1988; Burnham, & Seamons, 1987; Garrison, 1987). As a result, learners are often given a number of individualized learning options and allowed to chose the methods that they perceive as most favorable to their learning situation. This method assumes the adult learner is capable of making informed educational decisions. However, (Garrison, 1988; Knowles, 1980; & Pratt,1988) would suggest that not all adult learners, in all situations, are capable of making informed decisions. Hence, the need for a balance

between a dependent and independent approach. This balance will not be achieved if too much responsibility for learning is put on the individual.

Assuming that the demand for adult distance education programs continues to grow, new technologies will need to be incorporated into the program design to provide the flexibility, and levels of independence that the adult learner requires. If new technologies are to be incorporated effectively, then ongoing research is needed to create the knowledge base on which informed decisions can be made. This research could focus on the following areas: identifying appropriate teaching roles for different technologies; identifying how media differ from one another in the way they present, represent, and organize knowledge; and how this use of technologies relates to the cognitive learning processes (Bates, 1985). Burnham, & Seamons (1987) state that, with such an array of technologies to chose from, it is important that research be conducted to determine "Which type of system configuration is best for what type of learning and for whom is a given system best?" (p. 9).

Bates's (1988) idea of investigating the appropriate roles for different technologies could be approached a number of ways. Garrison (1987) looks at the role of technology in distance education from the stance of how will it assist in meeting the students' needs of equity of access, support, and interaction during the learning process.

Sparks (1984) discusses the role of technology from a pedagogical perspective. Based on a modified version of Bloom's (1956) taxonomy of educational objectives, Sparks contests that the role of technology varies in different learning situations. Depending on what is taught, be it knowledge, understanding or skills, requires varied applications or different technologies to be used. Further, technological roles change when learning moves from the cognitive to affective domains. Thus Sparks (1984) concludes, that the role of technology(s) is never stagnant, but changes as the learning environment changes to meet the learners' needs. In this changing environment, caution should be exercised to ensure the relevancy of the technologies chosen to preform a specific role. As

Sparks (1984) states, that although "everything may be possible eventually through technology -- but we should ensure that what is done through technology is what we want, no less in distance education as in other aspects of our lives" (p. 231).

Law & Sissons (1985) state that "the challenge of distance education is to open a genuine dialogue that builds up the learner's autonomy" p. 43. The role of technology from the perspective of how technologies can be used to create support systems (dialogic systems) for the distance education student is the focus of their discussion. Law & Sissons (1985) view dialogue as an important component of the learning experience and to be effective "dialogue requires two real people" (p. 51). Yet too often dialogue is between one person (the student) and a computer, an institution, or a tutor instructed to act as much like an institution, or a computer as possible" (p. 51) and thus not providing the support to reinforce the need for autonomy by the student. If the role of technology is to improve the teaching learning process, then one such role can be in supporting the number of different types of dialogue necessary to the student during the learning experience (Law & Sissons 1985).

According to Law & Sissons 1985, two types of dialogue important to the learning enterprise are as follows:

> .... dialogue with other students. It fulfils a number of very important functions, including the creation and maintenance of one's image of oneself as a student , establishing resource and personal support networks, and allocating importance to the variety of tasks ahead. The institute can facilitate it by providing contact names, venues, occasions to initiate contact, and so forth.
>
> .... dialogue with the teacher. Here, as with dialogue between students, there are a number of important functions that can be fulfilled in appropriate ways. First is the provision of information and facts. Information needs to be provided promptly

when it is needed. .... Second is the dialogic conversation that is part and parcel of learning and teaching. (p. 51).

Another approach to looking at the role of technology might be taken from educational theory in general. Gagne (1988) discusses events of instruction and their relation to the process of learning. The instructional events outlined by Gagne (1988) are:

1. Gaining attention
2. Informing learner of the objective
3. Stimulating recall of prerequisite learning
4. Presenting the stimulus material
5. Providing learning guidance
6. Eliciting the performance
7. Providing feedback about performance correctness
8. Assessing the performance
9. Enhancing retention and transfer (p. 182)

These instructional events are generic to the field of education and occur during the learning process in both traditional and distance education settings. The difference lies in how technologies might be applied to achieve the objectives of the nine events.

Whether the role of technology in education is investigated from the perspective of Garrison (1988); Spark (1984); Law, & Sissons (1985), or based on Gagne's (1988) nine events of instruction, will not affect the focus of inquiry. In both cases, the researcher would analyze the role of technology in the learning process: how are technologies being used to facilitate learning and which components on the learning process are the technologies supporting?

A common thread in the approaches to investigating the role of technology mentioned thus far, is that they all view the role of technology as one of presenting the course content; providing assistance, support and feedback to the student during learning; and as a means of evaluating if the learning objectives have been achieved. Hence, in the field of adult distance education a possible framework for investigating the role of technology in course delivery might be:

(a) to investigate which technologies are used to present the course content;

(b) which technologies provide support and feedback to the student, or as Law, & Sissons (1985) stated, which technologies provide dialogue between student/teacher and student/student; and

(c) which technologies are used in the evaluation process that provides the ongoing feedback of progress and the final determination if learning objectives have been met.

Satisfaction with Technologies Used

Role is defined by The Concise Oxford Dictionary (1976) as "what person or thing is appointed or expected to do; .... behaving in accordance with specified function" (p. 975). Thus, when defining satisfaction in relation to the role of technology it would seem appropriate to base it on how well a type of technology has achieved its specified function. From a teacher's perspective (as is the focus of this study) satisfaction could be interpreted as how well a teacher's time is spent using educational technology, and does it result in good quality materials and an effective teaching environment (Sparks 1984).

Knapper (1980) suggests that the "pre-eminent goal of instruction, including instructional technology, is the facilitation of learning" (p. 70). Teachers' often define

learning as what takes place during the numerous activities and processes over the time frame of a course. The very number of activities and processes make the measurement of student learning a complex task. To meet the task of measuring if learning has taken place requires clearly defined and measurable objectives (Knapper 1980). In the context of educational technology, this could be translated as how well has the use of technologies assisted in the achievement of objectives in the teaching/learning process.

As mentioned in previous discussion, Sparks (1984) cautioned that although the prospects for technological applications in the educational environment are ever expanding, educators should ensure that the technologies used are doing what is expected. A survey conducted by Ellis (1989) that looked at the use of telecommunication technologies in Alberta, Canada defined satisfaction with technologies using a 4 point scale from very satisfied to very dissatisfied. This scale will be used in this study to measure instructors' satisfaction with the technologies used for the presentation and support of the courses they teach.

Summary

In this chapter theoretical and research literature were reviewed in an effort to provide the necessary background and focus for this study. The literature review began by exploring the meaning of the phrase "adult distance education program". The literature suggested that the field of adult distance education involves ever changing activities designed to meet the needs of a clientele whose requirements vary greatly from the traditional K to 12 student. Within this environment the literature suggested that the key goal is making the programs offered accessible to the needs of different adult clientele Further, the programming of the institutions involved must have some schema under which programs can be classified to provide a sense of organization so necessary for their growth and survival.

The literature also suggested that the role of technologies was to help improve the overall efficiency of the teaching learning process; that today, the use of modern technologies is achieving the ability to create an interactive environment similar to that of the regular classroom. Hence, this allows the application of adult learning theories to the distance education environment because of the interaction that can now be achieved through the use of two-way communication.

The concept of how technologies relate to the programs they support and assist the learner in achieving his goals was then explored. The literature suggested that this question must be answered by program developers when selecting technologies for program delivery systems. What role technologies play in the delivery of a program was then explored from different authors' perspectives. This exploration indicated that research needs to be done because little theory exists in this field. Finally from the literature referred to, a possible framework for investigating the role of technology was presented.

The literature review concluded by establishing the importance of having clearly defined and measurable objectives to evaluate if learning has taken place. This focus was then related to technologies used in adult distance education and a scale for measuring satisfaction with the technologies identified by respondents in this study was presented.

CHAPTER THREE

RESEARCH METHODOLOGY

In this chapter the research methods utilized and the study group involved will be presented and discussed. This information be be presented in the following order: First, a description of the research design will be provided. Second, the study population will be discussed as to its size and methods of selection. Third, the ethical considerations taken for this study will be explained. Fourth, the development, content and administration of the data collection instrument (questionnaire) will be examined. Fifth, the method used to pilot the questionnaire will be discussed. And sixth, the method of data collection and analysis will be presented.

Research Design and Population

A descriptive survey design was adopted to investigate types of technologies, their extent of use and the role they played within the various program categories of adult distance education. Instructors' degree of satisfaction with these technologies was also examined.

Instructors of adult distance education courses at selected institutions in the Province of Alberta comprised the study population. The size of the population was determined by the number of the instructors who taught adult distance education course(s) in the previous academic year, their continued employment at the institution, and their willingness to complete the questionnaires. The respondents who participated completed questionnaires that gathered information related to the courses they had taught. To determine the number of instructors who qualified it was first necessary to contact the colleges and institutes in the province to ascertain which institutions had offered courses that qualified to be included in this study.

Eighteen institutions in Alberta were identified for possible participation. Of these, eight were found to have delivered adult distance education courses in the previous

academic year. This information was obtained by the following methods: first, inspection of calendars published by the institutions to determine if adult distance education courses were advertised; second, telephone contact with the registrars at the institutions to verify if courses were, in fact, offered; and third, telephone or personal contact with the coordinators of adult distance education courses at the institutions.

It was discovered by the researcher that many of the institutions' calendars failed to provide an accurate picture of the adult distance education courses they offered. In some cases the advertised adult distance education courses were not in place, or many of the adult distance education courses being delivered were not advertised. Consequently, the only true verification of courses that had been offered, and delivered, in the previous academic year was via telephone contact or by interviewing the administrative personnel responsible. Hence, the accuracy of the number of courses identified was limited by the researcher's ability to gather the necessary data and the reliability of the information obtained from administrative personnel at the institutions surveyed. An attempt to verify the completeness of the identified courses with the Department of Advanced Education was unsuccessful because the data were unavailable in the format required. Officials with the Department of Advanced Education indicated that the most recent publication of a document listing adult distance education courses in the Province was in 1986; plans to update the document entitled Distance Education Courses in Alberta (1986) were shelved because of funding restraints.

The eight institutions that participated in this study were: Alberta Vocational Centre, Slave Lake; Grant MacEwan College, Edmonton; Lethbridge Community College, Lethbridge; Mount Royal College, Calgary; Olds College, Olds; Northern Alberta Institute of Technology, Edmonton; Southern Alberta Institute of Technology, Calgary; Westerra Institute of Technology, Stony Plain.

Ethical Considerations

Ethical clearance for the study proposal and questionnaire was received from the Department of Adult Career and Technology Education Ethics Review Committee. Permission to approach the study population was obtained by a variety of means.

In the case of large institutions, a meeting was arranged with the Assistant Vice President Academic who on approval of the request presented an outline of the research proposal and method of data collection to the institution's Department Deans. When approval for the study was given by the Deans, a letter of acceptance was sent to the researcher with the names of the contact people within the institution. In most cases, the contact names were those of department heads at the institutions. At smaller institutions, permission to gain access to the study population was obtained through the institution's coordinator of distance education. Lastly, all of the institutions that were approached granted permission for the researcher to come into the institution and ask the instructors of adult distance education courses to participate.

During interviews with department heads and available instructors, an explanation of the nature and design of the study was given. A further explanation was included with each questionnaire received by instructors. The explanation included the following items: an assurance that all information would be kept confidential and the identity of the respondent would not be known to the researcher; the names of the courses surveyed would not be published in the research report so the responses could not be related to a particular institution; completion and return of the questionnaire indicated the respondents' consent to participate; their responses were to be sealed in the unmarked envelopes provided to maintain confidentiality.

A form letter was also sent with each questionnaire explaining the purpose of the study. The content of the form letter varied according to the researcher's previous interaction with the respondent. Reference to confidentiality was included both on the form letter and questionnaire. Further, an offer to share the results with each institution

was also conveyed. Examples of form letters and questionnaire used are shown in Appendix A and Appendix B.

The Data Collection Instrument

A six page questionnaire designed by the researcher was used to collect the data for this study (Appendix B). The makeup of the questionnaire was devised primarily from the review of the literature pertaining to investigation of the role of technology in distance education. Specific features of the questionnaire were developed through consultation with distance education personnel who had previous research experience. The questionnaire was divided into two sections. The first section, questions one to five, collected background information concerned with demographic data and categorization of the course being surveyed. The categorization of courses into Program Categories was necessary for the analysis of data related to the three sub-problems.

The second section, question six, was designed to gather data specific to the three sub-problems addressed in the survey. In answer to sub-problems 1 and 3, data were obtained regarding the technology(s) used in the delivery of a distance education course and the satisfaction an instructor attributed to the technology(s) used.

To collect the necessary data to address sub-problem 2, question six was further divided into four segments a, b, c, and d. The four segments were labeled, Course Content, Student/Teacher Interaction, Student/Student Interaction, and Student Evaluation. The identification of which technology(s) were used to deliver these segments allowed the role of the technology(s) to be defined.

Each section of the questionnaire will be described on the following pages.

Section 1

The first section consisted of five questions. Question one asked the respondent to name the course to which the questionnaire applied. This information was required for

two reasons, first to ensure that the information supplied in the questionnaire related to an adult distance education course identified for admission to the study, and second, as a means of determining the accuracy of the course categorization by the respondent and thus the reliability of the categorization system used in question five.

Question two identified the instructors' experience with the delivery of the courses by asking them to indicate the number of times they had taught the same course(s). Questions three and four looked at participation requirements for the course. Question three asked if enrollment in the course was limited to students enrolled in a program of studies, or if it could be taken independently. Question four asked the respondent to indicate the approximate duration of the course in hours. The scales used in question four were developed by perusing institutions' calendars to identify the most frequently used course time lines. This information was then put into four scales with zero to fifteen hours being the lowest and over forty five hours the longest duration in course time. The data gathered in questions two, three and four were obtained to determine the overall experience the respondent had with the delivery of a particular course and the admission and course duration requirements of the courses involved.

The purpose of question five was to categorize each course surveyed into one of twelve program categories for purposes of analysis. Each program category was given a code number from one to twelve. Category twelve was an open category for respondents to enter a category name that they felt more accurately reflected the content and objectives of their course. This served two purposes, first to identify relevant program categories that may have been overlooked in the development of the codes, and second to ensure that if a respondent was unsure of which category the course fell under they could enter their own category (description) which could then be placed in one of the predetermined categories by the researcher.

The program categories used were adapted from those developed by Employment and Immigration Canada to categorize college and university courses in Canada, and from program headings of post-secondary institution calendars in Alberta.

Section 2

Section two of the questionnaire was designed to collect information regarding the technology(s) used in the delivery of the distance education courses surveyed. Question six broke the course into four segments, Course Content, Student/Teacher Interaction, Student/Student Interaction, and Student Evaluation. In each segment the instructor was asked to supply information in three ways:

1) Identify the technology(s) used for the delivery of that segment. If more than one technology was used, then the respondent was asked to identify the technologies used by ranking their frequency of use. A maximum of three technologies were allowed to be identified for each segment. Finally, if a course segment did not apply to the course in question e.g., no Student/Student Interaction occurred, the respondent was asked to indicate none as their response to that segment.

2) On a Likert scale, respondents were asked to indicate their degree of satisfaction with the technologies used for the delivery of the course. The Likert scale ranged from 4 'very satisfied' to 1 'very dissatisfied.'

3) Respondents were asked to qualify their responses on the Likert scale by commenting on their reasons for the degree of satisfaction identified. This was done to more accurately define the meaning of the response on the Likert scale and to gather written responses for use in the analysis of this study. The inclusion of this third component was the result of concern expressed by instructors during the pilot study of the questionnaire. They indicated an opportunity to express their

views on the use or choice of a particular technology in the course they taught would result in a more enthusiastic response.

The questionnaire concluded by providing space for the respondent to add any other information regarding the course or questionnaire they felt to be important. The primary purpose of this section was to solicit additional information that might prove valuable when the data were analyzed.

Pilot Study

A pilot study of the questionnaire was conducted utilizing a cross section of eight professional staff from the field of adult distance education. Their expertise was in the fields of instructional design, adult education, instructional technology, administration, and teaching. The comments received resulted in minor alterations in the instructions for the questionnaire, the restructuring of several questions, and changes in the physical layout of the questionnaire.

Data Collection

The nature of the study made data collection a time consuming task. Determining the exact number of courses that had been delivered in the previous academic year, and the number of instructors still available to complete the questionnaire was best accomplished by interviewing the department heads involved. At seven of the eight institutions involved this contact was made by direct interview techniques over a ten week period. During this period it was discovered that numerous instructors who had taught the identified courses in the previous academic year were unavailable to complete the questionnaire. Commonly, they were employed as sessional instructors and were no longer with the institution, or were on sabbatical leave. Interviews with department heads and where possible the instructors, allowed for the objectives of the survey and the mechanics of the questionnaire to be explained. Further, it resulted in a commitment to participate by those

interviewed and for the personalization of the introductory letter sent to the participant with the questionnaire. At seven of the eight institutions surveyed this meant that all introductory letters included the respondent's first name. The one hundred percent return rate achieved at three institutions could have been a possible consequence of the personal contact.

One hundred and seventy possible respondents were identified to receive questionnaire packages. Of these, ninety one (54%) completed and returned the questionnaire(s) they received. This resulted in questionnaires being completed for one hundred and sixty nine of the two hundred and seventy six identified courses (61%) that had been offered by all possible respondents (170). The overall return rate of 54% was primarily influenced by a low return rate at two institutes (48% & 43%) where personal contact with instructors was not possible and the number of courses offered was high. The findings, therefore, pertain only to the instructors who completed the questionnaires and the courses they referred to. Further, the findings are limited by the response rate and may not accurately reflect all instructors opinions. Finally, it was found that interviewees appreciated the effort made to contact them and personally solicit their participation.

Every participant received an introductory letter explaining the goals of the survey, and an unmarked envelope for their response. The enclosed questionnaire was then returned by direct mail or to the department head for bulk mailing. In most cases respondents were given two weeks to complete and return the questionnaire. A difficulty arose with some respondents who had taught more than one closely related course using the same technologies. They indicated that completion of multiple questionnaires would simply be duplicating responses. In these cases they entered more than one course name on a single questionnaire and indicated which program categories each course fell within.

As noted previously, 91 of a possible 170 respondents completed the questionnaires. The 91 respondents returned 174 questionnaires. Of these, five were returned blank and were not included in the analysis. The respondents who returned the

five questionnaires indicated they considered the identified courses unsuitable for inclusion in the survey.

Coding Procedures

The responses on the completed questionnaires were coded and recorded on assembler coding forms. Open-ended questions relating to satisfaction with technologies used were categorized by frequency of response and given individual codes. These codes were also recorded on the assembler coding forms. The data were then transferred to magnetic tape and entered into a file on the MTS (Michigan Terminal System) computing system. The computation and analysis of data was accomplished through the use of the SPSSx (Statistical Package for the Social Sciences).

Data Analysis

The data in relation to questions one to five were analyzed by running a percentage frequency analysis of all variables.

The analysis of the data obtained in relation to question six required the use of cross tabulation procedures as follows:

> The identification of technologies used in each program category required cross tabulation of the variable program category by all variables related to technological use.
>
> The identification of role(s) played by the technologies used in each program category required cross tabulation of the variable program category by all variables related to technologies used within the four course segments of Course Content, Student/Teacher Interaction, Student/Student Interaction, and Student Evaluation.

To identify the satisfaction with the technologies used required cross tabulation between the variable program category and all variables related to satisfaction.

Finally, analysis of data related to comments made by the respondents required cross tabulation of the variable program category by all variables related comments. The comments were then grouped into technological categories and where applicable paraphrased to reduce the number of similar responses.

Summary

In this chapter the development and validation of the questionnaire were discussed including the piloting procedures. Further, the characteristics of the population involved were also described. The criteria for selecting courses and the number of courses involved in this study were also discussed. Finally, the procedures employed for data collection and the techniques used to analyze the data were outlined.

CHAPTER FOUR

PRESENTATION AND ANALYSIS OF RESULTS

This chapter begins by presenting relevant demographic data intended to provide an overview of the respondents' experience in delivering the courses surveyed and the characteristics of these courses. Then data related to the three research questions are presented. The questions were as follows: First, within the various program categories, what is the extent to which types of technologies are used to deliver adult distance education courses? Second, within the various program categories, what role do the identified technologies used play in the delivery of the adult distance education courses? Third, what is the degree of satisfaction of the technologies used in relation to each program category?

Characteristics of Respondents and Courses

Questions related to the characteristics of respondents' and courses were included at the beginning of the questionnaire. The questions served a number of important functions: identification of the instructors' experience with the courses they taught; to provide information related to the admission requirements of the courses; and finally, to identify the approximate duration of the courses surveyed.

Experience with Delivery of Courses

Table 1 presents a summary of the length of experience the respondents had with delivering the adult distance education courses they taught. There were 91 respondents who returned questionnaires. Of these respondents, 68 (74.7%) had offered the same course three or more times; 11 (12.1%) had offered the same course twice; and 12

Table 1

Times Courses Offered by Same Instructor

	f	%
Course has been offered three or more times	68	74.7
Course has been offered twice	11	12.1
Course has been offered once	12	13.2
Number of instructors	91	100.0

f = # of instructors.

(13.2%) had offered the course only once. These figures indicate that the majority of instructors (74.7%) had significant experience in the delivery of the course they taught.

Course Admission Requirements

Table 2 displays the data relevant to course admission requirements. Participants were asked to identify whether each course could be taken as part of a program only or could be taken independently. In responding to this question, nine questionnaires from the Engineering/Technology program category were returned with the comment both as a response. Since it was the intent of the researcher to identify whether a course was exclusive to a program or not, the nine responses of both, were considered as independent courses.

The two program categories of Health and Trades & Services were the only ones to indicate that the majority of their courses were exclusive to a program of studies and could not be taken independently. The other seven program categories offered the majority of their courses on an independent basis. In total, 97 (63%) of the courses were available to the student on an independent basis.

Duration of Courses

Participants were asked to indicate the approximate duration of their courses in hours. The results of this question are summarized in Table 3. The data in Table 3 indicate that the majority of courses surveyed (102, 60.4%) had a course duration in excess of forty five hours. Only 28 (16.6%) courses were offered with a duration of less than 31 hours. This indicates that the majority of courses surveyed were regular full-term.

Table 2

Course Admission Requirements

	Number of Courses	
	f	%
Requires program admission	63	37.3
Course can be taken independently	106	62.7
Total	169	100.0

Table 3

Duration of Courses in Hours

Course Duration	Number of Courses	
	f	%
0 - 15 Hours	10	5.9
16 - 30 Hours	18	10.7
31 - 45 Hours	39	23.1
Over 45 hours	102	60.4
Total	169	100.0

Summary

The analysis of data has provided an overview of the instructors' experience with delivery of the courses they taught; admission prerequisites; and time requirements for each course. The analysis showed that the majority of instructors had delivered the same course at least three times, which indicates a largely experienced group were involved in the study; that most courses could be taken on an independent basis; and finally, the greater number of courses surveyed were regular full-term courses.

Data Related to The Problem Statement

In this section, survey results that provide analysis of the problem statement will be presented. The problem was to identify for types of technologies, their extent of use and the role they played within the various program categories of adult distance education. Instructors' degree of satisfaction with these technologies was also examined. To address this problem, three sub-problems were formulated. The results of the data analysis related to the three sub-problems will now be discussed.

Program Categories

The three sub-problems focused on aspects of course delivery within specific program categories thus, it was necessary to first categorize the courses surveyed. The categorization of courses into program categories was carried out in question five. Table 4 summarizes the results of course categorization by the respondents. Shown are the program categories that respondents placed their courses within and the number of courses that fell within each program category. This information is presented at this stage to provide a focus for the analysis that follows related to the three sub-problems.

The respondents were given twelve possible program categories in which to place their course(s). Program category twelve (other - please specify) allowed the respondent to enter the name of a program category of their choice if they felt the options provided

Table 4

Respondents' Classification of Courses by Program Category

Program Categories	Courses per Category	
	f	%
Business & Administration	23	13.6
Community Services	6	3.6
Education	11	6.5
Engineering/Technology	24	14.2
Health	51	30.2
Liberal Arts & Social Science	16	9.5
Medical Sciences	24	14.2
Natural Sciences & Mathematics	6	3.6
Trades & Services	8	4.7
Total Courses	169	100.0

were unsuitable. Program category twelve was left blank by all respondents. Of the remaining eleven program categories nine were utilized by the respondents as shown in Table 4. The two program categories that were not used were Clerical/Secretarial and Performing Arts.

The data in Table 4 show that the largest number of courses identified in this survey fell within the program category of Health (30.2%). Engineering/Technology (14.2%), Medical Sciences (14.2%) and Business & Administration (13.6%) were the next most frequently identified program categories. Community Services and Natural Science & Mathematics were the least frequently identified program categories. Only (3.6%) of the total number of courses surveyed where in each of these categories.

Sub-problem 1

Within the various program categories, what is the extent to which types of technologies are used to deliver adult distance education courses?

In response to sub-problem 1, respondents were asked to identify the types of technologies they used in the delivery of their courses. Further, they were asked to rank the technologies chosen by their frequency of use. The ranking of technologies was limited to the three most frequently used.

The respondents also identified the types of technologies used in four areas. These were, the technologies used for the delivery of Course Content; to facilitate Student/Teacher Interaction and Student/Student Interaction; and those used to Evaluate Student Performance. Given that a respondent could indicate a first, second, and third most frequently used technology for each of these four areas, the total number of frequencies shown in Tables 5, 6, and 7 exceed the number of courses that fell within that category as shown in Table 1.

Table 5

Technologies Rated Most Frequently Used For Course Delivery by Instructors, by Program

Technologies used	*Programs*									
	Bus & Admin %	Comm Serv %	Educ %	Engin/ Tech %	Health %	Lib/A Soc/Sc %	Med Sci %	Nat/Sc Math %	Trade Serv %	f
Audio Cassettes					0.5					1
Audio Teleconferencing	5.0*	73.3	8.3		4.3	3.9	7.1	23.8	32.1	48
Cable Television										0
Computer Conferencing										0
CML/CAI on-campus					1.1		1.2	4.8		4
CML/CAI remote	11.4			19.3	0.5		4.7			25
Electronic Mail										0
Mail		6.6	2.7			2.0	1.2			4
Personal Contact					1.1	2.0				3
Print Materials	55.7	6.6	86.1	42.1	65.4	58.9	61.2	66.7	46.4	351
Seminar or Tutorial	10.1			15.8	11.4	9.8	11.8		17.9	58
Slides										0
Telephone	13.3		2.7	22.8	14.5	13.7	7.1			64
Tele-tutoring	3.8	13.3			1.6	5.9				11
Telewriter										0
Travelling Instructors						3.9	5.9	4.8		8
Video/enhan Audio/Telecon										0
Video Cassettes									3.6	1
NUMBER OF COURSES	23	6	11	24	51	16	24	6	8	578

*5.0, of the 23 courses in this program, in 5 percent, instructors made most use of audio teleconferencing

f = number of responses for each technology.

Bus & Admin - Business & Administration
Comm Serv - Community Services
Educ - Education
Engin/Tech - Engineering/Technology
Health - Health
Lib/A Soc/Sc - Liberal Arts & Social Sciences
Med Sci - Medical Sciences
Nat/Sc Math - Natural Sciences & Mathematics
Trade Serv - Trades & Services

Table 6

Technologies Rated Second Most Frequently Used For Course Delivery by Instructors, by Program

Technologies used	*Programs*									
	Bus & Admin %	Comm Serv %	Educ %	Engin/ Tech %	Health %	Lib/A Soc/Sc %	Med Sci %	Nat/Sc Math %	Trade Serv %	f
Audio Cassettes	1.8		5.3		11.3		2.2			20
Audio Teleconferencing	1.8				22.7	6.5	17.4	13.3		47
Cable Television										0
Computer Conferencing										0
CML/CAI on-campus				30.5	0.7		2.2	6.7		16
CML/CAI remote							2.2			1
Electronic Mail							2.2			1
Mail						6.5				2
Personal Contact					2.0				4.3	4
Print Materials	18.2	40.0			4.0	16.1	17.4		39.1	40
Seminar or Tutorial	14.5	40.0		38.9	17.3	9.7	13.0		4.3	60
Slides							2.2			1
Telephone	34.5*		78.3	8.3	18.0	42.0	26.1	13.3	21.7	96
Tele-tutoring					21.3	9.7		53.3		35
Telewriter										0
Travelling Instructors				22.2		3.2	10.1		13.0	17
Video/enhan Audio/Telecon									4.3	1
Video Cassettes	29.0	20.0	15.8		2.7	6.5	4.3	13.3	13.0	33
NUMBER OF COURSES	23	6	11	24	51	16	24	6	8	374

*34.5, of the 23 courses in this program, in 34.5%, instructors made most use of telephone.

f = number of responses for each technology.

Bus & Admin - Business & Administration
Comm Serv - Community Services
Educ - Education
Engin/Tech - Engineering/Technology
Health - Health
Lib/A Soc/Sc - Liberal Arts & Social Sciences
Med Sci - Medical Sciences
Nat/Sc Math - Natural Sciences & Mathematics
Trade Serv - Trades & Services

Table 7

Technologies Rated Third Most Frequently Used For Course Delivery by Instructors, by Program

Technologies used	*Programs*									
	Bus & Admin %	Comm Serv %	Educ %	Engin/ Tech %	Health %	Lib/A Soc/Sc %	Med Sci %	Nat/Sc Math %	Trade Serv %	f
Audio Cassettes	2.9				0.8	8.3	30.1		13.3	13
Audio Teleconferencing	14.7		50.0		16.4	8.3		28.6		26
Cable Television									6.7	1
Computer Conferencing								14.3		1
CML/CAI on-campus	2.9									1
CML/CAI remote					1.6		11.5			5
Electronic Mail										0
Mail										0
Personal Contact									6.7	1
Print Materials	26.6	50.0			7.0		7.7	28.6	20.0	26
Seminar or Tutorial	29.4*	25.0		27.3	23.4	42.0	7.7		26.7	54
Slides										0
Telephone	14.7				21.1	16.7	7.7		6.7	25
Tele-tutoring	2.9	25.0			3.1	16.7			6.7	8
Telewriter					0.8					1
Travelling Instructors							26.9	28.6	13.3	11
Video/enhan Audio/Telecon										0
Video Cassettes	5.9		50.0	72.7	25.8	8.3	7.7			46
NUMBER OF COURSES	23	6	11	24	51	16	24	6	8	219

*29.4, of the 23 courses in this program, in 29.4%, instructors made most use of seminar or tutorial.

f = number of responses for each technology.

Bus & Admin - Business & Administration
Comm Serv - Community Services
Educ - Education
Engin/Tech - Engineering/Technology
Health - Health
Lib/A Soc/Sc - Liberal Arts & Social Sciences
Med Sci - Medical Sciences
Nat/Sc Math - Natural Sciences & Mathematics
Trade Serv - Trades & Services

As stated previously, nine program categories were utilized by the respondents (Table 4). The data collected for each program category in relation to types of technologies used will now be presented in the following manner. First, a comparison of the data in Tables 5, 6, and 7 between program categories will be given, and second, a discussion of how the data in these tables relate to each specific program category will be provided.

First Most Frequently Used Technologies

The data in Table 5 show how frequently various technologies were used in the delivery of courses for the nine program categories. The technologies were identified by the respondents as those most frequently used to deliver their courses. The figures shown in Table 5 represent the percentage of utilization for a particular technology within the total number of courses surveyed in each program category. For example, in Business and Administration the 5% shown for audio teleconferencing means that it was used for 5% of course delivery within the 23 surveyed courses.

In eight of the nine program areas, print materials was identified as the most frequently used technology for course delivery. Education registered the highest use of print materials (86.1%) and Engineering/Technology the lowest use (42.1%). The program category that did not identify print materials as its most frequently used technology was Community Services. Community Services identified audio teleconferencing (73.3%) as its most frequently used technology for delivery of its courses.

When the types of most frequently used technologies are compared across the nine program categories, in a number of program categories the same technologies were used for most of the course delivery. For example, in Engineering/Technology, Health, Business & Administration, and Liberal Arts & Social Sciences, the combination of print materials and telephone was used for the greater portion of the delivery of their courses. Similarly, in Education, Natural Sciences & Mathematics, and Trades & Services, the

combination of print materials and audio teleconferencing was used for the greater portion of the delivery of their courses. Overall, print materials were used by all program categories and audio teleconferencing by eight program categories categories on a most frequently used basis for the delivery of surveyed courses.

Second Most Frequently Used Technologies

The data in Table 6 show the technologies that were identified by the respondents as those second most frequently used to deliver their courses. The data in Table 6 differs from that in Table 5 in that no single technology (print materials in Table 5) dominates as the second most frequently used. The technology shown in Table 6 to register the highest incidence of use in different program categories was the telephone. The telephone was used most second frequently by four program areas; Business & Administration (34.5%), Education (78.3%), Liberal Arts & Social Sciences (42.0%), and Medical Sciences (26.1%).

When comparing the types of second most frequently used technologies across the nine program categories, certain technologies were used more frequently than others for course delivery. For example, instructors in Business & Administration, and Education identified the combination of telephone and video cassettes as being used more often as second most frequently used technologies. Similarly, instructors in Liberal Arts & Social Sciences, and Medical Sciences identified the combination of print materials and telephone as being used more often as second most frequently used technologies. Overall, telephone and video cassettes were used by eight program areas, and seminar or tutorial by seven program areas more often, on a second most frequently used basis for delivery of the surveyed courses.

Third Most Frequently Used Technologies

The data in Table 7 show for the nine program categories, the technologies which were identified by the respondents as those third most frequently used to deliver their courses. The technologies identified in Table 7 to register the highest incidence of use in different program categories were seminar or tutorial and video cassettes. Seminar or tutorial was used most frequently by three program areas of Business & Administration (29.4%), Liberal Arts & Social Sciences (42.0%), Trades & Services (26.7%), while video cassettes was used third most frequently by the three program areas of Education (50%), Engineering/Technology (72.7%), and Health (25.8%).

When comparing the types of third most frequently used technologies across the nine program categories, in a number of program categories the same technologies were used more frequently than others for course delivery. For example, instructors in Business & Administration, Community Services, and Trades & Services identified the combination of print materials and seminar or tutorial as being used more often as a third most frequently used technology. Overall, seminar or tutorial was used by seven program areas and print materials by six program areas more often, on a third most frequently used basis for delivery of the surveyed courses.

Comparison of Data Related to Specific Program Categories

Tables 5, 6, and 7 show the frequency that identified technologies were utilized by the respondents in the delivery of their courses. Technologies are listed as first, second, and third most frequently used. However, it is also important to examine which technologies were used in a single program area to identify recurring combinations. The combination of technologies used in each program area based on these tables, is now described.

Business & Administration

There were twenty three courses for which questionnaires were completed in this program category. Business & Administration used nine types of technologies for the delivery of its courses. However, six technologies were identified as being used first most frequently and therefore could be considered the predominant technologies. Of these, the four most frequently used were print materials (55.7%), telephone (13.9%), CML/CAI remote (11.4%), and seminar or tutorial (10.1%). This indicates that the predominant technology for delivery of the 23 Business Administration courses was print materials supplemented by telecommunication systems and seminar or tutorial.

Community Services

There were six courses for which questionnaires were completed in this program category. Community Services used six types of technology for the delivery of its courses. The four most frequently used technologies were audio teleconferencing (73.3%), tele-tutoring (13.3%), print materials (6.6%), and mail (6.6%).

Telecommunications technologies played a major role in the delivery of the six Community Services courses.

Education

Eleven of the courses surveyed fell within the program category of Education. Unlike Community Services that relied heavily on telecommunications for the delivery of its courses, print materials was the major technology used for the delivery of Education courses. Respondents indicated that print materials was used most frequently for (86.1%) of the course delivery. The other technologies that were identified as being used most frequently were audio teleconferencing (8.3%), mail (2.7%), and telephone (2.7%).

This indicates that the most frequently used technology for the 11 Education courses was print materials with telecommunications and mail used in support. The total number of technologies used for the delivery of Education courses was seven.

Engineering/Technology

Seven types of technologies were used for the delivery of the 24 Engineering/Technology courses. The predominant technology used was print materials. Respondents indicated that print materials was used most frequently for (42.1%) of the course delivery. However, it was supported significantly by telephone (22.8%), CML/CAI remote (19.3%), and seminar (15.8%). The other two technologies used to a limited degree were travelling instructors and video cassettes.

Health

There were fifty one courses for which questionnaires were completed in this program category. This represented the largest number of responses for all program areas. Health used eleven types of technologies for the delivery of its courses. Of these, print materials played a major role in course delivery. It was used most frequently (65.4%) and supported to a minor degree by telephone (14.5%), and seminar (11.4%). In addition, six other technologies were used to a limited degree as most frequently used technologies. In total, nine of the identified technologies were used most frequently for delivery of the 51 courses.

Liberal Arts & Social Sciences

The number of courses identified in this program category was sixteen. Liberal Arts & Social Sciences used ten types of technologies for the delivery of its courses. Of these, print materials was shown to be the dominant technology for course delivery. Print materials was used most frequently for (58.9%) of course delivery and was supported to a

minor degree by telephone (13.7%) and seminar or tutorial (9.8%). These three technologies were supported to a lesser degree by five other most frequently used technologies of audio teleconferencing, mail, personal contact, tele-tutoring, and travelling instructors for the delivery of the 16 Liberal Arts & Social Science courses.

Medical Sciences

Twenty four courses fell within the program category of Medical Sciences. Instructors identified twelve types of technologies as being used for the delivery of these courses. Eight technologies were identified as being used most frequently and therefore could be considered the predominant technologies used for course delivery. Of these, print materials (61.2%) was the most frequently used technology, followed by seminar or tutorial (11.8%). The remaining six technologies in the most frequently used category were used sparingly for delivery of the 24 courses.

Natural Sciences & Mathematics

Only six questionnaires were completed for courses within this program category. Natural Sciences & Mathematics used eight types of technology to deliver these courses. Of the eight technologies, four were identified as being used most frequently and therefore could be considered the predominant technologies used. The four technologies used, were print materials (66.7%), audio teleconferencing (23.8%), CML/CAI on-campus (4.8%) and travelling instructors.

Trades & Services

Eight of the surveyed courses fell within this program category. Trades & Services used eleven types of technology for the delivery of its courses. Of these technologies, four were identified as being used most frequently and therefore could be considered the

predominant technologies. The four technologies were, print materials (46.4%), audio teleconferencing (32.1%), seminar or tutorial (17.9%), and video cassettes (3.6%).

Summary

While the number and variety of technologies used varied by program area, print materials and telephone (either individually or in combination with audio teleconferencing) predominated. Community Services was the only program area where print materials was not the predominant technology. This program area used audio teleconferencing as its predominant technology. Also, in many program areas the most common supplementary technologies were seminar or tutorial, and video cassettes.

Sub-problem 2

Within the various program categories, what role do the used technologies play in the delivery of the adult distance education courses?

The role of technology was defined in the literature review as one of presenting the course content, providing assistance, support and feedback to the student during learning, and as a means of evaluating if the learning objectives have been achieved. To investigate what role the technologies played in the delivery of courses within this study, question six was divided into four areas: Course Content, Student/Teacher Interaction, Student/Student Interaction, and Student Evaluation. Participants were then asked to identify which technologies were used in each area. The results from the analysis of data related to this sub-problem follow.

The analysis made use of percentage frequency distribution and cross tabulation of variables. This allowed the technologies used within each course segment to be identified on a program category basis. The results are presented in tables under the headings of the four areas: Course Content, Student/Teacher Interaction, Student/Student Interaction, and

Student Evaluation. Each section shows which technologies were used by individual program categories in the delivery of that segment of the courses. Also identified is the most frequently utilized technology for the delivery of each course segment within the individual program categories.

Further, the varying numbers of technologies identified in each course segment of the following Tables result from the following two factors. First, respondents were allowed to indicate a first, second, and third most frequently used technology for the delivery of each segment. Hence, the possibility of having from one to three responses for any segment in a given course. Second, respondents were allowed to indicate if a course segment did not apply to their course, i.e., no Student/Student Interaction occurred. When this response was given zero technologies were recorded for the delivery of that course segment for the course involved. The data for each program area are reported on separate tables.

Role of Technology in *Business and Administration*

The role that technologies played in the delivery of courses within the program category of Business and Administration is shown in Table 8. The table is divided into five columns. Column one displays the technologies used for course delivery identified by respondents in this study. Columns two to five identify the technologies used for the delivery of a particular course segment and thus, the role the technology(s) played in the delivery of the courses. In addition, the technology identified most frequently as having a role in the delivery of the course segment is also shown.

The data in Table 8 show that the role of a particular technology used was not limited to just one aspect of the courses involved. Technologies such as audio teleconferencing, print materials, and seminar or tutorial played a role in the delivery of three segments of the courses surveyed. Telephone was the only technology to play a role in the delivery of all course segments. Further, the combinations of technologies used varied from segment

Table 8

Role of Technology

in the Delivery of Business and Administration Courses

Technologies used	Course Content	Student/ Teacher Interaction	Student/ Student Interaction	Student Evaluation
Audio Cassettes	2'			
Audio Teleconferencing	2	2	1	
Cable Television				
Computer Conferencing				
CML/CAI on-campus	1			
CML/CAI remote				9
Electronic Mail				
Mail				
Personal Contact				
Print Materials	22*	17		23*
Seminar or Tutorial	9	8	8	
Slides				
Telephone	5	18*	9*	1
Tele-Tutoring		3		
Telewriter				
Travelling Instructors				
Video/enhanced Audio Telecon				
Video Cassettes	16			

* Technology identified most frequently as having a role in the delivery of course segment.

f = # of courses.

Number of courses = 23

2'- In two courses, audio cassettes were used to deliver course content.

to segment denoting the changing requirements for the delivery of each segment. The greatest variety of technologies were used for the delivery of Course Content.

The most frequently used technologies for each segment were print materials for the delivery of Course Content and Student Evaluation; and telephone to facilitate Student/Teacher Interaction and Student/Student Interaction.

Role of Technology in *Community Services*

The role that technologies played in the delivery of courses within the program category of Community Services is shown in Table 9. The data show that the greatest variety of technologies were used for the delivery of Course Content. The most frequently used single technology was audio teleconferencing. Technologies that were used in multiple roles were, audio teleconferencing, print materials, seminar or tutorial, and tele-tutoring. Mail was the only technology identified as having a single role, being the delivery of student evaluation. The combinations of technologies used for delivery of course segments were the same for Student/Teacher Interaction, and Student/Student Interaction.

The most frequently used technology for segments that used multiple technologies was audio teleconferencing for the delivery of Course Content and Student/Teacher Interaction. The segment of Student/Student Interaction used the technologies of audio teleconferencing, print materials, seminar or tutorial, tele-tutoring to the same degree.

Role of Technology in *Education*

The role that technologies played in the delivery of courses within the program category of Education is shown in Table 10. Instructors in this program category used the greatest variety of technologies to deliver Course Content. The most frequently used single technology for delivery of the eleven courses was print materials. Audio

Table 9

Role of Technology

in the Delivery of Community Services Courses

Technologies used	Course Content	Student/ Teacher Interaction	Student/ Student Interaction	Student Evaluation
Audio Cassettes				
Audio Teleconferencing	5*	5*	1	
Cable Television				
Computer Conferencing				
CML/CAI on-campus				
CML/CAI remote				
Electronic Mail				
Mail				1
Personal Contact				
Print Materials	2'	2	1	
Seminar or Tutorial	1	1	1	
Slides				
Telephone				
Tele-Tutoring	1	1	1	
Telewriter				
Travelling Instructors				
Video/enhanced Audio Telecon				
Video Cassettes	1			

* Technology identified most frequently as having a role in the delivery of course segment.

f = # of courses.

Number of courses = 6

2'- In two courses, print materials were used to deliver course content.

Table 10

Role of Technology

in the Delivery of Education Courses

Technologies used	Course Content	Student/ Teacher Interaction	Student/ Student Interaction	Student Evaluation
Audio Cassettes	1			
Audio Teleconferencing	1	1	3*	
Cable Television				
Computer Conferencing				
CML/CAI on-campus				
CML/CAI remote				
Electronic Mail				
Mail				1
Personal Contact				
Print Materials	11*	10		10*
Seminar or Tutorial				
Slides				
Telephone	5'	11*		
Tele-Tutoring				
Telewriter				
Travelling Instructors				
Video/enhanced Audio Telecon				
Video Cassettes	5			

* Technology identified most frequently as having a role in the delivery of course segment.

f = # of courses.

Number of courses = 11

5'- In five courses, telephone was used to deliver course content.

teleconferencing, print materials, and telephone were used in multiple roles, while audio teleconferencing played a single role in the facilitation of Student/Student Interaction.

Three different technologies were used most frequently to deliver the four course segments. They were print materials for the delivery of Course Content and Student Evaluation, telephone to facilitate Student/Teacher Interaction, and audio teleconferencing to facilitate Student/Student Interaction.

Role of Technology in *Engineering/Technology*

The data in Table 11 show that the most frequently used single technology was print materials. The most frequently used technologies for each segment were: print materials for the delivery of Course Content and Student Evaluation; and seminar or tutorial to facilitate Student/Teacher Interaction and Student/Student Interaction. All the identified technologies were used in multiple roles with the exception of travelling instructors and video cassettes. Seminar or tutorial was the only technology used to facilitate Student/Student Interaction, while multiple technologies were used to deliver the other three segments. Finally, the largest variety of technologies were used for the delivery of Course Content.

Role of Technology in *Health*

The data in Table 12 show that instructors in this program category used eleven types of technologies to deliver their courses. Of these, 10 were used in delivery of Course Content. The most frequently used technologies were print materials in the delivery of Course Content and Student Evaluation, telephone to facilitate Student/Teacher Interaction, and audio teleconferencing and telephone to facilitate Student/Student Interaction. Personal contact and use of the telewriter were the only technologies not used in multiple roles.

Table 11

Role of Technology

in the Delivery of Engineering/Technology Courses

Technologies used	Course Content	Student/ Teacher Interaction	Student/ Student Interaction	Student Evaluation
Audio Cassettes				
Audio Teleconferencing				
Cable Television				
Computer Conferencing				
CML/CAI on-campus	3			8
CML/CAI remote	8			3
Electronic Mail				
Mail				
Personal Contact				
Print Materials	16*	8		21*
Seminar or Tutorial	3	14*	8*	3
Slides				
Telephone	3	13		
Tele-Tutoring				
Telewriter				
Travelling Instructors	8'			
Video/enhanced Audio Telecon				
Video Cassettes		8		

* Technology identified most frequently as having a role in the delivery of course segment.

f = # of courses.

Number of courses = 24

8'- In eight courses, travelling instructors were used to deliver Course Content.

Table 12

Role of Technology

in the Delivery of Health Courses

Technologies used	Course Content	Student/ Teacher Interaction	Student/ Student Interaction	Student Evaluation
Audio Cassettes	15	1		3
Audio Teleconferencing	12	23	22*	6
Cable Television				
Computer Conferencing				
CML/CAI on-campus	2	1		2
CML/CAI remote	1	1		1
Electronic Mail				
Mail				
Personal Contact			5	
Print Materials	50*	30	6	50*
Seminar or Tutorial	9	32	21	15
Slides				
Telephone	7	36*	22*	5
Tele-Tutoring	18'	10	5	6
Telewriter	1			
Travelling Instructors				
Video/enhanced Audio Telecon				
Video Cassettes	32	3		2

* Technology identified most frequently as having a role in the delivery of course segment.

f = # of courses.

Number of courses = 51

18'- In 18 courses, tele-tutoring was used to deliver Course Content.

Role of Technology in *Liberal Arts and Social Sciences*

The role that technologies played in the delivery of courses within the program category of Liberal Arts and Social Sciences is shown in Table 13. The greater variety of identified technologies were used to deliver Course Content and Student/Teacher. Print materials was the most frequently used single technology. All the identified technologies were used in multiple roles with the exception of audio cassettes and personal contact.

By course segment, the most frequently used technologies were print materials for the delivery of Course Content and Student Evaluation, telephone to facilitate Student/Teacher Interaction, and seminar or tutorial to facilitate Student/Student Interaction.

Role of Technology in *Medical Sciences*

The data in Table 14 show the variety of technologies used and their frequency of use to deliver the four course segments. They illustrate, that print materials was the most frequently used technology in all course segments; that the greatest variety of technologies were used for the delivery of Course Content, and that all the identified technologies were used in multiple roles with the exception of electronic mail and mail.

Role of Technology in *Natural Sciences and Mathematics*

The data in Table 15 show that instructors of Natural Sciences and Mathematics courses used the greatest variety of technologies to deliver Course Content. Further, the most frequently utilized technologies for each segment were print materials for the delivery of Course Content, Student/Teacher Interaction, and Student Evaluation; and audio teleconferencing to facilitate Student/Student Interaction.

Overall, print materials was the most frequently used single technology and, all the identified technologies were used in multiple roles with the exception of computer conferencing, telephone, and video cassettes.

Table 13

Role of Technology

in the Delivery of Liberal Arts & Social Science Courses

Technologies used	Course Content	Student/ Teacher Interaction	Student/ Student Interaction	Student Evaluation
Audio Cassettes		1		
Audio Teleconferencing	2	1	1	1
Cable Television				
Computer Conferencing				
CML/CAI on-campus				
CML/CAI remote				
Electronic Mail				
Mail	1	2		
Personal Contact			1	
Print Materials	14*	7	1	13*
Seminar or Tutorial	4	3	3*	3
Slides				
Telephone	7'	10*	1	4
Tele-Tutoring	4	4		
Telewriter				
Travelling Instructors	1	1		1
Video/enhanced Audio Telecon				
Video Cassettes	2			1

* Technology identified most frequently as having a role in the delivery of course segment.

f = # of courses.

Number of courses = 16

7'- In seven courses, telephone was used to deliver Course Content.

Table 14

Role of Technology

in the Delivery of Medical Science Courses

Technologies used	Course Content	Student/ Teacher Interaction	Student/ Student Interaction	Student Evaluation
Audio Cassettes	3	2	2	4
Audio Teleconferencing	4	4	4	
Cable Television				
Computer Conferencing				
CML/CAI on-campus	1			1
CML/CAI remote	3	3	1	1
Electronic Mail		1		
Mail		1		
Personal Contact				
Print Materials	22*	15*	7*	18*
Seminar or Tutorial	5	5	5	3
Slides	1			
Telephone	2	12	3	3
Tele-Tutoring				
Telewriter				
Travelling Instructors	5	5	3	4
Video/enhanced Audio Telecon				
Video Cassettes	3'		1	

* Technology identified most frequently as having a role in the delivery of course segment.

f = # of courses.

Number of courses = 24

3'- In three courses, video cassettes were used to deliver Course Content.

Table 15

Role of Technology

in the Delivery of Natural Sciences & Mathematics Courses

Technologies used	Course Content	Student/ Teacher Interaction	Student/ Student Interaction	Student Evaluation
Audio Cassettes				
Audio Teleconferencing	3	3	3*	
Cable Television				
Computer Conferencing	1			
CML/CAI on-campus	1			1
CML/CAI remote				
Electronic Mail				
Mail				
Personal Contact				
Print Materials	6*	5*		5*
Seminar or Tutorial				
Slides				
Telephone		2		
Tele-Tutoring				
Telewriter	2	2	2	2
Travelling Instructors	1	2		
Video/enhanced Audio Telecon				
Video Cassettes	2'			

* Technology identified most frequently as having a role in the delivery of course segment.

f = # of courses.

Number of courses = 6

2'- In two courses, video cassettes were used to deliver Course Content.

Role of Technology in *Trades and Services*

The data in Table 16 summarize the role that technologies played in the delivery of courses within the program category of Trades and Services. Instructors used the greatest variety of technologies to deliver Course Content and Student/Teacher Interaction. All the identified technologies were used in multiple roles with the exception of tele-tutoring and video enhanced audio teleconferencing. Of these technologies, print materials was the most frequently used technology for all course segments.

Summary

The analysis of data related to sub-problem 2 focused on the role that the technologies played in the delivery of courses within the nine program categories. The data showed that a number of technologies predominated in particular roles. These technologies were audio teleconferencing, print materials, seminar or tutorial, and telephone. The role(s) that these technologies predominated in follow:

Audio teleconferencing: Course Content, Student/Teacher Interaction, and Student/Student Interaction.

Print materials: Course Content, Student/Teacher Interaction, Student/Student. Interaction, and Student Evaluation.

Seminar or tutorial: Student/Teacher Interaction, Student/Student Interaction.

Telephone: Student/Teacher Interaction, and Student/Student Interaction.

A significant factor related to the use of print materials was that it was the single predominant technology used to delivery Course Content and Student Evaluation in all program categories except Community Services.

The combinations of predominant technologies used differed across program categories primarily, by alternating the use of audio teleconferencing, seminar or tutorial,

Table 16

Role of Technology

in the Delivery of Trades & Services Courses

Technologies used	Course Content	Student/ Teacher Interaction	Student/ Student Interaction	Student Evaluation
Audio Cassettes	1		1	
Audio Teleconferencing	3	3	2	1
Cable Television				1
Computer Conferencing				
CML/CAI on-campus				
CML/CAI remote				
Electronic Mail				
Mail				
Personal Contact		1	1	
Print Materials	8*	6*	4*	7*
Seminar or Tutorial	3	3	2	2
Slides				
Telephone	1	3	1	1
Tele-Tutoring		1		
Telewriter				
Travelling Instructors	1	1	1	2
Video/enhanced Audio Telecon	1			
Video Cassettes	2'	1		1

* Technology identified most frequently as having a role in the delivery of course segment.

f = # of courses.

Number of courses = 8

2'- In two courses, video cassettes were used to deliver Course Content.

and telephone in the interactive roles. Finally, the majority of technologies used in each program category were used in multiple roles.

Sub-problem 3

What is the degree of satisfaction with the technologies used in relation to each program category?

As part of question 6, respondents were asked to identify their satisfaction with the technologies used for the delivery of their course. A four point scale varying from very satisfied to very dissatisfied was used for the respondents to indicate their satisfaction. The respondents identified their satisfaction with the role the technology(s) played in the delivery of the courses within four Role segments: Course Content; Student/Teacher Interaction; Student/Student Interaction; and Student Evaluation.

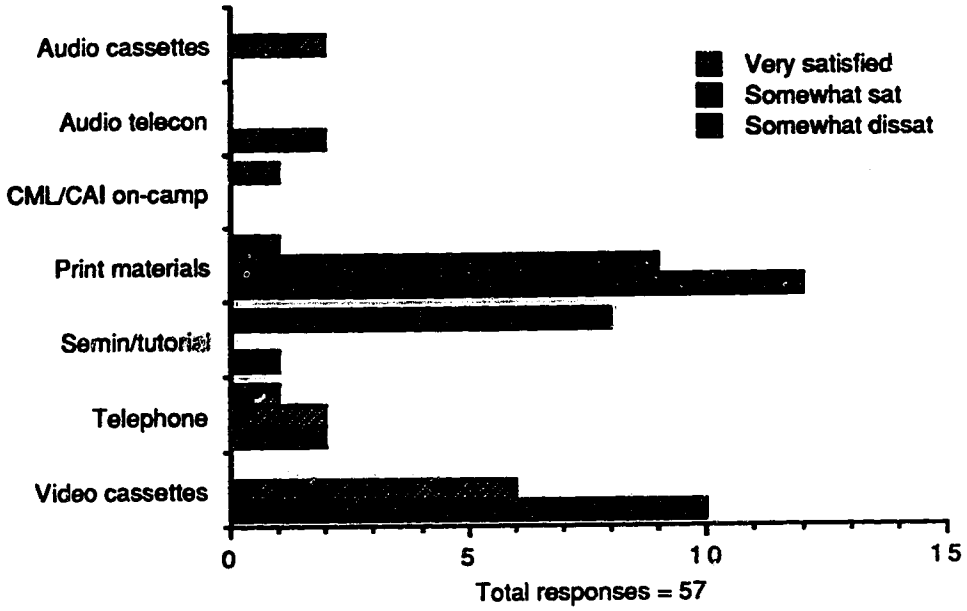
Furthermore, the respondents were given the opportunity to provide a written comment supporting their selection on the Likert scale. Examples of some comments made by respondents are provided where appropriate to support the discussion of data presented in each program category. A complete list of written comments made by respondents from all program categories (sorted by technological categories) is provided in Appendix C.

Satisfaction with Technologies in *Business & Administration*

The degree of satisfaction attributed to the technologies used for the delivery of courses within the program category of Business & Administration are shown in Figures 1, 2, 3, and 4. The number of responses to each figure varied according to the number of technologies used to deliver that segment.

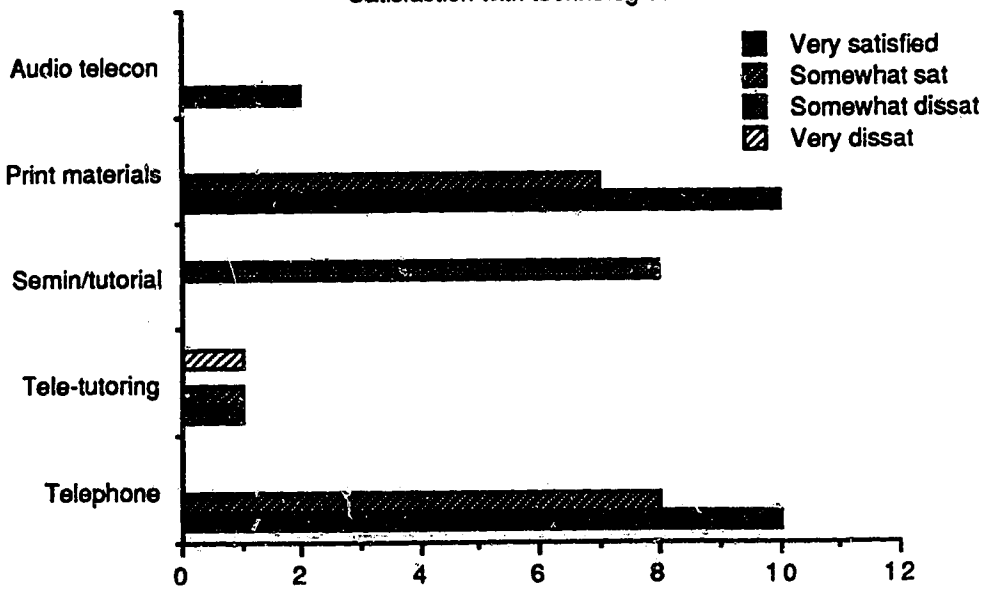
Figures 1, 2, 3, and 4 show the degree of satisfaction for the delivery of Course Content, Student/Teacher Interaction, Student/Student Interaction, and Student Evaluation. In the case of Course Content, the greatest number of responses were related

Figure 1
Business & Administration - Course Content
Satisfaction with technologies used



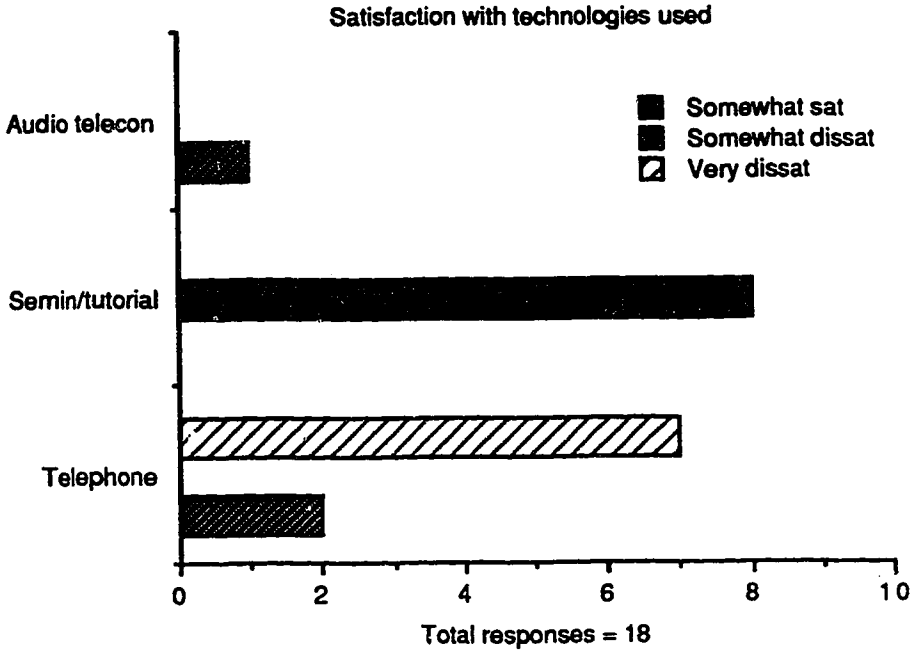
Total responses = 57

Figure 2
Business & Administration - Student/Teacher Interaction
Satisfaction with technologies used



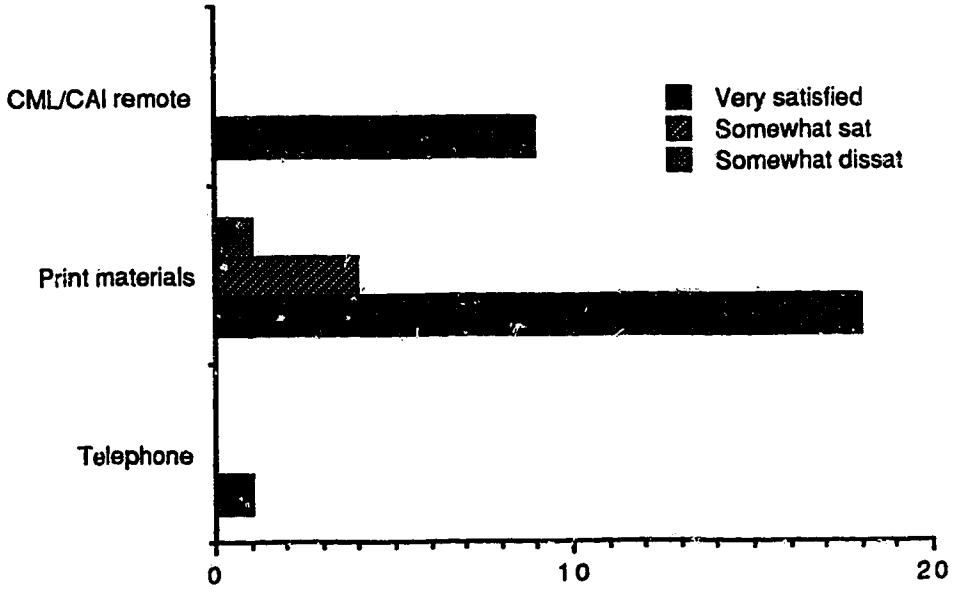
Total responses = 48

Figure 3
Business & Administration - Student/Student Interaction
Satisfaction with technologies used



Total responses = 18

Figure 4
Business & Administration - Student Evaluation
Satisfaction with technologies used



Total responses = 33

to print materials and video cassettes. Further, in the majority of cases the instructors indicated they were very satisfied with the technologies they used. The technology to register the greatest dissatisfaction was seminar or tutorial where 8 of the 9 users rated its ability to handle Course Content as somewhat dissatisfied. This may have been due to other concerns. One instructor commented that "Seminars (workshops) greatly enhance positive learning. However, not all students are able to attend all the time".

Overall the greater number of responses to the technologies involved fell within the category of very or somewhat satisfied.

Figure 2 (Student/Teacher Interaction) shows that in the majority of cases the instructors were satisfied with the technologies they used. For example, telephone was given a satisfied rating by all 18 users to facilitate Student/Teacher Interaction. One comment made by an instructor to support this satisfied response was that "Telephone is an effective way of addressing student concerns without requiring the student to come to an educational institution". Technologies that elicited a dissatisfied response were seminar or tutorial and tele-tutoring. In the case of seminar or tutorial, all 8 users gave the technology a somewhat dissatisfied rating.

Figure 3 shows the degree of satisfaction attributed to the three technologies used to facilitate Student/Student Interaction. With the exception of audio teleconferencing, respondents indicated that in most cases they were dissatisfied with the technologies used. Again it is noticeable that all users rated seminar or tutorial as somewhat dissatisfied indicating an overall dissatisfaction with this technology to deliver courses within Business and Administration. Although telephone elicited a very dissatisfied response from 7 of the 9 users, none of the respondents commented on their reasons for the rating they gave.

Figure 4 shows that in most cases the respondents were very satisfied with the technologies they used for Student Evaluation. Print materials solicited the greatest number of responses and all but a small number were positive. A comment made by an

instructor to support the satisfied rating given print materials in the delivery of Student Evaluation was, "Works very well, the structure of a print exam is suitable for students of varying abilities".

Satisfaction with Technologies in *Community Services*

Figures 5, 6, and 7, show the degree of satisfaction with technologies used for the delivery of courses within the program category of Community Services. The course delivery segment not represented by a figure is Student Evaluation. This was because Student Evaluation only utilized one technology, mail. The degree of satisfaction towards this technology was somewhat satisfied for the three responses given.

The technologies represented by the majority of responses in Figures 5 (Course Content), 6 (Student/Teacher Interaction), and 7 (Student/Student Interaction) are audio teleconferencing, print materials, seminar or tutorial, and tele-tutoring. The satisfaction attributed to these technologies was either very satisfied or somewhat satisfied. None of the technologies used to deliver courses in Community Services were given a dissatisfied rating. However, the satisfied ratings were qualified by instructors involved as shown in the following comments related to audio teleconferencing and tele-tutoring, "Audio teleconferencing works well and eliminates the need for travelling by many students. However, poor transmission is a common complaint by rural students", and "Tele-tutoring works well with students who are prepared and poorly with students who are not prepared".

Satisfaction with Technologies in *Education*

Figures 8, 9, and 10 show the degree of satisfaction with technologies used for the delivery of courses within the program category of Education. The course delivery segment not represented by a figure is Student/Student Interaction. This was because

Figure 5
Community Services - Course Content
Satisfaction with technologies used

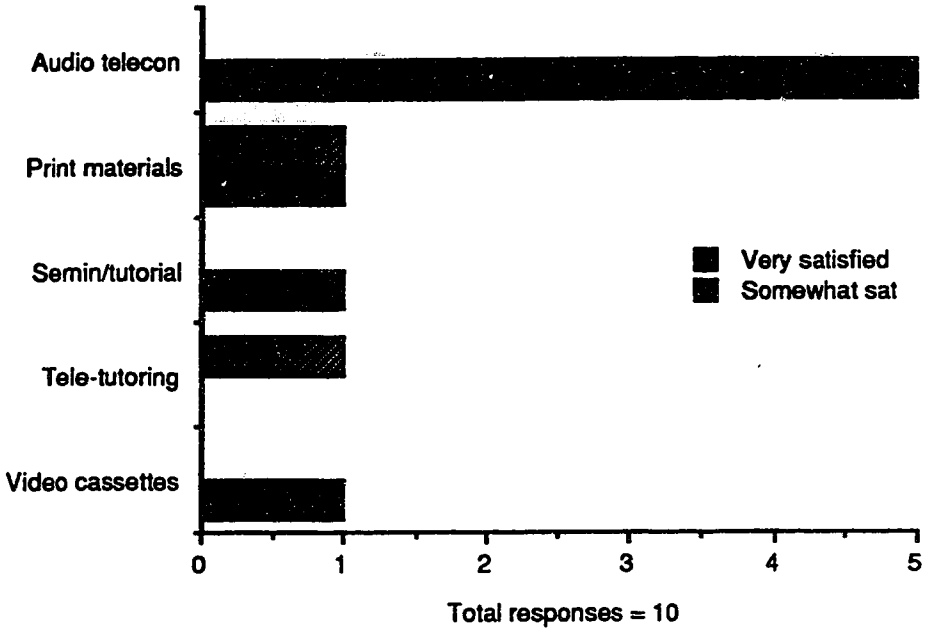


Figure 6
Community Services - Student/Teacher Interaction
Satisfaction with technologies used

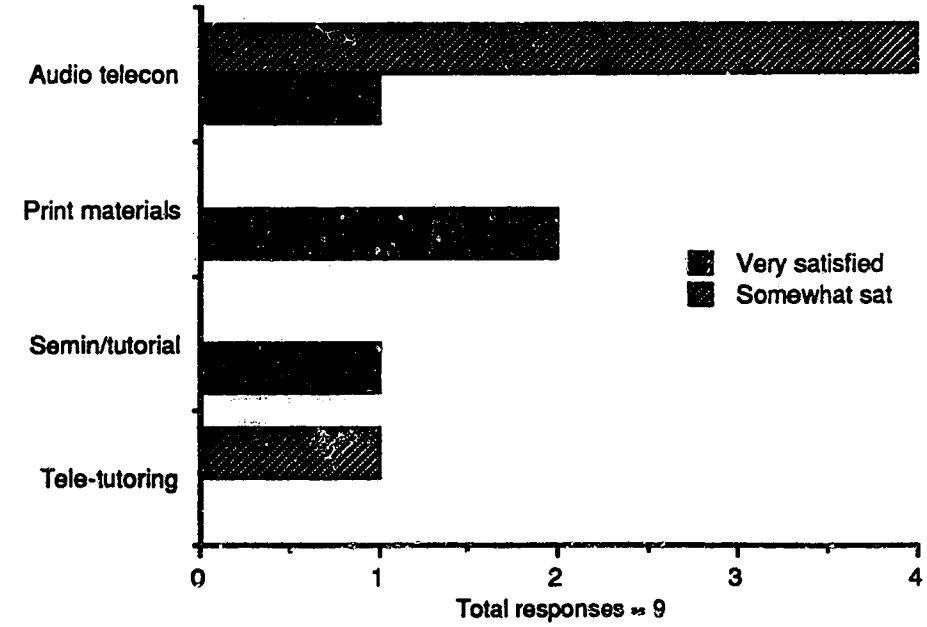


Figure 7
Community Services - Student/Student Interaction
Satisfaction with technologies used

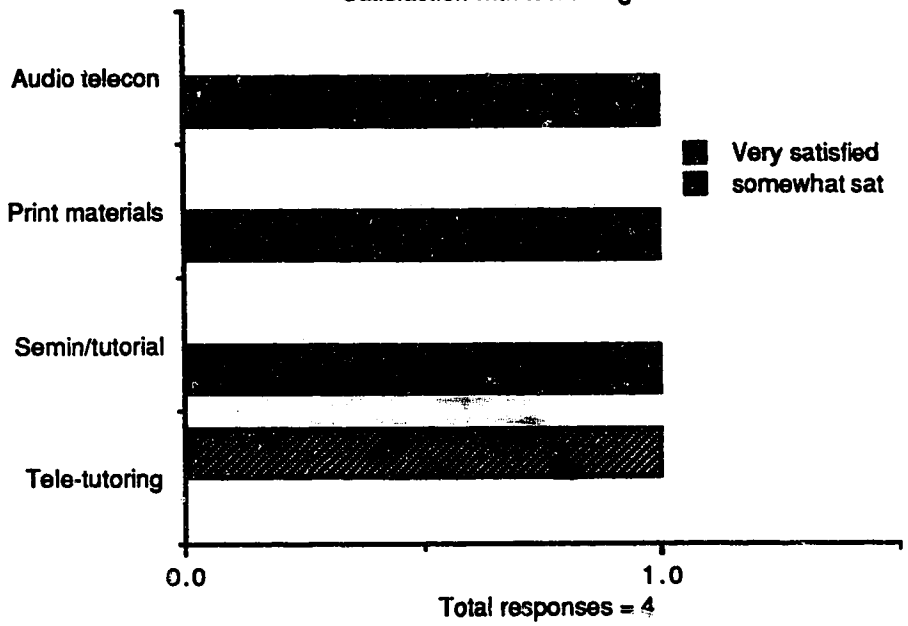
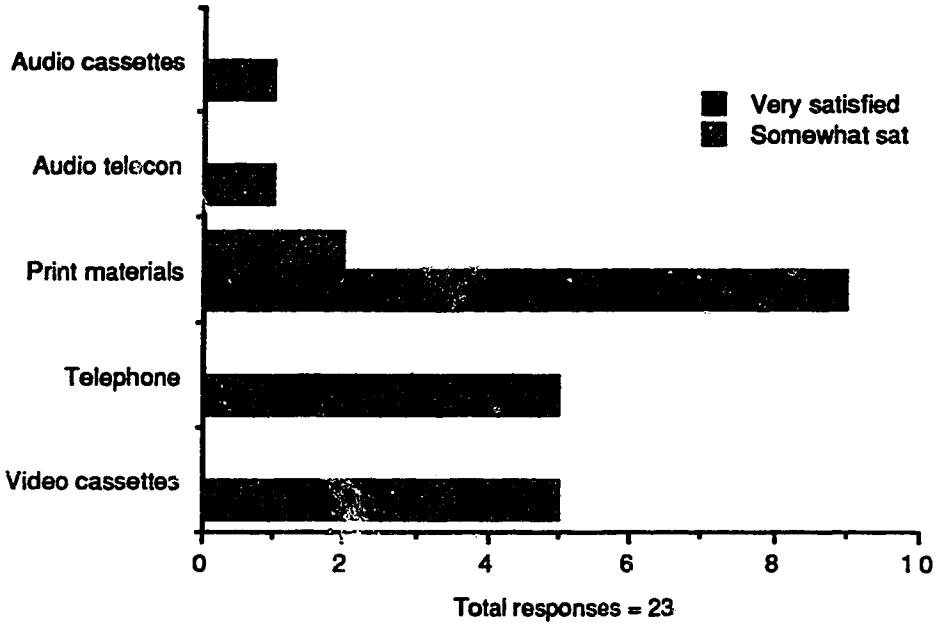
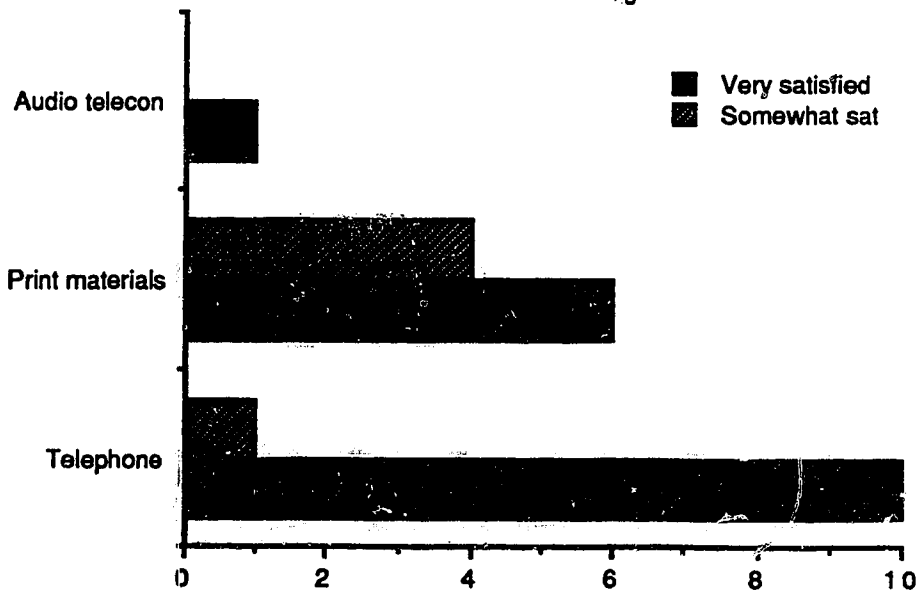


Figure 8
Education - Course Content
Satisfaction with technologies used



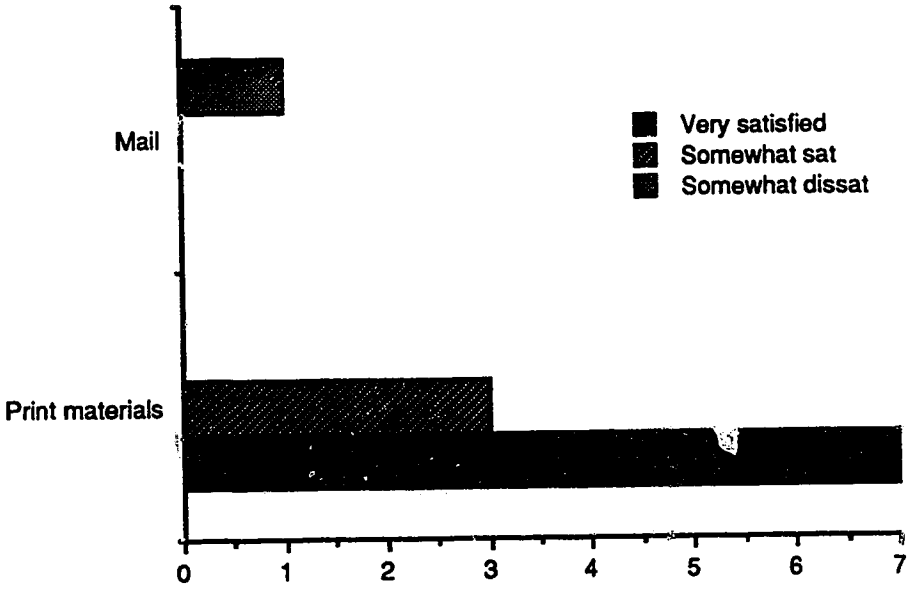
Total responses = 23

Figure 9
Education - Student/Teacher Interaction
Satisfaction with technologies used



Total responses = 22

Figure 10
Education - Student Evaluation
Satisfaction with technologies used



Total responses = 11

Student/Student Interaction utilized only one technology, audio teleconferencing which received a very satisfied rating for the three responses given.

Print materials, telephone, and video cassettes elicited the majority of responses in Figures 8 (Course Content), 9 (Student/Teacher Interaction), and 10 (Student Evaluation). The satisfaction attributed with these technologies was either very satisfied or somewhat satisfied. Where print materials received a somewhat satisfied rating it could possibly be related to the following comment provided by an instructor, "One has to be sure that all material is covered adequately and is easily accessible by print materials or students will become frustrated trying to locate the information they need".

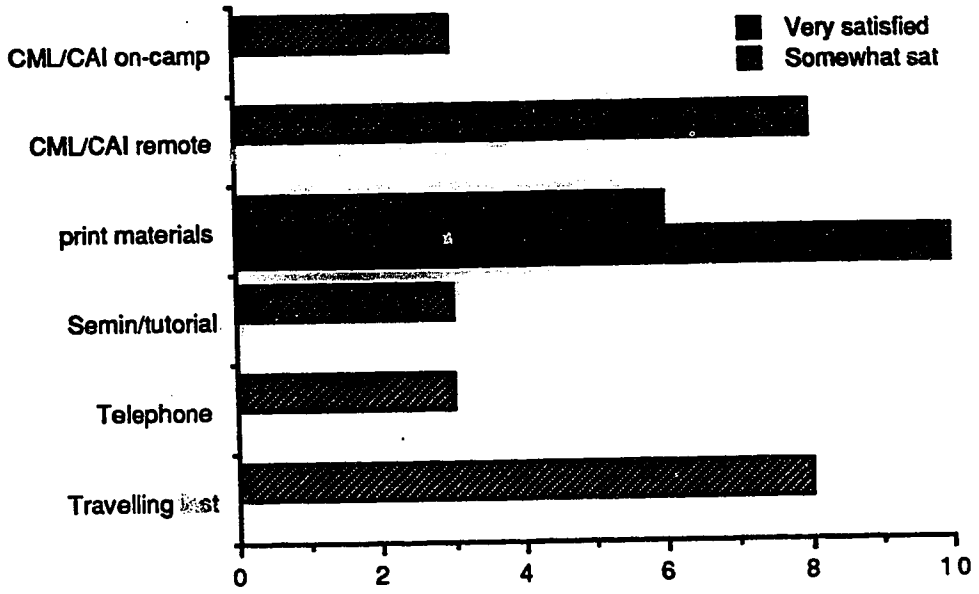
The only technology to be given a negative rating (somewhat dissatisfied) was mail when used to deliver Student Evaluation (Figure 10). However, a comment to support this dissatisfied response was not provided.

Satisfaction with Technologies in *Engineering/Technology*

Figures 11 to 14 show the degree of satisfaction with technologies used for the delivery of courses within the program category of Engineering/Technology. Figures 11 (Course Content), 12 (Student/Teacher Interaction), 13 (Student/Student Interaction), and 14 (Student Evaluation) show a level of satisfaction with the technologies used that ranges from very satisfied to somewhat dissatisfied. A significant number of dissatisfied ratings where given the technology of video cassettes when used to facilitate Student/Teacher Interaction. A comment made by an instructor in support of the rating given was that "Students as a rule do not make sufficient use of the video materials available to them. If they did the success rate would be a lot higher".

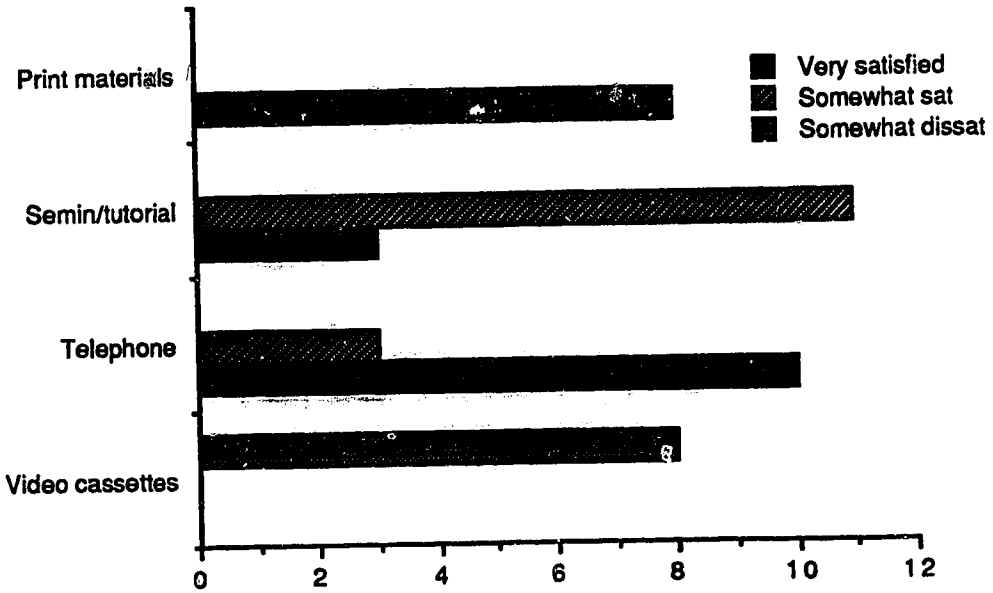
The segment that showed the highest satisfaction with the technologies used was Student Evaluation (Figure 14). A comment made in relation to the use of CML/CAI on campus indicated that "CML/CAI on campus has proven to be a satisfactory method of evaluation".

Figure 11
Engineering/Technology - Course Content
Satisfaction with technologies used



Total responses = 41

Figure 12
Engineering/Technology - Student/Teacher Interaction
Satisfaction with technologies used



Total responses = 43

Figure 13

Engineering/Technology - Student/Student Interaction

Satisfaction with technologies used

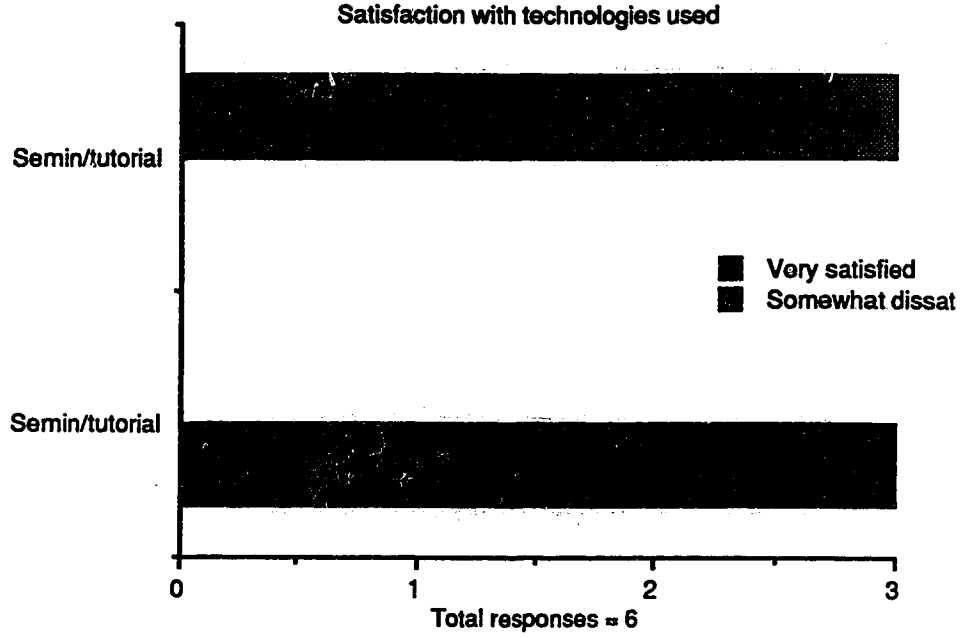
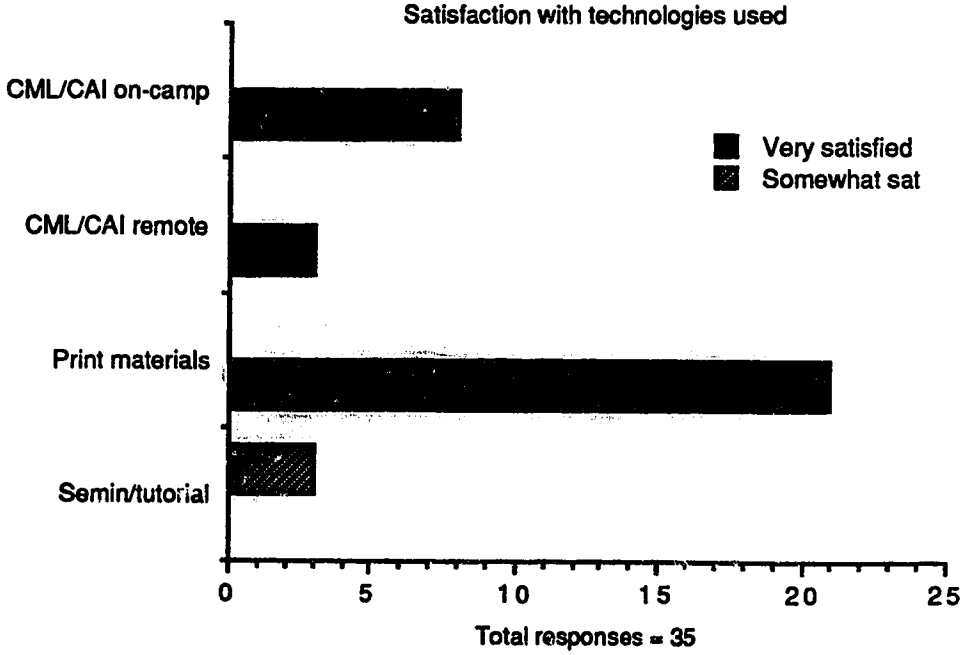


Figure 14

Engineering/Technology - Student Evaluation

Satisfaction with technologies used



The segment showing the least satisfaction with the technologies used was Student/Student Interaction (Figure 13) where the responses were equally divided between very satisfied and somewhat dissatisfied. However, a comment supporting the dissatisfied rating given seminar or tutorial was not provided.

Overall the respondents indicated they were satisfied with the technologies used.

Satisfaction with Technologies in *Health*

Figures 15 to 18 show the degree of satisfaction with technologies used for the delivery of courses within the program category of Health. Figures 15 (Course Content), 16 (Student/Teacher Interaction), 17 (Student/Student Interaction), and 18 (Student Evaluation) show a satisfaction level with the technologies used that ranges from very satisfied to very dissatisfied. The very dissatisfied ratings only related to two responses given the technologies of telewriter (Course Content) and telephone (Student Evaluation).

The segment showing the least satisfaction with the technologies used was ent/Student Interaction (Figure 17). This results primarily from somewhat dissatisfied nses given the technologies of print materials (5 of 6), telephone (11 of 22), and tele- g (3 of 5). A comment supplied to support the rating given tele-tutoring was, "Tele- is somewhat cumbersome due to time limitations".

The predominant technologies that received satisfied ratings were audio teleconferencing, print materials, seminar or tutorial, telephone, and video cassettes. Instructors supported these ratings with comments such as "The units of instruction are well laid out and the assignments are clear and instructional", and " Seminar provides a very positive experience for students to interact at this time. Possibly more time could be allotted for it".

Figure 15
Health - Course Content
Satisfaction with technologies used

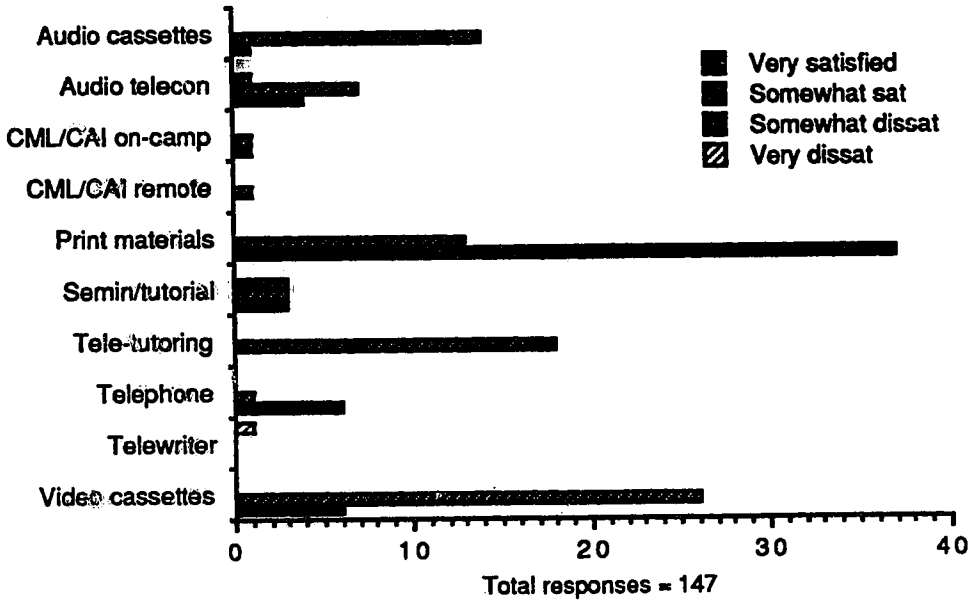


Figure 16
Health - Student/Teacher Interaction
Satisfaction with technologies used

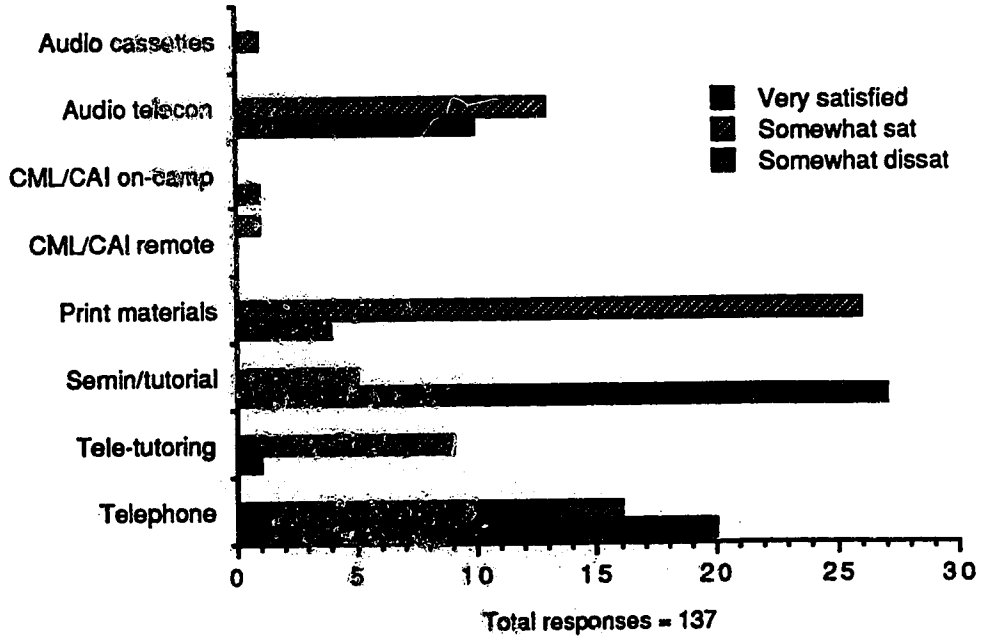
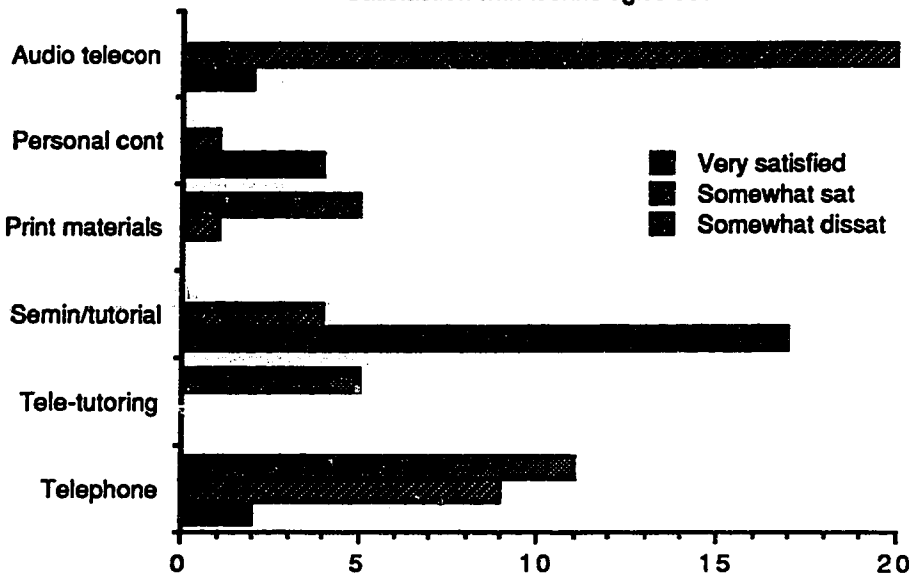


Figure 17

Health - Student/Student Interaction

Satisfaction with technologies used

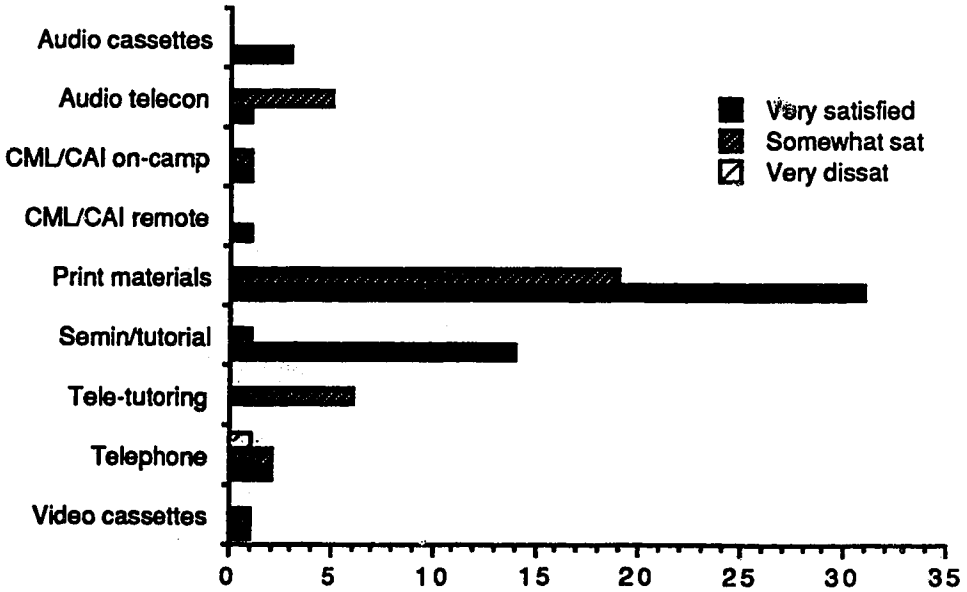


Total responses = 81

Figure 18

Health - Student Evaluation

Satisfaction with technologies used



Total responses = 90

Finally, apart from some dissatisfaction with technologies used for the delivery of Student/Student Interaction the respondents were generally satisfied with the technologies they used.

Satisfaction with Technologies in *Liberal Arts & Social Sciences*

Figures 19 to 22 show the degree of satisfaction with technologies used for the delivery of courses within the program category of Liberal Arts & Social Sciences. Figures 19 (Course Content) and 20 (Student/Teacher Interaction) show a satisfaction level with the technologies used that ranges from very satisfied to somewhat dissatisfied. However, the total number of dissatisfied responses are minimal when compared to satisfied responses. An interesting comment made by one instructor was that "Tele-tutoring proved excellent when used on a predetermined basis. The personal interaction provides motivation for the student and also helps them to complete the course on time".

Figure 21 (Student/Student Interaction) shows a low response rate (7) in relation to the number of responses received in other three segments. This resulted from respondents indicating that Student/Student Interaction was not applicable in many of the courses. However, it is noticeable that of the responses given a large percentage (43%) indicated dissatisfaction with the technologies used. Although on a positive note, one instructor commented that "Audio teleconferencing is a rewarding method for presenting and discussing course content. Students frequently comment that they appreciate the opportunity to meet each other via audio teleconferencing".

Figure 22 shows a level of satisfaction with the technologies used for the delivery of Student/Evaluation that ranges from very satisfied to very dissatisfied. However, the very dissatisfied responses (two in total) were limited to the two technologies of print materials and telephone.

Finally, the technologies to receive the greatest number of satisfied responses were print materials and telephone.

Figure 19

Liberal Arts & Social Sciences - Course Content

Satisfaction with technologies used

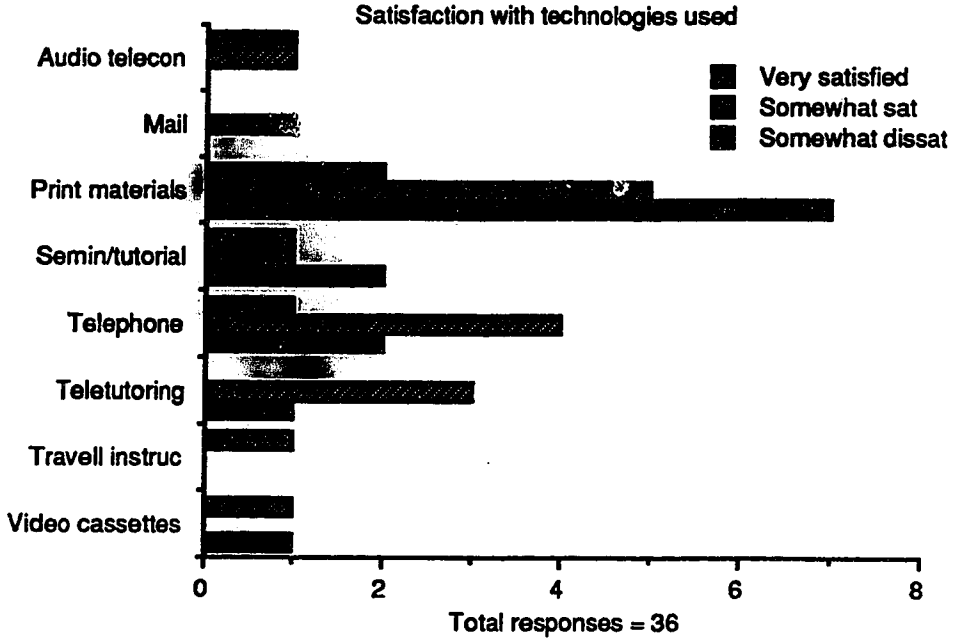


Figure 20

Liberal Arts & Social Sciences - Student/Teacher Interaction

Satisfaction with technologies used

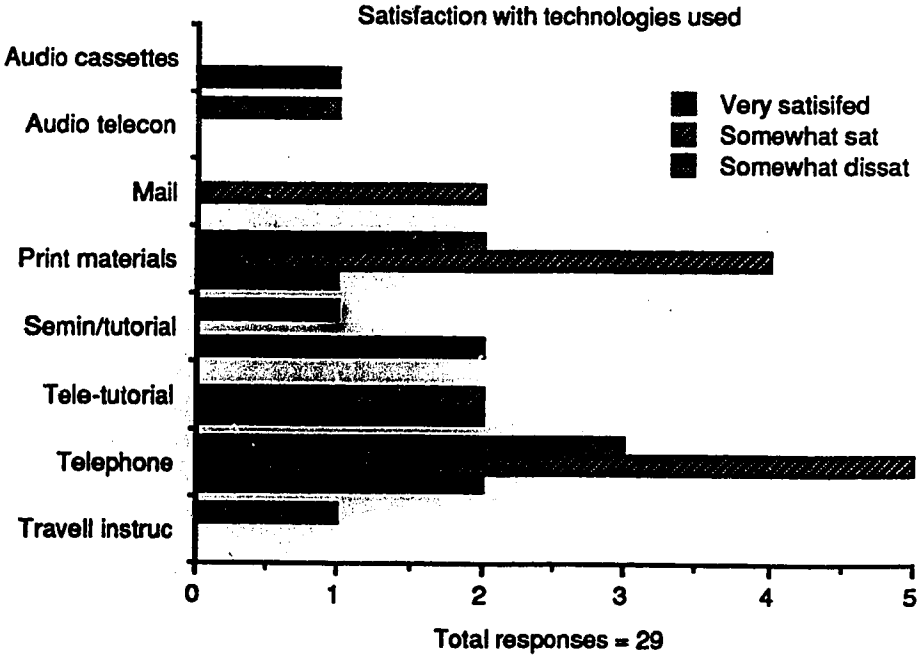


Figure 21
Liberal Arts & Social Sciences - Student/Student Interaction
Satisfaction with technologies used

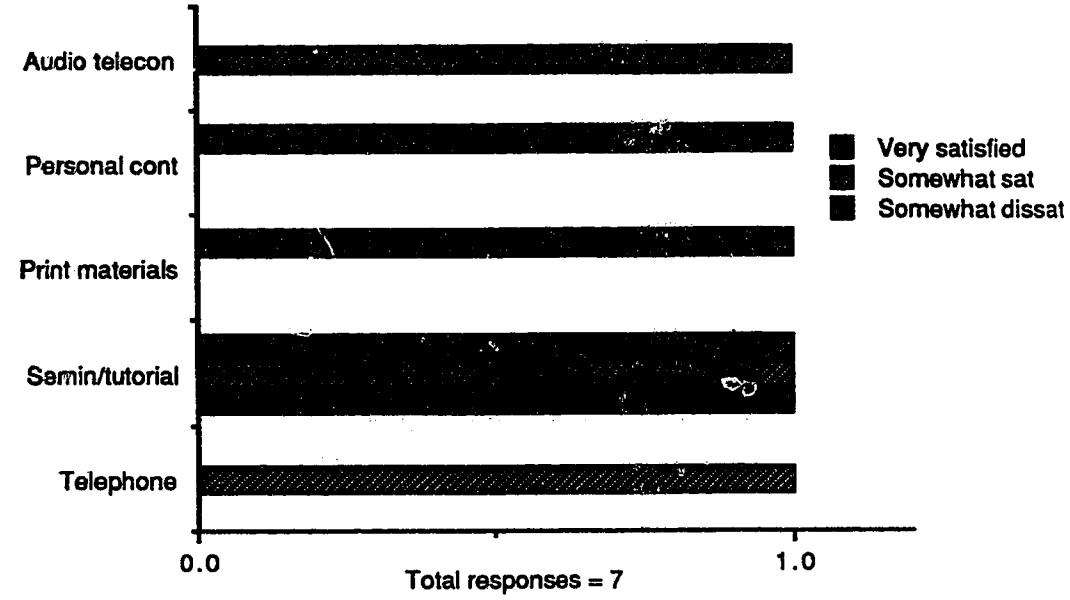
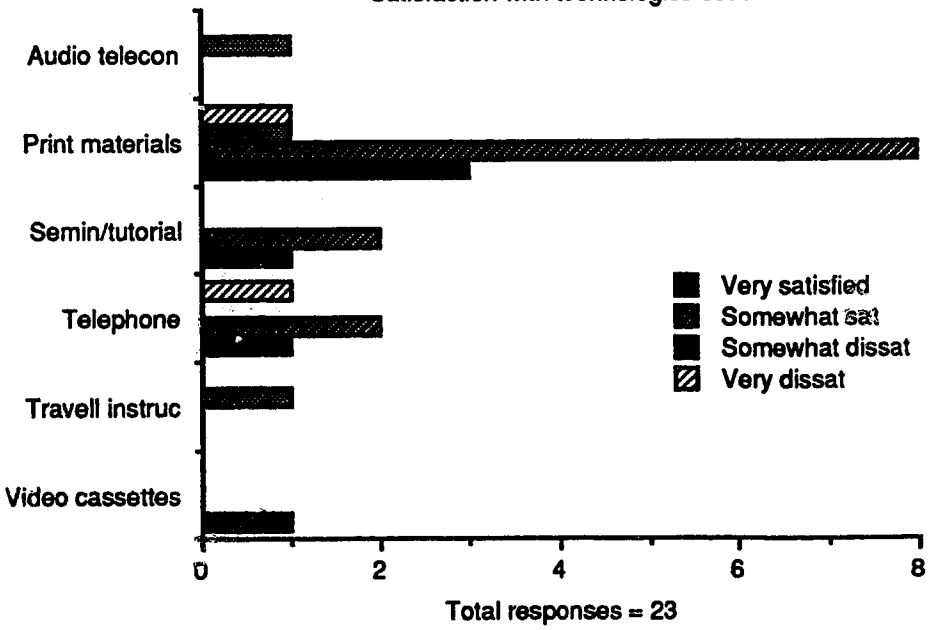


Figure 22
Liberal Arts & Social Sciences - Student Evaluation
Satisfaction with technologies used



Satisfaction with Technologies in *Medical Sciences*

Figures 23 to 26 show the degree of satisfaction with technologies used for delivery of courses within the program category of Medical Sciences. Figures 23 (Course Content), 24 (Student/Teacher Interaction), 25 (Student/Student Interaction), and 26 (Student Evaluation) show that for each course segment the satisfaction with the technologies ranged from very satisfied to very dissatisfied. However, in each segment the majority of responses gave a satisfactory rating for the technologies used. Comments such as "I feel that the use of slides makes it much easier to communicate detail than written description", and "Travelling instructors are used very effectively for the hands on skills component of the course" where provided by instructors to support the satisfied ratings given these technologies.

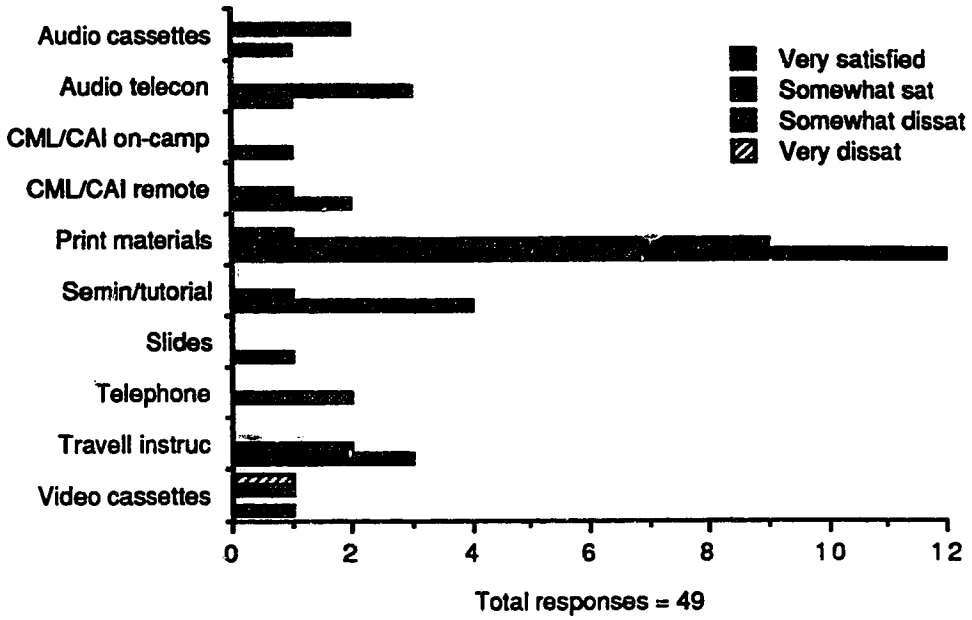
The technology that received a consistent very dissatisfied rating was audio cassettes when used to facilitate Student/Teacher Interaction (Figure 24), Student/Student Interaction (Figure 25), and when used to deliver Student Evaluation (Figure 26). Unfortunately, comments were not provided to support the ratings given this technology.

Finally, print materials received the greater number of satisfied responses in each delivery segment.

Satisfaction with Technologies in *Natural Sciences & Mathematics*

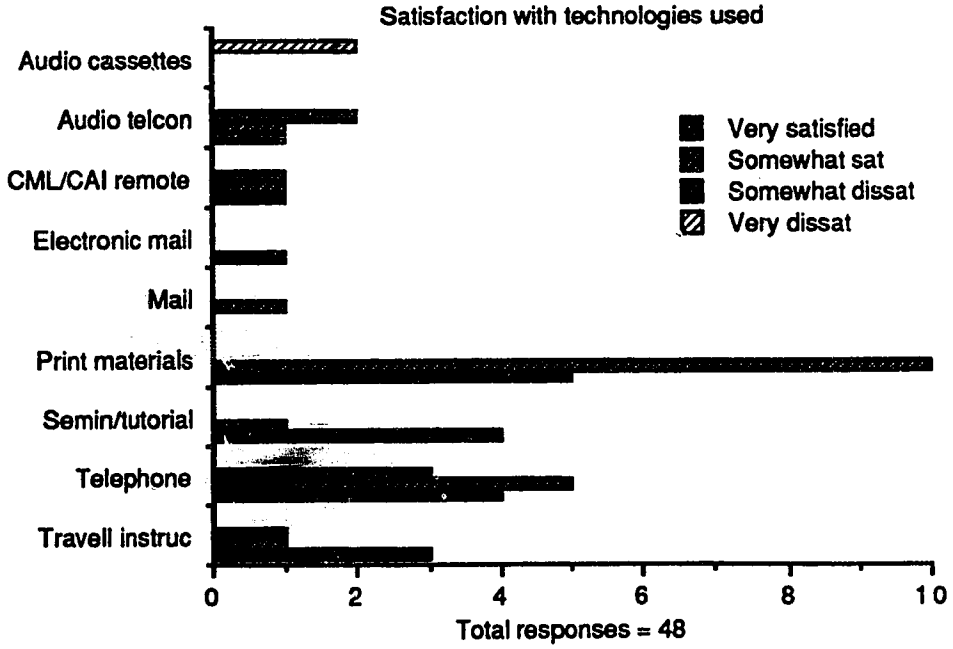
Figures 27 to 30 show the degree of satisfaction with technologies used for delivery of courses within the program category of Natural Sciences & Mathematics. Figures 27 (Course Content) and 28 (Student/Teacher Interaction) show that the majority of responses gave a rating of somewhat satisfied for the technologies used in the delivery of these segments. In relation to the delivery of Course Content, one instructor commented that "Video cassettes worked well. However, we need to develop more of them because they become quickly outdated".

Figure 23
Medical Sciences - Course Content
Satisfaction with technologies used



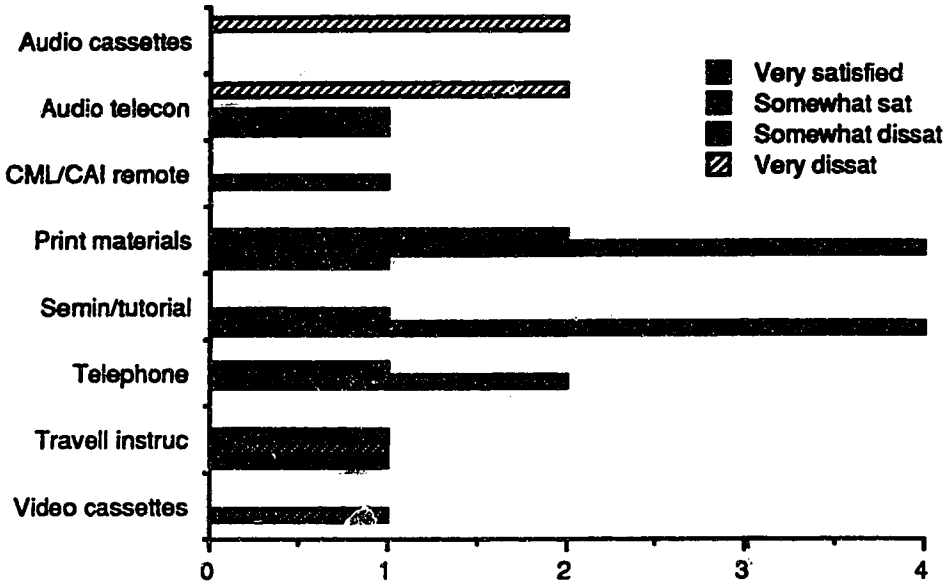
Total responses = 49

Figure 24
Medical Sciences - Student/Teacher Interaction
Satisfaction with technologies used



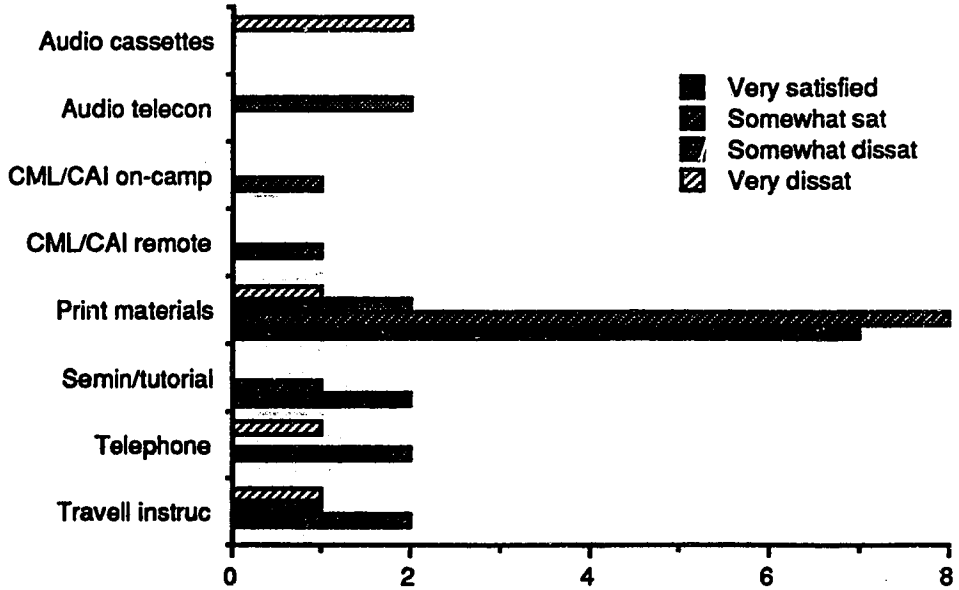
Total responses = 48

Figure 25
Medical Sciences - Student/Student Interaction
Satisfaction with technologies used



Total responses = 26

Figure 26
Medical Sciences - Student Evaluation
Satisfaction with technologies used



Total responses = 34

Figure 27

Natural Sciences & Mathematics - Course Content
Satisfaction with technologies used

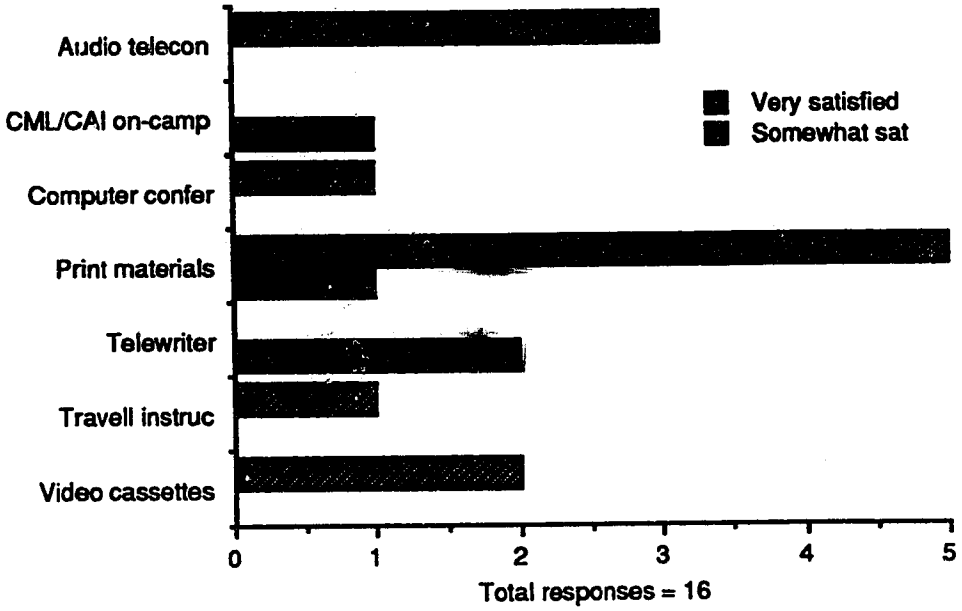


Figure 28

Natural Sciences & Mathematics - Student/Teacher Interaction
Satisfaction with technologies used

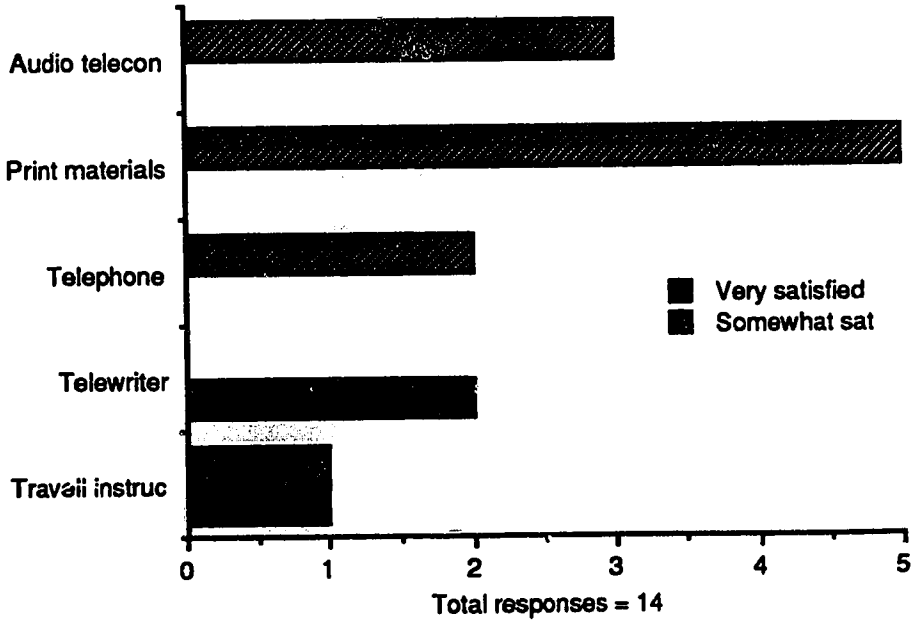


Figure 29
Natural Sciences & Mathematics - Student/Student Interaction
Satisfaction with technologies used

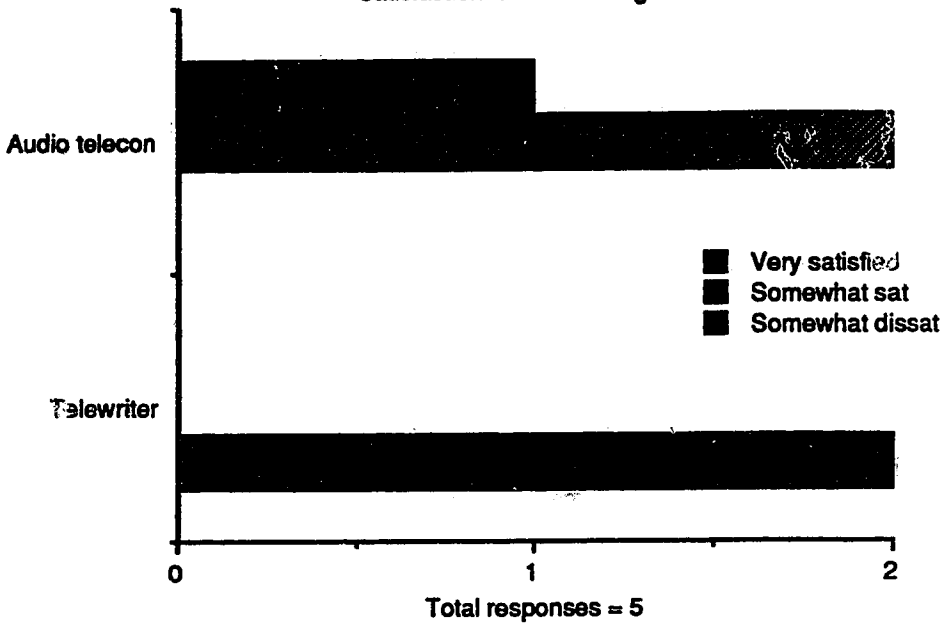
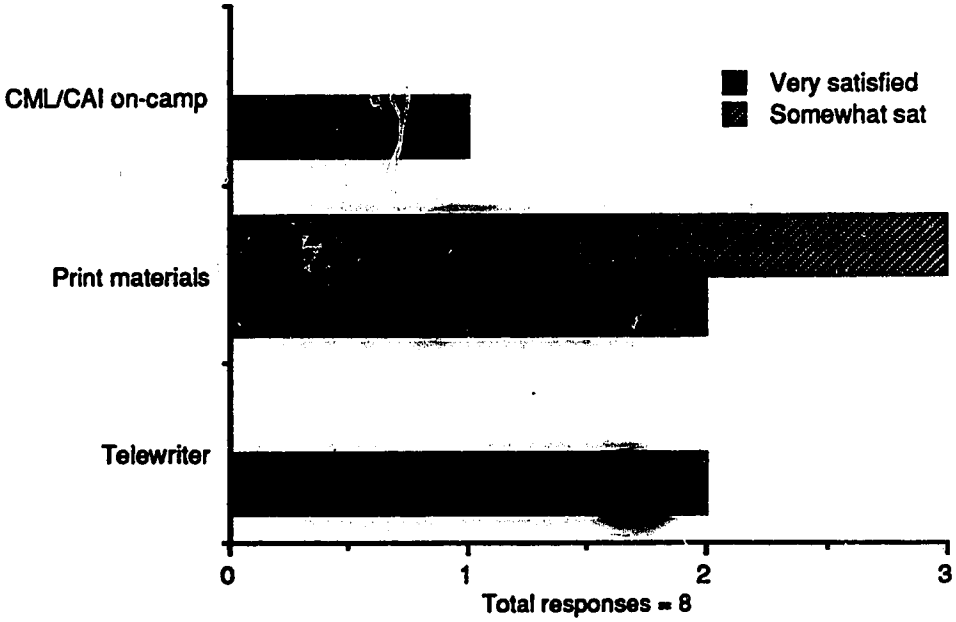


Figure 30
Natural Sciences & Mathematics - Student Evaluation
Satisfaction with technologies used



The only technology to receive a dissatisfied rating (one response) was audio teleconferencing when used to facilitate Student/Student Interaction (Figure 29).

Figure 30 shows that the majority of responses were very satisfied for the technologies used in the delivery of Student Evaluation.

Finally, in Figures 27 to 30 it is shown that print materials received the greater number of satisfied responses. Overall, the most frequent rating for the identified technologies was somewhat satisfied.

Satisfaction with Technologies in *Trades & Services*

Figures 31 to 34 show the degree of satisfaction with technologies used for the delivery of courses within the program category of Trades & Services. Figures 31 (Course Content), 32 (Student/Teacher Interaction), 33 (Student/Student Interaction), and 34 (Student Evaluation) show that the majority of responses gave a rating of very satisfied to somewhat satisfied for the technologies used in the delivery of the four course segments.

These satisfied ratings were supported by instructors' comments such as "In our program, interaction between students is vital - audio teleconferencing is quite positive, it is even better after a seminar (workshop); because students have had face to face contact it facilitates teleconferencing", and "Video enhanced audio teleconferencing greatly enhanced audio only teleconferencing".

Audio teleconferencing was the only technology to receive a very dissatisfied rating by one instructor when used to facilitate Student/Student Interaction (Figure 33). However, a comment to support the dissatisfied rating was not provided.

Finally, in Figures 31 to 34 it is shown that print materials in general had a very satisfied rating. Overall, the most frequent rating was very satisfied for the technologies used.

Figure 31
Trades & Services - Course Content
Satisfaction with technologies used

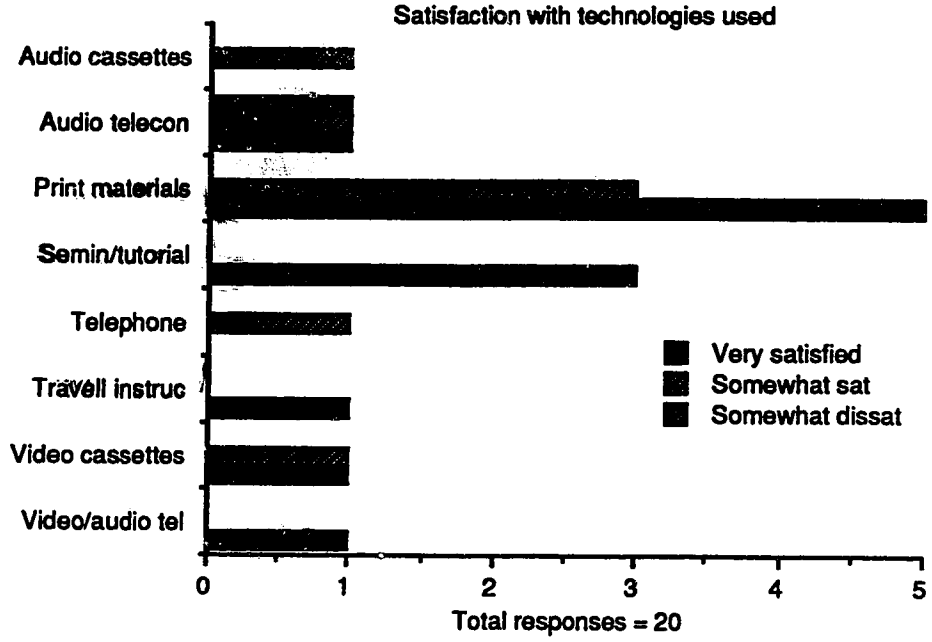


Figure 32
Trades & Services - Student/Teacher Interaction
Satisfaction with technologies used

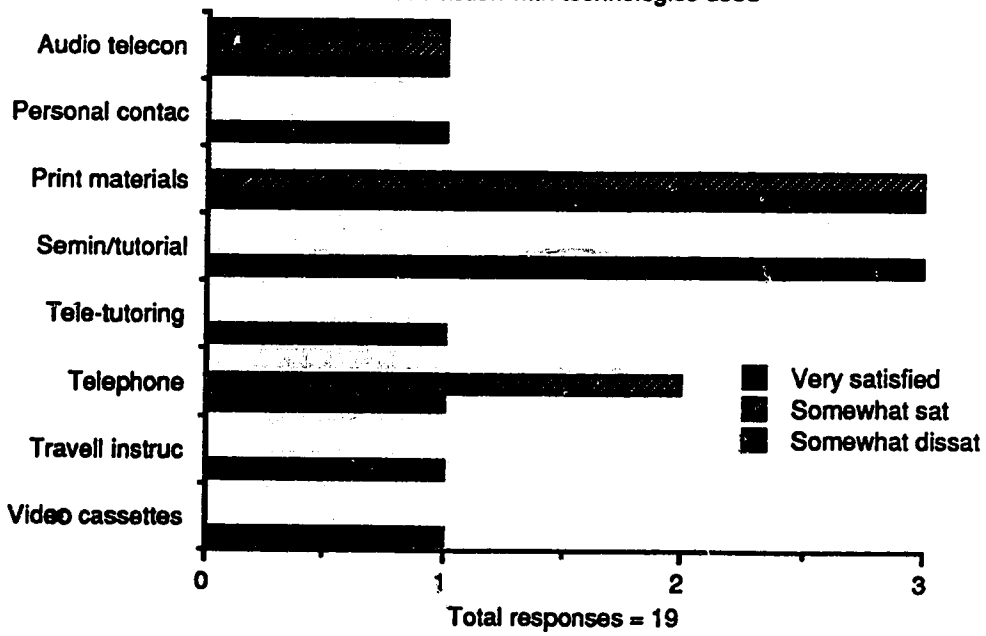
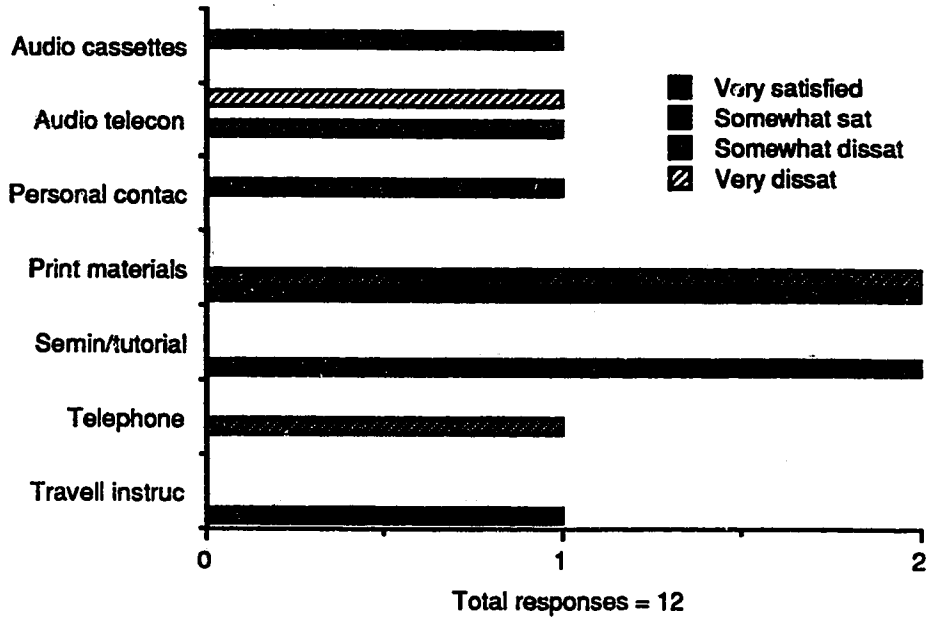


Figure 33

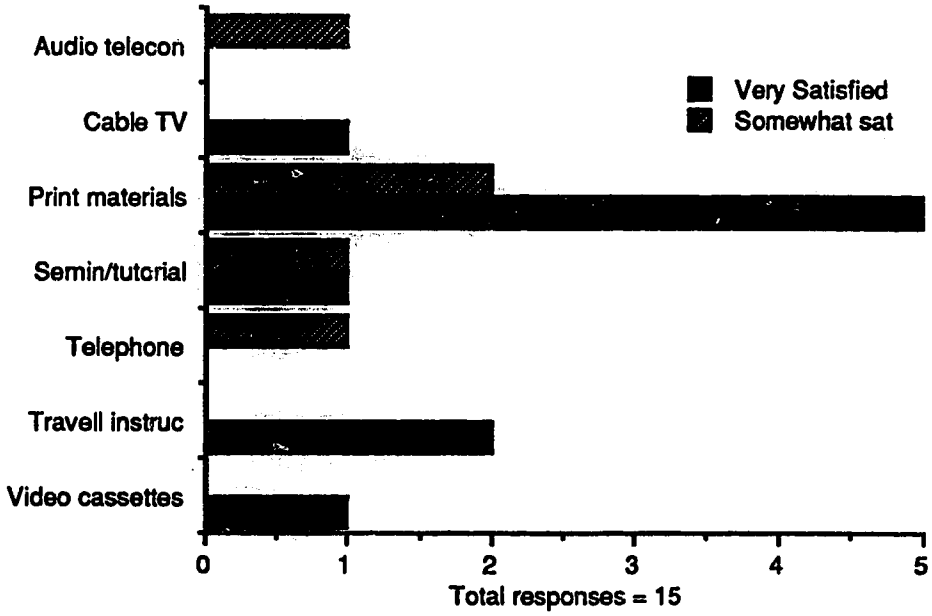
Trades & Services - Student/Student Interaction
Satisfaction with technologies used



Total responses = 12

Figure 34

Trades & Services - Student Evaluation
Satisfaction with technologies used



Total responses = 15

Summary

The majority of responses in each program category indicated that instructors were generally satisfied with the technologies they used, although dissatisfied responses for a particular technology were shown in all program categories with exception of Community Services. Overall, the satisfaction attributed to a technology was not fixed within a program category, but often changed with the role played in course delivery.

The comments made by instructors provided meaningful clarification for many of the satisfaction ratings by providing insight as to why a technology worked, or did not work, in a particular situation. Finally, the comments demonstrated that the successful use of a technology in improving the learning process was often determined by the environment it was used in and the type of student(s) involved. This finding is more clearly illustrated by referring to the complete list of comments in Appendix C.

Chapter Summary

In this chapter data collected from the respondents in each program category were presented and a discussion of the analysis of the data was provided. The discussion began by focusing on the instructors' experience with delivery of the courses they taught; admission prerequisites; and time requirements for each course. The discussion then focused on the results of analysis related to the three sub-problems.

Findings indicated that the majority of instructors were experienced with the delivery of the courses taught. Therefore, the responses they provided were generally based on a reasonable amount of experience with the technologies they used. Also shown was that the majority of courses could be taken on an independent basis and that the greater number of courses surveyed were regular full-term courses. This indicated that the majority of courses were accessible to students without being required to first enroll in a program of studies however, being full-term courses required a considerable time commitment by those who enrolled.

Data analysis related to sub-problem 1 showed that the number and variety of technologies varied by program area. However, print materials and telephone (either individually or in combination with audio teleconferencing) predominated. Community Services was the only program area where print materials was not the predominant technology. This program area used audio teleconferencing as its predominant technology. This may have been a reflection of the type of content delivered in this program area where a necessary requirement is the ability to interact with others. In many program areas the most common supplementary technologies were seminar or tutorial, and video cassettes.

The analysis of data related to sub-problem 2 focused on the role that the technologies used played in the delivery of courses within the nine program categories. The data showed that a number of technologies predominated in particular roles. These technologies were audio teleconferencing, print materials, seminar or tutorial, and telephone.

It was also shown that the combinations of predominant technologies differed across the nine program categories and the majority of these and other identified technologies were used in multiple roles.

Findings related to sub-problem 3 indicated that instructors were generally satisfied with the technologies they used, although dissatisfied responses for a particular technology were shown. The satisfaction attributed to a technology was not fixed within a program category, but often changed with the role played in course delivery.

Further, comments made by instructors were included in the discussion to provide meaningful clarification for many of the satisfaction ratings. Unfortunately not all respondents provided comments to support the ratings they gave to the technologies used. However, the available comments did provide insight as to why a technology worked, or did not work, in a particular situation.

CHAPTER 5

SUMMARY, CONCLUSIONS AND IMPLICATIONS

Chapter 5 is divided into three sections. The first section contains a summary of the study and its findings. Section two presents the conclusions drawn from the findings. Section three discusses implications to education and research.

Summary

Many recently evolved technologies are presently used to facilitate the delivery of adult distance education courses. Information on how the new and established technologies are being utilized is somewhat limited. This study was designed to provide educators with information about the application of technologies and how satisfied instructors are with these technologies in their assigned roles in the field of adult distance education.

Purpose

The purpose was to identify the extent of use, the role played, and the degree of satisfaction with types of technologies within the various program categories of adult distance education.

Sub-problems

In order to address the stated purpose the following sub-problems were addressed in this study:

1 Within the various program categories, what is the extent to which types of technologies are used to deliver adult distance education courses?

2 Within the various program categories, what role do the identified technologies play in the delivery of the adult distance courses?

3 What is the degree of satisfaction with the technologies used in relation to each program category?

Methodology

The population was limited to post secondary institutions (excluding universities) in Alberta, Canada. Data related to the problem addressed in this study were collected using a questionnaire designed for this purpose. The questionnaires were distributed to the selected institutions after approval to include them in the study had been granted. A requirement for institutions to participate was that they had delivered adult distance education courses in the previous academic year. At the selected institutions, questionnaires were completed by instructors who had delivered adult distance education course(s) in the previous academic year.

The questionnaires asked the instructors to provide data related to the courses they had taught. This data could be categorized as demographic and technology related. The demographic data focused on the instructors' experience, enrollment requirements, and duration of the courses. The data related to technology focused on a number of areas. These were: the categorization of courses into program categories; the identification of technologies used to deliver the courses; the role the technologies played in the delivery of the courses; and the satisfaction attributed to the technologies used.

The instructors who participated did so at their own discretion. Instructors who participated represented 54% of the identified population. Further, both instructors and institutions were guaranteed anonymity in this study.

Data Collection and Analysis

The data collection instrument was a questionnaire which had been previously validated by a group of individuals with expertise in the field of adult distance education (Appendix B). The data collected were analyzed in the following manner.

Percentage distributions were used to discuss the demographic data related to the responses received from the identified population. This allowed the respondents' experience, admission requirements, and course duration to be displayed. Percentage distribution was also used to identify the number of courses that fell into the nine program categories identified by the respondents.

Frequency analysis and cross tabulation techniques were used to analyze data related to the three sub-problems. These techniques were employed to show the frequency with which identified technologies were used in the delivery of courses within each program category, the role that identified technologies played in course delivery, and the satisfaction attributed to the technologies by the respondents. Frequency analysis and cross tabulation techniques were also used to identify the frequency of comments made in relation to technological use within each program category.

Findings

Demographic Profile

The majority of respondents (74.7%) had taught the same course at least three times. Only (13.2%) of the respondents had delivered a surveyed course only once. These results indicated that the majority of respondents had reasonable experience with the technologies used in the delivery of the courses they taught. Hence, the satisfaction they attributed to the technologies they used was in the majority of cases based on experience that allowed a reasonable evaluation to be made.

Data related to course requirements showed that the majority of courses (62.7%) could be taken independently and did not require the student to be admitted to a program

of studies before registering. Also the majority of these courses (60.4%) had a duration in excess of forty five hours meaning they were most likely full-term courses that required considerable commitment by the student.

Categorization of Courses

Respondents placed the one hundred and sixty nine courses they taught into nine program categories. The number of courses that fell within each program category varied significantly. The program category to have the largest number of courses accredited to it was Health (51). The program categories of Community Services (6) and Natural Sciences & Mathematics (6) had the least number of courses accredited to them. Within the population, the majority of courses fell within the program categories of Business & Administration, Engineering/Technology, Health, and Medical Sciences.

The program categories chosen by the respondents were all taken from the list supplied in the questionnaire. Clerical/Secretarial and Performing Arts were the only program categories included in the questionnaire not utilized by the respondents.

Technologies Used

The respondents indicated that eighteen types of technologies were used to varying degrees in the delivery of their courses. Of these, four were added under the category other - please specify on the questionnaire. They were: electronic mail, mail, personal contact, and slides. Broadcast television and video disc were the only technologies included in the questionnaire not to be identified as a medium used in any of the courses surveyed.

With the exception of Community Services whose predominant technology was audio teleconferencing, all program categories used print materials as their predominant medium. However, a significant factor was that instructors in all program categories

incorporated numerous technologies in the delivery of their courses. The minimum number of technologies used was six, and this occurred in the three program categories of Community Services, Education, and Engineering/Technology. The maximum number of technologies used was twelve and this occurred in the program category of Medical Sciences.

Print materials dominated as the first most frequently used technology, however, no single technology dominated as a second or third most frequently used technology. The domination of a technology changed from one program category to another, possibly reflecting the changing content or environment of course delivery. Of the identified technologies, nine were shown to be used by at least five program categories, indicating an acceptance and wide use of the technology. The nine technologies were:

Audio cassettes	Telephone
Audio teleconferencing	Tele-tutoring
CML/CAI on campus	Travelling instructors
Print materials	Video cassettes
Seminar or tutorial	

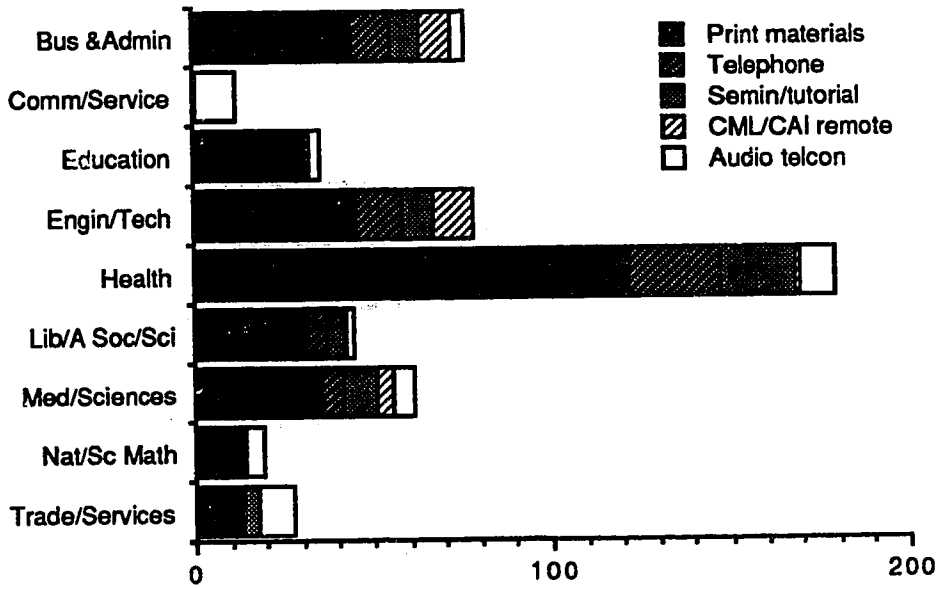
Two of the eighteen identified technologies were only utilized by a single program category. These were cable television and video enhanced audio teleconferencing used by Trades & Services.

Finally, although the instructors in each program category demonstrated a use of many varied technologies in the delivery of their courses, a number of technologies were predominant in their frequency of use. These technologies in order of utilization were print materials, telephone, seminar or tutorial, audio teleconferencing, and CML/CAI remote. Figure 35 was compiled from data related to technologies used first most

Figure 35

Predominant Technologies

Frequency of Utilization for Course Delivery



Total responses = 531

frequently by the nine program categories. Shown is a comparison of the frequency of use of the five predominant technologies for the delivery of courses in the nine program categories.

Role of Technologies

The role of the technologies used was defined as which segment of a particular course a technology was used to deliver. It was shown in the analysis that numerous technologies played multiple roles in the delivery of a given course, although some technologies tended to dominate a particular segment. The findings in relation to each course segment are summarized below.

Course Content

The technology to dominate the delivery of Course Content was print materials. All program categories with the exception of Community Services indicated that print materials was used more often than any other technology in the delivery of Course Content. It was indicated within Community Services that audio teleconferencing was used more often than any other technology for the delivery of Course Content.

In total, fifteen of the eighteen technologies identified in this study were used to some degree in the delivery of Course Content. The technologies not used were cable television, electronic mail, and personal contact. Excluding print materials, a number of other technologies were identified frequently as playing a role in the the delivery of Course Content. These included audio teleconferencing, seminar or tutorial, telephone, travelling instructors, and video cassettes, all of which were used on an individual basis by at least five of the nine program categories.

Student/Teacher Interaction

The facilitation of Student/Teacher Interaction was not dominated by a single technology as was Course Content. Four technologies were identified as having a dominant role within one or more of the nine program categories. The four technologies were telephone, print materials, seminar or tutorial, and audio teleconferencing. The program categories in which they dominated were:

Audio teleconferencing	Community Services
Print materials	Medical Sciences, Natural Sciences & Mathematics, Trades & Services.
Seminar or tutorial	Engineering/Technology
Telephone	Business and Administration, Education, Health, Liberal Arts & Social Sciences.

In total, thirteen of the eighteen technologies identified in this study were used to some degree to facilitate Student/Teacher Interaction. The technologies not utilized were cable television, computer conferencing, slides, telewriter, and video enhanced audio teleconferencing.

Student/Student Interaction

A total of eleven technologies were identified as being used to some degree to facilitate Student/Student Interaction. Technologies not utilized by any program category to deliver this course segment were: cable television, computer conferencing, CML/CAI on-campus, electronic mail, mail, slides, and video enhanced audio teleconferencing.

Again, no one technology dominated the facilitation of Student/Student Interaction in all program categories. The technologies identified as having a dominant role within one or more of the nine program categories were the same as those identified with the facilitation of Student/Teacher Interaction. The four technologies were audio teleconferencing, print materials, seminar or tutorial, and telephone. The program categories in which they dominated were:

Audio teleconferencing	Education, Health, Natural Sciences & Mathematics.
Print materials	Medical Sciences, Trades & Services.
Seminar or tutorial	Engineering/Technology, Liberal Arts & Natural Sciences.
Telephone	Business and Administration, Health.

Community Services indicated four technologies were equally used for the facilitation of its six surveyed courses. Hence, no single technology dominated in this program category. The technologies used were the same as above with the exception that telephone was replaced by tele-tutoring. Finally, the technologies of audio teleconferencing and telephone were used similarly in the program category of Health for the facilitation of Student/Student Interaction.

Student Evaluation

The technology of print materials was the dominant technology used to deliver Student Evaluation in all program categories except Community Services. The only technology identified by Community Services to deliver Student Evaluation was mail.

However, it could be reasonably assumed that mail was used to deliver print materials in this case. This mirrors the finding for technologies used to deliver Course Content where print materials dominated in the same program categories.

In total, thirteen of the eighteen technologies identified in this study were used to some degree in the delivery of Student Evaluation. However, the technologies were used sparingly in comparison to the frequency that print materials were used. This is in contrast to the delivery of Course Content where print materials dominated in the same program categories, but were supported by the frequent use of other technologies.

The technologies not used were computer conferencing, electronic mail, personal contact, slides, and video enhanced audio teleconferencing.

Satisfaction With Technologies Used

The respondents were asked to indicate their satisfaction with technologies used in a specific role, the delivery of one of the four course segments, Course Content, Student/Teacher Interaction, Student/Student Interaction, and Student Evaluation. Therefore, the satisfaction attributed to a technology changed in many cases according to the role it played in the delivery of a course. Where a technology might have been given a very satisfied rating for Course Content, the same technology may have been give a very dissatisfied rating for Student/Student Interaction. This type of occurrence was visually presented in Chapter four.

Overall, the instructors within the nine program categories were satisfied with the technologies they used if a comparison of positive versus negative responses is made. For the entire group, the means for satisfaction with technologies used within the four course segments were: Course Content 3.4, Student/Teacher Interaction 3.4, Student/Student Interaction 2.9, Student Evaluation 3.5. These means are based on a four point scale with 4 being very satisfied.

In many cases the rating of satisfaction was qualified by the respondent in the form of a written comment (Appendix C). The comments provided useful feedback regarding the indicated satisfaction with a technology. This feedback tended to fall under three headings: reasons for a response, good or bad; reason for a response with suggestion how to improve the situation; and reason for a response based on technological advantages or equipment problems. The comments displayed in Appendix C are grouped under the technological headings to which they refer to. The only technologies used by the participants that were not commented on were cable television and computer conferencing. However, both of these technologies were only utilized once in the delivery of courses within a program category and in each case the technologies elicited a satisfactory response. Finally, it was found that the comments made by participants were well articulated, indicating a genuine concern that their input be correctly relayed.

Conclusions

The following conclusions were based on the findings of the study:

1. Adult distance education courses are offered across a broad range of disciplines. In the case of this study, nine different categories of programming were identified.

2. The majority of instructors had delivered the course on which they completed the questionnaire at least three times. Therefore, their responses to questions asked were based on experience that had allowed them ample time to evaluate the effectiveness of technologies used.

3. There was a wide use of many traditional and more recently developed technologies. The willingness to incorporate numerous technologies in the delivery of a course was shared by all program categories. This was demonstrated

by no fewer than six technologies being used for delivery of courses within any program category.

4. Many of the identified technologies could be used in multiple roles. However, the frequency a particular technology was used in different roles did vary. Further, it was shown that some technologies appear to be more suited to a particular role than others. This was demonstrated where the delivery of Course Content and Student Evaluation relied most frequently on print materials. And the roles of facilitating interaction between Student/Teacher and Student/Student relied most often on the technologies of telephone, seminar or tutorial, and audio teleconferencing.

5 Based on the comments made by respondents, satisfaction with the technologies was determined primarily by three factors. First, whether the technology was being used in a suitable role; second, whether the outcomes of using a particular technology matched the instructor's expectations; and third, whether there were student motivation concerns or difficulties inherent in the use of the technology.

Implications

The findings of this study should be interpreted within the limitations set. The limitations were set by the population size being restricted to post secondary institutions (excluding universities) in Alberta, Canada and the availability of instructors to complete the questionnaires.

Further, in some cases there was a significant difference in the number of courses surveyed in different program categories. This difference should be considered when interpreting the findings.

Implications for Education

The wide use of traditional and recently evolved electronic media within the program categories of this study demonstrates how the institutions involved are catering to distance learners. Through the incorporation of selected technologies they are able to design courses that help to remove the barrier of access that may have once existed. The direction taken by the institutions is supported by government because of its effect on equalizing educational opportunities, and economically it is an attractive alternative. However, as evidence in this study suggests, the success of a technology is determined by its performance in an assigned role. Therefore, the use of a technology should be based on its role in facilitating the learning process and the ability the perform this role in a specific environment. Technology for technology's sake is not acceptable when you consider the experience that exists in the field of adult distance education in Alberta as shown in this study.

The information gained from this study could be used by administrators of institutions that offer adult distance education courses. When new course offerings are considered the findings of this study could be referred to to see which technologies are used to deliver courses in the same program category and how satisfactory the technologies were rated. This information could then be used as a rationale for the purchase of such technologies.

Instructional designers could use the findings as part of their instructional design process. The findings relate to instructors' experiences with numerous technologies within a defined role, and it is the instructors who must deliver the designer's course. Hence, the satisfaction ratings and comments made provide useful feedback to an instructional designer when considering which technologies to use in a specific role of course delivery.

These findings should be of interest to instructors in the field of adult distance education. Their beliefs and concerns regarding the technologies they use could be compared with those provided by colleagues teaching in a similar environment. Also, if they are considering incorporating new technologies in their course(s) delivery, the findings could be used as a gauge to see how successful the technologies may have been used in a similar environment.

Implications for Research

This study provided some useful information regarding technological applications in the delivery of adult distance education courses at selected institutions in Alberta, Canada. However, the findings are representative of applications within a specific population and may not be generalizable to all distance education institutes offering courses that fall within the same program categories. Nevertheless, the conclusions represent a beginning in the gathering of knowledge related to the most appropriate roles for different technologies and the conditions necessary for their successful implementation.

To further knowledge gained in this study future research activities might focus on the following:

1. Replication of this study with a larger population that might include institutions in other provinces. This would allow a comparison of adult distance education programs across provinces to be made and regional preferences to be identified.

2 Research focusing specifically on what objectives are met by using a particular technology (in the identified program categories) in a given learning situation.

3 Research to investigate the most favorable environment for technological applications.

4 Research designed to create a data bank of information related to technological applications in adult distance education. The data bank would be developed with the intent of being continually updated by professionals in this field. Ideally this research might be conducted by a government agency that would be responsible for the data bank's cost and accessibility.

BIBLIOGRAPHY

Bates, A. W. (1985). Research into the use of advanced technology in education: Future requirements. (Paper No. 244). Paris. (ERIC Document Reproduction Service No. 274 324)

Bates, A. W. (1988). Technology for distance education: a ten year prospective. Open Learning, 3 (3), pp.3-12.

Boyle, P. G., & Jahns, I. R. (1970). "Program development and evaluation". In R. M. Smith, G. F. Aker, & J. R. Kidd (Eds.). (1970). Handbook of adult education. New York: Macmillan.

Bryson, Lyman. (1936). Adult education. New York: American Book Company.

Burge, L. (1988). Beyond andragogy: Some explorations for distance learning design. Journal of Distance Education, 3 (1), pp. 5-23.

Burge, E., Wilson, J., & Mehler, A. (1984). Communications and information technologies and distance education in Canada. No. 5. Toronto: Television Ontario.

Burnham, B. R., & Seamons, R. A. (1987). Exploring the landscape of electronic distance education. Lifelong Learning, 11 (2), pp. 8-11.

Canada Employment and Immigration Canada. (1985). College and university programs in Canada. Ottawa: Author.

Coldeway, Dan. O. (1986). Learner characteristics and success. In I. Mugridge & D. Kaufman (Eds.), Distance Education in Canada (pp.37-50). Sydney: Croom Helm.

Ellis, Barry. (1989). Post-secondary distance learning services: Market size and definition. Calgary, Alberta: Advanced Global Telecommunications, (AGT).

Farrell, G. M., & Haughey, M. (1986). The future of open learning. In I. Mudridge & D. Kaufman (Eds.), Distance Education in Canada (pp. 30-35). Sydney: Croom Helm.

Flexner, S. B., & Hauck, L. C. (Eds.). (1987). The Random House dictionary of the English language (2nd ed.). New York: Random House.

Gagne, R. M., Briggs, L. J., & Wager, W. W. (1988). Principles of instructional design (3rd ed.). New York: Holt, Rinehart and Winston.

Garrison, R. D. (1987). The role of technology in continuing education. New Directions for Continuing Education, 36, pp. 41-53.

Garrison, R. D. (1988). Andragogy, learner-centredness and the educational transaction at a distance. Journal of Distance Education, 3 (2), pp. 123-127.

Heinich, R. Molenda, M., & Russell, J. D. (1982). Instructional media and the new technologies of instruction. New York: Wiley.

Holmberg, Borje. (1981). Independent study for university degrees - Distance education compared with the Keller Plan. Distance Education, 2, pp. 39-53.

Hummel, C. (1977). Education today for the world of tomorrow. Paris: UNESCO.

Knapper, C. K. (1980). Evaluating instructional technology. New York: John Wiley & Sons.

Knowles, M. S. (Ed.). (1960). Handbook of adult education in the United States. Chicago: Adult Education Association of the U.S.A..

Knowles, M. S. (1973). The adult learner: A neglected species. Houston: Gulf Publishing Division.

Knowles, M. S. (1977). The modern practice of adult education. New York: Associated Press.

Knowles, M. S. (1980). The modern practice of adult education: From pedagogy to andragogy (2nd ed.). New York: Cambridge Books.

Law, M., & Sissons, L. (1985). The challenge of distance education. New Directions for Continuing Education, 26, pp. 43-51.

Long, H.B. (1983). Adult and continuing education, responding to change. New York: Teachers College Press.

Moore, M. (1986). Self-directed learning and distance education. Journal of Distance Education, 1, pp. 7-24.

Moore, M. G. (1987). Print media as distance education. New Directions for Continuing Education ,34, pp. 41-50.

Niemi, J. A., & Gooler, D. D. (1987). Themes and issues. New Directions for Continuing Education, 34, pp. 101-107.

Percival, F., & Ellington, H. (1988). A handbook of educational technology. (2nd. Ed.) London: Kogan Page.

Pratt, D. D. (1987). Technology and instructional functions. New Directions for Continuing Education ,34, pp. 41-50.

Pratt, D. D. (1988). Andragogy as a relational construct. Adult Education Quarterly, 38, pp. 160-172.

Reiter, B. A. (1988). Student perceptions of effective instruction: Senior citizens and undergraduates. Unpublished master's thesis. Edmonton, Alberta: University of Alberta.

Saettler, P. Pa. (1968). A history of instructional technology, New York: McGraw Hill.

Schroeder, Wayne. L. (1964). Adult education defined and described. In Smith, R. M., Aker, G., & Kidd, J. R (Eds.), Handbook of adult education (pp. 25-43). New York: Macmillan.

Schroeder, Wayne. L. (1970). Adult education defined and described. In Smith, R. M., Aker, G., & Kidd, J. R (Eds.), Handbook of adult education (pp. 30-31). New York: Macmillan.

Seaborne, Kate., & Zuckernick, Arlene. (1986). Course design and development. In I. Mugridge & D. Kaufman (Eds.), Distance Education in Canada (pp. 37-50). Sydney: Croom Helm.

Shobe, C. R. (1986). New technologies in Distance education. In I. Mugridge & D. Kaufman (Eds.), Distance Education in Canada (pp.37-50). Sydney: Croom Helm.

Smith, R. M., Aker, G., & Kidd, J. R (Eds.). (1970). Handbook of adult education. New York: Macmillan.

Sparks, J. (1984). Pedagogic differences between media. In A. W. Bates (Ed.), The role of technology in distance education (pp. 207-231). New York: St. Martin's Press.

Sykes, J. B. (Ed.). (1976). The concise Oxford dictionary of current English (6th. ed.). Oxford: Oxford University Press.

Toffler, A. (1970). A future shock. New York: Random House.

Toffler, A. (1980). The third wave. New York: Bantam Books.

Verner, C. (1964). Definition of terms. In G. Gensen, A. A. Liveright, & W. Hallenbeck. (Eds.), Adult education: outlines of an emerging field of university study (pp.27-39). Washington, D.C.: Adult Education Association of the U.S.A..

APPENDIX A

COVERING LETTERS

September 1, 1989

Dear Administrator:

Please find enclosed copies of the questionnaire discussed in our recent correspondence. The questionnaire is designed to investigate the role of technologies presently used in the delivery of adult distance education courses, and the satisfaction attributed to these technologies from an instructor's perspective.

As mentioned, the questionnaire is to be completed by instructors of adult distance education courses at your institute, including yourself if applicable. The questionnaire can be completed by any available instructor who has taught one or more adult distance education course in the previous academic year. In the case of an instructor who has taught more than one course, a separate questionnaire should be completed for each course. It will take approximately ten minutes to complete a questionnaire for one course. Instructions are included with each questionnaire.

May I ask you to forward copy(s) of the questionnaire to relevant personnel in your department for their consideration.

The completion and returning of the enclosed questionnaire(s) will indicate consent to participate. All information will be kept strictly **CONFIDENTIAL** and the identity of participants will not be known to the researcher. The code numbers on the questionnaires are for identification so that in the event of a poor initial response a follow-up letter can be sent to non-responders.

Please return the completed questionnaire(s) by September 30, 1989, using the enclosed stamped, self addressed envelope.

Your comments regarding any aspect of this questionnaire would be most welcome and can be included with your response or sent separately to the above address. If you have any questions I can be reached at 426-2010 Ex. 230, during the day. I look forward to sharing the results of this survey with you when completed.

Thank you for your cooperation.

Sincerely,

Mark Murray, B.ED
Graduate Student
M.ED Program
University of Alberta

October 2, 1989

Dear Colleague:

The attached questionnaire is designed to investigate the role of technologies presently used in the delivery of post-secondary courses offered via distance education, and the satisfaction attributed to these technologies from an instructor's perspective. The results of this questionnaire will help provide some of the information necessary to achieve more effective matching between course, technology, and the role of the technology chosen when developing distance education programs. Therefore, I am particularly interested in obtaining your responses to this questionnaire. Your experience in distance education should contribute significantly to providing some of the answers in this area of education.

The questionnaire is divided up into two sections:

1) Background Information - which is concerned with demographic dat. nd categorization of the course.

2) Technologies Used & Satisfaction - is designed to gather information regarding the technology(s) used in the delivery of a distance education course and the satisfaction an instructor attributes to the technology(s) used.

Please return the completed questionnaire by October 15, 1989, using the enclosed stamped, self addressed envelope. If you have any questions I can be reached at 426-2010 Ex. 230 during the day and 438-9427 in the evening.

Thank you in advance for your cooperation.

Yours sincerely,

Mark Murray
Department of Industrial
and Vocational Education
University of Alberta

APPENDIX B

QUESTIONNAIRE

THE ROLE OF TECHNOLOGY IN DISTANCE EDUCATION

General Information Regarding Completion of This Questionnaire

This questionnaire is to be completed by instructors of post-secondary distance education courses. A separate questionnaire should generally be completed for each different course you have taught in the previous academic year. However, if you feel that completing multiple questionnaires will simply be duplicating responses then, you can enter the names of more than one course on a single questionnaire provided you indicate which program categories the courses fall under.
The questionnaire is designed to investigate the role of technologies presently used in the delivery of post-secondary distance education courses, and the satisfaction attributed to these technologies from an instructor's perspective. Each questionnaire should require approximately ten minutes of your time to complete.

The completion of this questionnaire will indicate your consent to participate. All information will be kept strictly **Confidential** and the identity of the participant will not be known to the researcher.

Provision is provided for additional comments regarding any aspect of this questionnaire following question 6. Your comments would be greatly appreciated and most helpful in this research.

For the purposes of this research the following definition of a distance education course is used.

Distance Education Course

A distance education course infers that the student spends the greater part, or all, of his/her study time working on materials without the presence of a teacher. The student's self study can be carried out both on or off campus and geographical separation between student and teacher is not essential. For example, a course that was completely self-instructed via computer assisted instruction (CAI) on-campus is considered a distance education course.

Please complete the following questions by checking (✔) the appropriate response or filling in the blank.

Part (A) - BACKGROUND INFORMATION

Questions 1-5

1 What is the name of this course you teach via distance delivery?

_____

2 How many times have you taught this course?

1 ❑ 2 ❑ 3 ❑ or more

3 Does course enrollment require program admission, or can it be taken independently?

COURSE ENROLLMENT REQUIRES PROGRAM ADMISSION ❑
COURSE CAN BE TAKEN INDEPENDENTLY ❑

4 What is the approximate duration of this course in hours?

0 - 15 ❑
16 - 30 ❑
31 - 45 ❑
Over 45 ❑

5 For the purpose of this study, it is necessary to categorize the courses being surveyed. Toincrease the accuracy of this process may I ask you to categorize your course by using a code from Table 1, Program Category Codes.

For example, English 201 would fall within the Liberal Arts program category. Therefore, to categorize English 201 you would place a category code of 07 in the space provided.

E.g., PROGRAM CATEGORY 07

TABLE 1 PROGRAM CATEGORY CODES

CODE#		CODE#	
01	BUSINESS AND ADMINISTRATION	07	LIBERAL ARTS & SOCIAL SCIENCES
02	CLERICAL/SECRETARIAL	08	MEDICAL SCIENCES
03	COMMUNITY SERVICES	09	NATURAL SCIENCES & MATHEMATICS
04	EDUCATION	10	PERFORMING ARTS
05	ENGINEERING/TECHNOLOGY	11	TRADES & SERVICES
06	HEALTH	12	OTHER - PLEASE SPECIFY: _____

Please indicate which program category you feel this course falls within by placing a program category code in the space provided.

CODE#____

Please complete the following questions by entering a code number or checking (✔) the appropriate response.

Question 6 **Part (B) - TECHNOLOGIES USED & SATISFACTION**

Question 6 breaks your course down into the following segments:

(6A) Course Content

(6B) Student/Teacher Interaction

(6C) Student/Student Interaction

(6D) Student Evaluation

Each segments requires a three part response:

(1) Identify which technology(s) you use for the delivery of each segment by placing a technology code number from Table 2 in the space provided. If more than one technology is used then prioritize your responses as the 1st most frequently used technology, the 2nd most frequently used technology, and the 3rd. most frequently used technology for delivery of that course segment.

(2) Indicate your satisfaction with the technologies you identify by checking (✔)one of the four check boxes marked 4 to 1.The key for the satisfaction scale is shown below in Table 3.

(3) In the blanks provided following each course segment, respond to your experiences with the technologies by commenting on **what satisfied/dissatisfied you and why.**

It is **very important** that you respond to all three questions in each segment.

If one of these segments does not apply to this course e.g.,. no Student Evaluation is carried out, then strike None ☐ as your response to that segment.

TABLE 2 TECHNOLOGY CODE NUMBERS

CODE#		CODE#	
01	PRINT MATERIALS	10	TELE-TUTORING
02	TRAVELLING INSTRUCTORS	11	TELEPHONE
03	SEMINAR OR TUTORIAL	12	BROADCAST TELEVISION
04	AUDIO CASSETTES	13	CABLE TELEVISION
05	VIDEO CASSETTES	14	COMPUTER CONFERENCING
06	VIDEO DISC	15	CML/CAI REMOTE
07	AUDIO TELECONFERENCING	16	CML/CAI ON-CAMPUS
08	TELEWRITER	17	OTHER - PLEASE SPECIFY :
09	VIDEO ENHANCED AUDIO TELECONFERENCING		_____

TABLE 3 SATISFACTION SCALE

4 = Very Satisfied 3 = Somewhat Satisfied 2= Somewhat Dissatisfied 1= Very Dissatisfied

Example for completion of question 6 course segments:

6A COURSE CONTENT	TECHNOLOGY CODE	SATISFACTION WITH TECHNOLOGY
1st. Most frequently used technology	Code# 01	4☐ 3☐ 2☐ 1☐
2nd. Most frequently used technology	Code# 07	4☐ 3☐ 2☐ 1☐
3rd. Most frequently used technology	Code# 06	4☐ 3☐ 2☐ 1☐

☐ None (6A does not apply to this course)

Experiences with technologies used: The printed materials are well designed and achieving their educational objectives. Audio teleconferencing has tremendous potential in this course, however my lack of experience with this mode of delivery has caused me some problems. I am very pleased with the results obtained by using video disc for delivery of mechanical procedures.

QUESTION 6 CONTINUED
Please complete the following questions **6A** and **6B** by entering a code number or checking (✔) the appropriate response.

TABLE 2 TECHNOLOGY CODE NUMBERS

CODE#		CODE#	
01	PRINT MATERIALS	10	TELE-TUTORING
02	TRAVELLING INSTRUCTORS	11	TELEPHONE
03	SEMINAR OR TUTORIAL	12	BROADCAST TELEVISION
04	AUDIO CASSETTES	13	CABLE TELEVISION
05	VIDEO CASSETTES	14	COMPUTER CONFERENCING
06	VIDEO DISC	15	CMI/CAI REMOTE
07	AUDIO TELECONFERENCING	16	CMI/CAI ON-CAMPUS
08	TELEWRITER	17	OTHER - PLEASE SPECIFY :
09	VIDEO ENHANCED AUDIO TELECONFERENCING		_____

TABLE 3 SATISFACTION SCALE

4 = Very Satisfied 3 = Somewhat Satisfied 2= Somewhat Dissatisfied 1= Very Dissatisfied

6A COURSE CONTENT	TECHNOLOGY CODE	SATISFACTION WITH TECHNOLOGY
1st. Most frequently used technology	Code# _____	4 ☐ 3 ☐ 2 ☐ 1 ☐
2nd. Most frequently used technology	Code# _____	4 ☐ 3 ☐ 2 ☐ 1 ☐
3rd. Most frequently used technology	Code# _____	4 ☐ 3 ☐ 2 ☐ 1 ☐

☐ None (6A does not apply to this course)

Experiences with technologies used: _____

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6B STUDENT/TEACHER INTERACTION	TECHNOLOGY CODE	SATISFACTION WITH TECHNOLOGY
1st. Most frequently used technology	Code# _____	4 ☐ 3 ☐ 2 ☐ 1 ☐
2nd. Most frequently used technology	Code# _____	4 ☐ 3 ☐ 2 ☐ 1 ☐
3rd. Most frequently used technology	Code# _____	4 ☐ 3 ☐ 2 ☐ 1 ☐

☐ None (6B does not apply to this course)

Experiences with technologies used: _____

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QUESTION 6 CONTINUED
Please complete the following questions **6C and 6D** by entering a code number or checking (✔) the appropriate response.

TABLE 2 TECHNOLOGY CODE NUMBERS

CODE#		CODE#	
01	PRINT MATERIALS	10	TELE-TUTORING
02	TRAVELLING INSTRUCTORS	11	TELEPHONE
03	SEMINAR OR TUTORIAL	12	BROADCAST TELEVISION
04	AUDIO CASSETTES	13	CABLE TELEVISION
05	VIDEO CASSETTES	14	COMPUTER CONFERENCING
06	VIDEO DISC	15	CMI/CAI REMOTE
07	AUDIO TELECONFERENCING	16	CMI/CAI ON-CAMPUS
08	TELEWRITER	17	OTHER - PLEASE SPECIFY :
09	VIDEO ENHANCED AUDIO TELECONFERENCING		_____

TABLE 3 SATISFACTION SCALE

4 = Very Satisfied 3 = Somewhat Satisfied 2= Somewhat Dissatisfied 1= Very Dissatisfied

6C STUDENT/STUDENT INTERACTION	TECHNOLOGY CODE	SATISFACTION WITH TECHNOLOGY
1st. Most frequently used technology	Code# _____	4 ☐ 3 ☐ 2 ☐ 1 ☐
2nd. Most frequently used technology	Code# _____	4 ☐ 3 ☐ 2 ☐ 1 ☐
3rd. Most frequently used technology	Code# _____	4 ☐ 3 ☐ 2 ☐ 1 ☐

☐ None (6C does not apply to this course)

Experiences with technologies used: _____

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6D * STUDENT EVALUATION	TECHNOLOGY CODE	SATISFACTION WITH TECHNOLOGY
1st. Most frequently used technology	Code# _____	4 ☐ 3 ☐ 2 ☐ 1 ☐
2nd. Most frequently used technology	Code# _____	4 ☐ 3 ☐ 2 ☐ 1 ☐
3rd. Most frequently used technology	Code# _____	4 ☐ 3 ☐ 2 ☐ 1 ☐

☐ None (6D does not apply to this course)

Experiences with technologies used: _____

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* Refers to evaluation of student performance.

Other information you feel is important:

Thank you for your time.

APPENDIX C

COMMENTS IN RELATION TO SATISFACTION WITH TECHNOLOGIES USED

Comments Related to - Audio Cassettes

Audio cassettes work well and can be used for students to catch up on information from a teleconferencing session they were unable to attend.

Audio cassettes have been used to allow conversation with students in remote areas: it helps to personalize contact. The disadvantage is reviewing cassette to relocate certain information.

Audio cassettes provide an interesting valuable alternative for student evaluation when appropriate

Comments Related to - Audio Teleconferencing

Audio teleconferencing provides for limited (minimal) interaction between students. This medium is cold and students are often shy about speaking out. Not too many students take advantage of this medium to interact with one another.

With audio teleconferencing, facial expression and body language is missing, thus interaction is more difficult than a classroom environment. Further, it takes longer for students to respond to the microphone and sometimes students lack the motivation to respond.

Audio teleconferencing, apart from the occasional poor connections, static and students not getting on line (technology related problems) works well and eliminates excessive travelling for many students.

Audio teleconferencing works well and eliminates the need for travelling by many students. However, poor transmission is a common complaint by rural students.

Audio teleconferencing works well over a distance, but it is hard for the instructor to obtain feedback on how the student is coping and how the instructor is being received.

Audio teleconferencing is a rewarding method for presenting and discussing course content. Students frequently comment that they appreciate the opportunity to meet each other via audio teleconferencing.

In our program, interaction between students is vital - audio teleconferencing is quite positive, it is even better after a seminar (workshop). Because students have had face to face contact it facilitates the teleconferencing.

Audio teleconferencing has been useful, but it is very hard to arrange and if you can't use the government right lines, it costs a fortune.

Comments Related to - <u>CML/CAI On/Campus</u>

CML/CAI on campus has proven to be a satisfactory method of evaluation.

CML/CAI the problems with CML are due to the complexity of the software and delayed response time.

CML helpful in giving students immediate feedback on exams.

CML has the advantage of immediate feedback to students, however when students reside in communities where they are the only learner it is not practical to install equipment so the student writes on hard copy. Results are phoned to the student to reduce turn around time.

Comments Related to - CML/CAI Remote

CML/CAI remote was used for student/teacher interaction, but it was very poorly organized and students became frustrated.

CML/CAI remote is used to answer student questions, but is it suitable only for those students who live near the learning centres.

CML/CAI remote mode of instruction is working well and tends to improve the success rate of students in the course.

CML testing allows for great flexibility.

Comments Related to - Mail/Written Feedback

Mail has been too slow in response time.

Mail provides a poor means of ongoing assessment of student - need to give student feedback based on discussion.

Comment Related to - Personal Contact

Personal contact in the form of students coming together who live in close proximity of one another, works well and allows sharing of course experiences.

Comments Related to - Print Materials

The units of instruction are well laid out and the assignments are clear and instructional.

Print materials work well in distance education if students are highly motivated.

One has to be sure that all material is covered adequately and is easily accessible by print materials or students will become frustrated trying to locate the information they need.

One must be careful not to try and cram too much material in a print package. It is better to limit to quantity of information to a manageable level so student can see the linkages between the units and concepts presented. If necessary, divide one course into two.

Print materials are time consuming to update. This is not built into the workload.

Time element: lack of immediacy in response time may limit its effectiveness.

Works well in the right environment.

Works very well, the structure of a print exam is suitable for students of varying abilities.

I feel the assignments demonstrate a better knowledge of the subject than the final exam.

Comments Related to - Seminar or Tutorial

Seminar provides very good environment for student/teacher interaction.

Generally works well, but some students come unprepared and have a negative effect on the duration of the class day.

Provides a very positive experience for students to interact at this time. Possibly more time could be allotted for it.

Seminar (workshop) greatly enhance positive learning. However, not all students are able to attend all the time.

Seminars (workshops) are very hectic for the student and teacher due to effort to pack as much into time as possible - it leaves student with information overload.

Seminar provides very good environment for student/teacher interaction. For those students that attend the completion rate rises dramatically.

Continuous entry makes seminars and pacing groups difficult to organize. Consequently, the flexibility gained by the technology inhibits group cohesion.

Comments Related to - Telephone

Telephone proved unsatisfactory because it was not a natural situation for myself or the student.

Telephone is used to enhance printed materials by providing clarification of content and sharing of information. Telephone provides a situation that is close to in person contact.

Telephone works well share information, but it is often difficult to reach students (telephone tag).

Telephone works well except for the occasional difficulty in reaching students (telephone tag) and the long distance costs incurred by students living at a distance.

Telephone can be time consuming when you have to flip back and forth through material to find the required answers.

Telephone is an effective way of addressing student concerns without requiring student to come to an educational institution.

Telephone has proved to be a satisfactory means for students to contact each other. However, I am unaware what percentage of students make use of this medium.

With students receiving feedback from computer, very little telephone contact time was necessary.

Telephone contact is very useful but so expensive that we must use it sparingly.

Comment Related to - <u>Slides</u>

I feel the use of slides makes it much easier to communicate detail than written description.

Comments Related to - Tele-Tutoring

Tele-tutoring proved excellent when used on a predetermined basis. The personal interaction provides motivation for the student and also helps them complete the course on time.

Tele-tutoring is somewhat cumbersome due to time limitations.

Tele-tutoring works well with students who are prepared and poorly with students who are not prepared: the difficulty arises with discussion.

Comments Related to - Telewriter

Have used telewriter and was extremely disappointed and frustrated with the continual inadequacies of the system: if students could "see" they could not "hear". I appreciate the benefits of technology but expect the system to function as advertised.

Telewriter is excellent for science courses due to the large number of symbols and problems that have to be presented.

Comments Related to - Travelling Instructors

Most student/student interaction takes place during skill teaching days. It encourages encourages students to interact with one another.

Works well for skills evaluation.

Works very well and allows for very positive interaction to take place. However, time allowed for this purpose needs to be increased.

Travelling instructors are used very effectively for the hands on skills component of the course content.

The success rate (completion rate) tends to improve when travelling instructors are used. When students are left by themselves a lot of them will never finish the course.

Comments Related to - Video Cassettes

Video cassettes worked well and students reported no problems with this medium.

Video cassettes are excellent to illustrate a particular point with.

Students as a rule do not make sufficient use of the video materials available to them. If they did the success rate would be a lot higher.

Video cassettes worked well. However, we need to develop more of them.

Video cassettes required the students to come to campus view; this was often impossible for students to manage.

Comments Related to - Video Enhanced Audio Teleconferencing

Video enhanced audio teleconferencing greatly enhanced audio only teleconferencing.