CHAPTER 2

REVIEW OF RELATED LITERATURE

2.1 Introduction

Distance education is used as an alternative mode of delivery in order to enable more students to gain knowledge. Threlkeld and Brzoska (1994, p. 51) note that 'distance education is sometimes viewed as a substitute for traditional education; a route to be taken where traditional means are not available'. Simpson, Pugh and Parchman (1993) have the same opinion as Threkeld and Brzoska. According to Simpson, et al. (1993, p.147):

> Distance education is extensively used in countries with large geographic areas and low population densities where it is impractical or too costly to deliver instruction in schools.

However, distance education is also used in countries with large populations such as in India to provide education to the increasing number of students and to 'equalize educational opportunity across different socio-economic groups' (Anshari, 1992, p. 28).

The teacher and learners in distance education usually are in different locations and therefore, institutions that offer distance education play

important roles in enhancing their teaching and learning process. Holmberg (1985), Willis (1994) and Steiner (n. d.) have discussed the importance of distance education extensively. Holmberg (1985, p. 2) in defining distance education, describes distance education as:

> various form of study at all levels which are not under the continuous, immediate supervision of tutors present with their students in lecture rooms or on the same premises, but which, nevertheless, benefit from the planning, guidance and tuition on a tutorial organisation.

Distance education institutions have adopted various media in delivering their course materials to distant learners, for instance, through mail, audio, video, computers and graphics. Moreover, a combination of a few delivery media are frequently used as learning materials in distance education. The effect of delivery media is forwarded by Benson (1994) in the article entitled <u>SUNY/K-12 Learning Technology Partnerships for Enhancing Educational Opportunities in Schools and Homes</u>. According to Benson (1994, p. 3), the delivery media together with telecommunications technology is capable of increasing the quality of learning, enhance productivity and provide opportunities for learners. Apparently the above view, stresses on the role of delivery media in distance education.

However, the relationship and interaction between learners and teacher are also equally important. The importance of instruction is noted by Lentell (cited in Brown, 1996, p. 44) as:

> ... however splendid the printed texts, and however refined the quality measurement tools [in distance education], it is the relationship between the tutor and the learner that determines success or failure.

Holmberg (1995, p. 2) emphasizes the communicational aspect in distance education and he divides this communication into two kinds: (a) one-way traffic - interaction which occurs between students and pre-produced course materials or text that has been sent by the supporting organization, and (b) two way traffic - involves real communication among students and the supporting organization.

Communication in distance education is made possible through the development in communications technologies (Romiszowski, 1993, pp. 1-2). Audio conferencing, video conferencing and computer conferencing are some of the examples that utilize telecommunications in distance education.

2.2 Definition of Teleconferencing

The current development in telecommunications technology has influenced the usage of teleconferencing in educational institutions (Holmberg, 1995; Lundin, 1994; Keegan, 1983). Many institutions are using teleconferencing as a delivery tool to enhance communication via electronic means.

What is teleconferencing? Barron and Orwig (1995, p. 228) explain that 'teleconferencing is the process of communicating with one or more people who are at distant locations. Unlike e-mail, teleconferencing usually takes place in "real-time" and provides interactive conversation'. Kinyanjui and Morton (1992, p. 3) also concur with the above view about teleconferencing. They noted teleconferencing as:

> an electronic means which can bring together people in two or more locations into a common network to discuss or share

information which lasts only for the duration of the particular event.

The above argument explains that teleconferencing is an electronic means that enhances meetings between individuals or groups at distant locations and that communication is the salient point in teleconferencing. The utilization of telecommunications technologies make teleconferencing possible.

2.3 Types of Teleconferencing

According to Lundin (1994, p. 3), 'teleconferencing is a generic term which encompasses all forms of interactive communication using electronic telecommunications between individuals and groups'. Furthermore, Lundin added that teleconferencing is categorized into six types:

a) audio conferencing

b) audio-graphic conferencing

c) computer text conferencing

d) interactive satellite television

e) analog video conferencing, and

f) compressed video conferencing.

However, these six types of teleconferencing are divided into three major groups: audio teleconferencing, audiographic teleconferencing and video teleconferencing (Barron & Orwig, 1995; Brock, 1994).

2.3.1 Audio Teleconferencing

Audio teleconferencing is the early form of teleconferencing. It involves voice links between participants and between participants and teacher in

supporting organizations. Telephone lines play an important role in permitting communication among people who are physically separated or who are at a distance (Kinyanjui & Morton, 1992; Lundin, 1994; Barron & Orwig, 1995).

However, in audio teleconferencing students and teacher must take part simultaneously in the teaching and learning process (Cheng, Lehman & Reynolds, 1991, p. 16) as in Figure 2.1.
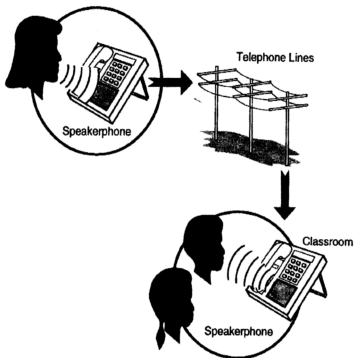

Figure 2.1: Audio Teleconferencing System

Source: Barron, A. E. & Orwig, G. W. (1995). <u>New technologies for education: A beginner's guide</u> (2nd Ed.). Englewood, CO: Libraries Unlimited, p. 231.

The transmission of audio teleconferencing uses analog transmission because it uses telephone lines. The participants of audio teleconferencing are required to have telephone sets and speakerphones to participate in the discussion. Collis (1994, p. 9) explains that audio teleconferencing 'involves

telephone contact between two or more sites, usually connected by means of a telephone bridge and via speakerphones'.

Whereas Wolcott, Napper and Lindsay (1994, p. 138) explain that the equipment required in audio teleconferencing are: 'telephone hand sets, speakerphones, or microphones; audio bridge; and a speaker device to facilitate multiple interactions'.

a. Speakerphone

There are two types of speakerphones: simplex message devices and duplex message devices (Barron & Orwig, 1995, p. 230). Simplex message devices allows one way communication at a time and does not allow simultaneous communication at a time.

Meanwhile, duplex message devices allow two-way conversation at the same time and this allows two-way interaction simultaneously just like standard telephones. When a speakerphone is used to receive participants voices, the microphone must to be turned off to avoid surrounding noises or voice echoes. However, if the participants' voice is loud the speakerphone will switch off automatically and the microphone will be switched on instantly. Thus, it allows a distant person to hear the participants' voice with minimum disturbances.

b. Audio bridge/ telephone bridge

The process of teleconferencing happens through the interconnection of multiple telephone lines. According to Barron & Orwig (1995, p. 232), the

telephone bridge:

> is an electronic system that links multiple telephone lines and automatically balances all audio levels. The bridge can be provided through the telephone company or competing long-distance services or it can be owned and operated by the school system.

Figure 2.2 shows a telephone bridge which is used in audio teleconferencing sessions. Telephone bridges require standard telephone lines and participants can either call the bridge or wait for the bridge to call out to begin conferencing.
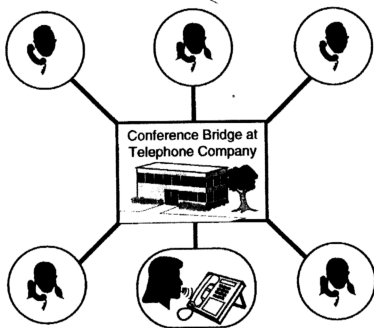

Figure 2.2: Telephone Bridge

Source: Barron, A. E. & Orwig, G. W. (1995). <u>New technologies for education: A beginner's guide</u> (2nd Ed.). Englewood, CO: Libraries Unlimited, p. 233.

Audio teleconferencing is the simplest and most inexpensive or economical method in teleconferencing (Barron & Orwig, 1995; Wolcott, et al.,

1994). Garrison (cited in Collis, 1994, p. 10) notes that audio teleconferencing became common 'because of the availability of the technology and the acceptability of costs'. The use of common phone lines makes audio teleconferencing favourable and it is considered cheap because the participants have to pay according to their phone bills only.

Nevertheless, audio teleconferencing requires amplifier speakers and additional microphones if bigger groups of participants are involved. Classrooms with 'sound absorbing materials (e.g. acoustic ceiling)' (Barron & Orwig, 1995; Wolcott, et al., 1994) are required to avoid incoming sounds and to minimize surrounding disturbances.

Audio teleconferencing has the advantage of enabling live interaction among participants. Furthermore, participants can be supplied with extra study materials by mail or facsimile (Collis, 1994; Schamber, 1988). Despite this, the lack of visual is an apparent disadvantage in audio teleconferencing.

2.3.2 Audiographic Teleconferencing

In audiographic teleconferencing, communication via telephone remains as the primary communicational medium. In addition, audiographic teleconferencing also allows transmission of still images and data (Wolcott, et al., 1994; Lundin, 1994). In other words, audiographic teleconferencing is defined as 'the transmission of still images(or other computer data) and audio ignals over telephone lines, usually two lines at the same time' (Collis, 1994, p. 24).

The transmission of audio signals in audiographic teleconferencing is similar to audio teleconferencing whereby it may or may not be transmitted

simultaneously. The transmission of graphic images and data in audiographic teleconferencing, is parallel with transmissions via telephone lines. The graphic images or visual and data, are used to supplement and enhance audio messages (Wolcott, et al., 1994, p.138). The colour of images received by participants may be in black and white or coloured depending on the machines used.

According to Barker (cited in Collis, 1994, p. 10) audiographic teleconferencing involves 'the combination of an audio conference with graphic support, such as an electronic blackboard, writing tablet, still video, or computer-generated visual material'. In the above statement, Barker has stressed on the equipment required in audiographic teleconferencing. Barron and Orwig and Wolcott et al. too emphasize the importance of audiographic teleconferencing gadgets as in Figure 2.3.
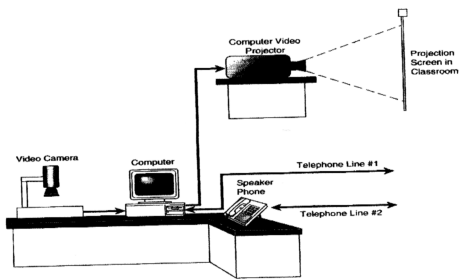

Figure 2.3: Audiographic Teleconferencing Classroom

Source: Barron, A. E. & Orwig, G. W. (1995). <u>New technologies for education: A beginner's guide</u> (2nd Ed.). Englewood, CO: Libraries Unlimited, p. 236.

a. Electronic blackboard

An electronic blackboard is a pressure sensitive board (Wolcott et al., 1994, p. 139) which transmits the instructor's writing or drawing through telephone lines to the receiving sites. However, the writing on an electronic blackboard is relatively small and thus there is no clear display. Therefore, the use of an electronic blackboard is considered a disadvantage because not much notes can be written on it.

b. Facsimile

Facsimile machines are used to transmit printed images and documents during teleconferencing. A facsimile machine therefore, functions as a photocopier to send information back and forth through the second telephone line while the other telephone line is used to transmit audio messages (Barron & Orwig, 1995, p. 234).

c. Computers

Computers are used to transmit images and documents through telephone lines. Consequently, computers enable the transmission of colour graphic and images at the receiving sites in audiographic teleconferencing. According to Wolcott, et al. (1994, p. 140):

> Combined with voice capabilities, computer-based systems permit the use of a variety of visual images and allows writing without transmission delays... offer advantages over slow-scan technologies in term of additional visual stimuli, more immediate interaction, and improved visual quality.

d. Still video images

Wolcott et al. (1994) and Barron and Orwig (1995) explained that still video images are used, to enhance audio teleconferencing. Still video image is also known as still-frame, slow scan or freeze-frame video. Schamber (1988, p. 2) describes still video image as 'an electronic slide show transmitted by telephone lines'. Audiographic teleconferencing permits compressed video to be transmitted to receiving sites via telephone lines. The advantage of still video images is that it allows instructors to use graphics and images in their presentation.

In comparison to audio teleconferencing, audiographic teleconferencing is costly because it needs a second telephone line, computers or an electronic blackboard. Moreover, audiographic teleconferencing requires a '9,600-baud or better modems' (Collis, 1994, p. 10) and specialized computer softwares at each learning site. Another disadvantage of audiographic teleconferencing is that it lacks full-motion visual and is not totally interactive.

2.3.3 Video Teleconferencing

Video technology is the primary medium of communication in video teleconferencing (Oliver, 1994, p. 172). Video teleconferencing is often used in business, military and industrial training because it allows face to face contact between the participants and instructor (Williams, 1997; Schrum, 1996; Barron & Orwig, 1995; Schamber, 1988). Video teleconferencing is a favourite in workshops, seminars and courses that are conducted at a distance. Schamber (1988, p. 1) states that:

Video conferencing is a full-motion, full-color system whose one-way or two-way audio portion may be transmitted by satellite,

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and whose two-way audio portion is also carried by satellite or on telephone lines. This system permits a range of information forms, including videotape, film, graphics, slides, and data. It is a good medium for drama, demonstrations, and simulations.

Oliver (1994, p. 172), agrees with Schamber and according to Oliver, there are two types of video teleconferencing (a) one-way video, two-way audio and (b) two-way video, two-way audio.

The one-way video, two way audio system allows two-way communication simultaneously, where the participants can see and hear their instructor on a television monitor or screen at the receiving sites. However, in this type of video teleconferencing the instructor will not be able to see the participants, and can only hear them.

However, in the two-way video, two-way audio system the participants and instructor can see and hear each other simultaneously. The transmission and receiving sites in video teleconferencing are equipped with a television, monitor, cameras and microphones that enable two-way communication and live visual.

A telephone bridge is used to send audio and video signals together in video teleconferencing. Cables, microwaves or satellites are used to send television images or full-motion visual in both directions. However, the cost of setting up video teleconferencing rooms and gadgets are expensive. Analog signals from the video camera at the transmission room are received by a Codec and are then converted to digital signals. Codec is a device which digitizes and codes the images before transmitting them over a digital link (Collis, 1994; Galbreath, 1995). The receiving sites with the codec system,

decode the digital signals and convert them to video signals so that it can be displayed on a screen.

The delivery cost of video teleconferencing is expensive. This is especially so in the two-way audio and video system. Schamber (1988, p. 1), states, 'It is also costly, to the point that links to as many as 30 locations are required in order for it to be economically feasible'.

However, the recent development in telecommunications technology has reduced the cost of video teleconferencing. Video teleconferencing can also be transmitted via satellites, cables and microwaves.

a) Satellite Video Teleconferencing

Satellite video teleconferencing is the early form of teleconferencing, which requires a studio classroom that is equipped with a proper lighting system, microphones, and cameras for the instructor.

According to Barron & Orwig (1994, p. 237) 'two distinct sets of equipment is needed for satellite systems. The uplink is the set of equipment needed to create and transmit the signals to the satellite. The downlink is the equipment needed to receive and display the signals'. Figure 2.4 shows how satellite is used to conduct video conferencing. Satellite video teleconferencing is costly but it can become cost-effective if it is used to cover wider geographical areas.
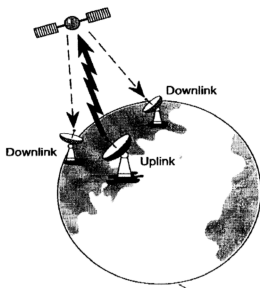
Figure 2.4: Audiographic Teleconferencing System

Source: Barron, A. E. & Orwig, G. W. (1995). <u>New technologies for education: A beginner's guide</u> (2nd Ed.). Englewood, CO: Libraries Unlimited, p. 238.

a) Cable Television

Cable television is effective if the participants of video teleconferencing have cable television. Barron and Orwig (1994, p. 239) explained that cable television 'is most effective in areas where a high percentage of the community subscribes to the cable television system'.

b) Microwave Television Conferencing

Microwave Television Conferencing is 'used to send and deliver audio and video signals via transmitters and receivers that must be in 'line of sight' with each other. Many are capable of two-way audio and two-way video full-motion transmission' (Collis, 1994, p. 25). Microwave television

conferencing is transmitted to areas between 20 and 25 miles apart and this system uses microwave that is cheaper than satellite video teleconferencing and cable TV.

c) Desktop Video Teleconferencing

Desktop video teleconferencing (VTC) uses computers that are connected with cameras and microphones at both sites during video teleconferencing. It allows synchronous communication and at present it is used in business meetings and in sharing documents. Redding and Fletcher (1994, p. 83) state:

> All desktop VTC systems require sophisticated communications systems to route signals and provide multipoint capabilities, in a LAN environment, and require additional components to interoperate with compressor/decompressor (Codec) based VTC systems.

2.4 The Role of Teleconferencing in Distance Education

The introduction of teleconferencing in distance education has spawned many distinctive roles of teleconferencing in education. Matthewson (1991, p. 61) in Philosophy and Roles of Teleconferencing Distance Education has explained that the role of teleconferencing '...should differ in relation to geographical context. It will differ in relation to the fields of its endeavor: course design and delivery, support systems, administration'.

Matthewson added that the role of teleconferencing, in a philosophical point of view, has to do with (a) bridging, (b) enhancement, (c) extension, and (d) support. The review of literature on the role of teleconferencing will focus mainly on the roles that has been listed by Matthewson.

2.4.1 Bridging

Who are the people who bridge in distance education via teleconferencing? Primarily, bridging in teleconferencing occurs between (a) teacher and students, and (b) students and students at different learning sites.

Typically when we discuss teleconferencing, the link between the teacher and students is important. The teacher teaches from a distance while, the students learn at different locations, and bridging occurs during the transition of the teaching-learning process.

Hunter (cited in Odharo, 1983, p. 4) defined teaching as 'the conscious behaviour that makes learning more probable and more efficient than it would have been without that behaviour'. In distance education, especially in teleconferencing, the teacher plays an important role to create a harmonious and interactive situation.

Audiographic teleconferencing network is used to bridge the gap between distant students and teacher in the Memorial University of Newfoundland (Keough, 1990, p. 27). The School of Continuing Studies and Extension is in charge of transmitting 4500 hours of programmes to students at various locations or learning sites. The teacher or instructor acts as the content expert and content provider while the content is delivered through teleconferencing. Whereas, in Universiti Sains Malaysia audio teleconferencing uses cable phones which provide point-to-multipoint teleconferencing (Karsono, 1993, p. 90).

The Centre for Off-Campus Studies in Universiti Sains Malaysia is responsible for conducting audio teleconferencing. Universiti Sains Malaysia provides teleconferencing facilities only to its distant students in East Malaysia

because the cost of leasing phone lines across the South China Sea is high (Nik Norulaini, et al., 1994, p. 29). Therefore, only West Malaysia distant students are privileged to have live interaction during the teleconferencing.

According to Nik Norulaini, et al. (1994, p. 29) live teleconferencing encourages students to express and defend their ideas, and thus 'provide immediacy of imparting and receiving knowledge'.

The University of Otago has 30 learning sites for its audio transmission purposes and covers a large area to link students and teacher. Telecom New Zealand enhances their transmission using electronic blackboards to bring success in their audio teleconferencing (Love, 1990, p. 57).

Audio teleconferencing is also manipulated by the University of Calgary in conducting their distant programmes, for instance, in their Bachelor of Nursing programme. The University of Calgary has been offering this programme since 1991 through their distance education courses (Lalande, 1995, p. 64). Distant nursing students are facilitated through this programme and bridging occurs with technological linkages.

The number of participating students in a certain centre is limited to 25 to enhance the quality of communication that occurs between the teacher and students (Lalande, 1995, p. 67). Moreover, the teacher and students have each others photographs to enable them to recall each other when communication takes place. The photographs also help the teacher to trace the level of interaction of the students during transmission.

Moore (1987, p. 3) has noted that 'teaching begins with programmes that are mass produced and not all learners are able to adapt these materials to their own needs'. Robson (1996, p. 313), on the contrary said that the two-

way voice interaction between teacher-students or students-teacher enhances students learning. The teacher confirms the students learning through questioning and other teaching strategies.

A smooth flow of interaction occurs in the University of Calgary when the distant students state their names and study centres whenever they communicate with their distant teacher. Consequently, the teacher will be able to ask questions to provoke answers from the distant students.

Although audio teleconferencing encourages interaction among teacher and students, this system has its own disadvantage. It prevents face-to-face interaction. In relation to this Simpson, et al. (1993, p. 149) state that:

> Two-way video systems would appear to provide the greatest potential for instructor-student interaction, as instructors and students can both see and hear each other

Another distance education institution which uses video teleconferencing is the Curtin University of Nursing. A compressed video teleconferencing network which is called LIVE-NET is used to educate rural nurses in the Karratha Community College, the Ashburton Campus in Tom Price and at the Paraburdoo Mine Training Centre with the cooperation of the Central Metropolitan College of TAFE in Perth, Australia. Distance education for nurses in these institutions are conducted in seven sessions with 2 hours of two-way live, compressed video teleconferencing transmission per session (Latchem & Rapley, 1992, pp. 118-119).

Bridging or the link between teacher-students and students-students occurs in a more lively, interactive manner in distance education at the

University. Thus, regardless of distance, teleconferencing favours equity, accessibility and interactivity (Latchem & Rapley, 1992, p. 121).

Apart from the above, the Oklahoma State Regents of Higher Education has also set up the Oklahoma Televised Instruction System since 1970. This Televised Instruction System has enabled distance education in the state of Oklahoma. The Oklahoma State Regents of Higher Education has also established linkages with the Oklahoma public and private colleges, universities, junior colleges and technical institutions (Dillon, Gunawardena & Parker, 1992, p. 30).

Furthermore, the network covers a wide area in order to educate more distant students. Hence, teleconferencing is transmitted throughout 70 locations in 36 communities which covers more than 120 classrooms (Dillon, et al., 1992, p. 30). The distant students at the various locations communicate through point-to-point microwave radio facilities which are set up by the Oklahoma State Regents of Higher Education.

Although some educators consider teleconferencing as a device that enable interaction between teacher and distant students, the extend of interaction in teleconferencing is still questionable (Williams, 1997; Reid, 1995; Robson, 1996; Willis, 1994; Rowntree, 1992; Dillon & Blanchard, 1991; Moore, 1987). Robson (1996), for example, found that there was a lack of interaction between students at different remote sites because they sat together in pairs or small groups.

Teleconferencing enhances the link between teacher and students or between students at different study centres and is often described as 'serves equitably all students' (Willis, 1992, p. 1). The teaching process in

teleconferencing must be well planned and well organized. According to Walker and Hackman (1992, p. 89), 'transfer of information from instructor to student is the primary determinant of learning and satisfaction in telecourse'. The above statement is pertinent for teleconferencing too. This is because the lecturer in the transmission room and the students at the learning sites need a smooth flow of information to learn effectively.

Crys, T. E. (cited in Dillon, Gunawardena & Parker, 1989, p. 69) has listed the skills needed in a quality teleclass teaching. The skills can be applied to teleconferencing too. They are:

- good organization of teleclass courses and materials
- teachers must be camera aware
- teachers must speak clearly
- teachers should be able to use expressions and body language *during lessons*
- teachers must be able to address questions to students in televised classrooms
- teachers must use interactive study guides
- all materials necessary for field students should be at the television classroom before the class starts

Teaching in teleconferencing can be effective and *the transfer of knowledge will be successful if the above skills are used*. Willis (1992, p. 1) states that in teleconferencing the teachers utilize technical devices and that they are not in the same position as the other teachers in traditional classrooms who are in the position to reveal visual cues used in teaching. He added that distance education teachers have to overcome the obstacles that

they face by adjusting to the technical requirements and to the distance gap. Hence, Willis (1992, p. 1) states:

> ... instructors often comment that the preparation required by distance teaching improves their overall teaching ability and empathy for their students.

Thereupon, it is the teachers' duty to create a harmonious and 'real time interaction' (Swain, cited in Threlkeld and Brzoska, 1994, p. 7) during teleconferencing. Holmberg, too has the same viewpoint as Swain about the importance of meaningful learning in the learning process. Teaching through teleconferencing is considered to have achieved success if the learners are able to accomplish meaningful learning.

The role of the teacher is important in encouraging interaction among participants in teleconferencing. The distant students are given equal chances like the traditional classroom students to clarify any doubts or to articulate their opinions through teleconferencing.

2.4.2 Enhancement

Another important role of teleconferencing is the enhancement of the teaching and learning process in distance education. According to Matthewson (1991, p. 64) distance education via teleconferencing needs stages of planning, teaching and assessment which are conducted by the teaching team in order to 'enhance content, share workload, institutional co-operation in the interest of meeting needs beyond solo providers' resources'.

Do the institutions involved in teleconferencing enhance their teaching and learning process? The University of Otago, for instance, usually design their audio teleconferencing courses earlier. The planning of courses is done

carefully by ensuring the needs of the teaching and learning process (Love, 1990, p. 51).

However, in the Memorial University of Newfoundland, the stages of planning, teaching and assessments are provided by the Educational Technology division: this division has a sophisticated video production plan which comprises 'a studio, editing suites, cameramen, graphic artists, etc.' (Keough, 1990, p. 28). Reid (1995, p. 273) explains:

> Technology is wonderful when it enhances learning, when it doesn't, it can turn a learner off for life. Careful choice must be made about what technology is implemented, how it will be introduced to learners, and what part it will play in instruction or support.

The reason for such preparation is to increase the quality, so that distant students can acquire the objectives of the teaching learning processes successfully. The Memorial University of Newfoundland, with the above view, is conducting its distance education with a combination of trained staff in its network delivery, its operational and technical staff, and its instructional design groups and administrative groups. Such staff enhance the delivery of knowledge via teleconferencing in this university.

According to Moore (1993, p. 33) teleconferencing provides a more friendly and supportive atmosphere. However, in Universiti Sains Malaysia, only students in West Malaysia get the opportunity to attend distance courses through teleconferencing. On the other hand, distant students from East Malaysia get information through audio tapes which are recorded during live transmissions.

Gottchalk (1995, p. 4) states that 'student learning is enhanced when content is related to examples. Instructors tend to teach using examples that

learning site or study centre. The transmission receiving room at a particular learning site is equipped with facilities that allow distant students to have smooth live lectures without the teacher being present at the learning site.

The learning sites for the Curtin University School of Nursing are located at the Karratha Community College, the Ashburton Campus in Tom Price and at the Paraburdoo Mine Training Centre. Lundin and Lange (cited in Latchem & Rapley, 1992, p. 121) explain that video teleconferencing at the Curtin University:

> ... is live, it is interactive and essentially it is simply an extension of good classroom practice. The skills it calls for are those of sound preparation, good presentational and questioning techniques, sound judgment regarding pacing and variety and effective use of classroom aids.

Each video teleconferencing room at the learning sites in the Curtin University School of Nursing is equipped with television monitors (29" or larger), a preview monitor, a camera which focuses on the presenter or teacher and a whiteboard, a bench camera to show slides, and close-ups of objects), a class camera (at Perth and Karratha only) , microphones (desktop, hand-held and label-type) and a proper video and audio switching system (Latchem and Rapley, 1992, pp. 122-23). The equipment is prepared to create a lively classroom and it allows a face-to-face interactive setting at the learning sites of teleconferencing. In this way the students are able to question or express their opinion on issues related to the lesson and discuss it with their teacher and peers at other learning sites.

Whereas in the University of Otago, Universiti Sains Malaysia and University of Calgary audio teleconferencing plays important roles in bridging the isolation of distant students. Audio systems are used to link teacher-

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students and students-students in these universities. In addition, electronic blackboards are used to display texts or graphics at the learning sites. As a result, lessons are transmitted spontaneously in distance education even though, students are not able to see their teacher.

In the University of Calgary students and teachers are required to exchange their photographs. This allows them to recognize each other and enable them to create a good rapport while communication is taking place. Therefore, teleconferencing plays the role of an extended classroom which allows learning among distant students even though they are at different locations.

However, Sauvé (1996, p. 106) states that 'video teleconferencing brings distance education closer to face-to-face teaching but it also reduces the students' freedom to study at their own pace and at a time and place of their choice, and thus restrict the individualization of learning'.

2.4.4 Support

Teleconferencing is capable of providing support to the distant learners and thus, it should not be mistaken as an electronic gadget which transmits lectures only.

The student support in the University of Calgary is provided through audio teleconferencing. Student support services are transmitted in six psycho-educational workshops of two hours each. The purpose of such audio teleconferencing is to facilitate the professional development of the nursing students in this University. These workshops are conducted with the help of

the Student Resource Centre, the Library and the University Counselling Services. Below is the title of each workshop:

Workshop 1 Preparation for the Student Role
Workshop 2 Developing Independent Learning Skills: Information Selection and Evaluation
Workshop 3 Stress Management for the Multiple-Role Adult
Workshop 4 Strategies for Career Planning for Nurses
Workshop 5 Transition to the Workplace: Job Search Strategies and Resumé Writing
Workshop 6 Successful Interview Strategies for Nurses

The evaluation done at the end of each workshop shows that teleconferencing can provide effective student support. The Oklahoma State Regents of Higher Education transmits Instructional Television Fixed Service (ITFS) to 70 locations in the state of Oklahoma. ITFS is used to provide student support during the transmission of lectures, for instance, to help the students with their assignments or homework. Library and counselling services are also provided and the student support system is the prime concern of the University.

However, at the Memorial University of Newfoundland, where audiographic teleconferencing is used to educate, student support is also considered as an essential aspect of distance education. Keough, the Co-Director of Health Sciences Centre at the Memorial University of Newfoundland (1990, pp. 33-34) states that student support is obtained from: 'peers, coordinators at learning sites, academic counselling centre, technicians or operators, field officers in regions and manuals which contain work activities and lists of community resource'.

According to Keough (1990, pp. 33-34), peer support in teleconferencing creates the notion of togetherness at their respective learning

sites and most students prefer 'group dynamic' discussions because in this way they can discuss and exchange their opinions during lessons.

According to Keegan and Sewart (cited in Lalande, 1995, pp. 62-63), 'some authors suggest that academic success and the reduction of the attrition rate for distant students is related to the provision of student support such as counselling, advising, and library-skills development'. The above arguments stress on the importance of student support in teleconferencing. Student support enhances teleconferencing and increases motivation among distant students.