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Application of television production techniques to teleteaching:  
An investigation of the effects of visual reinforcement of lesson content  
on student performance and attitude towards presenter and content

Zeba Khan

A Thesis  
in  
The Department  
of  
Education

Presented in Partial Fulfilment of the Requirements  
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Concordia University  
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## ABSTRACT

Application of television production techniques to teleteaching:  
An investigation of the effects of visual reinforcement of lesson content  
on student performance and attitude towards presenter and content

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Teleteaching is a major activity conducted through the medium of videoconferencing in Indian distance education institutions. A quality problem arises from the fact that distance educators tend to regard teleteaching as an extension of the classroom teaching approach. For this reason, all their efforts are directed towards reproducing conventional classroom instruction, without the least concern for the fact that the instructional delivery medium is a technological interface: that is, a TV screen. This study investigates the use of three television production variables for visual reinforcement of the lecture content, to improve the learning outcomes of teleteaching in the Indian context. The impact of specific techniques (i.e. inserted graphics, video clips, and background electronically inserted by the 'chromakey' technique) was measured in three experiments using two dependent variables: achievement, and attitude towards the presentation and presenter. The study yielded highly significant effects of graphics on achievement and attitude; and a significant positive effect of the chromakeyed background was observed on attitude. The video clips that were used failed to produce any measurable effect. Further research on the effects of such presentation variables in videoconferencing appears to be warranted.

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## **CHAPTER 1:**

### **INTRODUCTION**

#### **1.1 Background of the study**

In early 1970s, when videoconferencing came into existence, it was seen to possess great potential for information sharing, training and education. However, its use remained limited to corporate meetings and conferences. This scenario has changed in recent years, with teleconferencing being increasingly used by distance education institutions around the world. Two parallel developments have taken place; first, the phenomenal growth in distance education; and secondly, the advances in teleconferencing technology, both reinforcing one other's strength. To meet the growing demand of education outside conventional institutions, existing distance education institutions have consolidated their efforts, new institutions have come into existence, and many conventional universities have begun to function as dual mode institutions by extending their educational opportunities to learners at a distance (Rumble, 1992). At the same time, rapid innovations in the technology of teleconferencing such as compressed digital video, and fibre-optic cables, have made teleconferencing more versatile, cost-effective and adaptive to the needs of distance education systems (Walsh & Reese, 1995).

Interestingly, distance education institutions in many developing countries have taken a lead in using teleconferencing. The Indira Gandhi National Open University (IGNOU), in India is one among them. The IGNOU is extensively using videoconferencing for the teleteaching, and telecounselling of students, and for teletraining of staff across over the nation. In fact, for IGNOU, videoconferencing is the most viable means for reaching its 6,00,000 students enrolled in various programmes of study. At IGNOU, *teleteaching* is the major activity conducted via the videoconferencing mode, to supplement the self-instructional print materials. The teleteaching involves curriculum oriented lectures by the teaching faculty of the university, and by the subject matter experts drawn from the academic institutions, from the discipline of the particular course. For instance, a teleteaching session for a Bachelor's degree programme in Nursing will include the lecture delivered by IGNOU teaching faculty, and by subject experts, working in major hospitals. The same is true for other academic and professional courses. This approach gives students all over the country an opportunity to see and listen to their teachers as well as to draw benefit from the best experts in the field. The goal of teleteaching at IGNOU is to provide its students with a good quality of education at a national level. This is a very important goal to achieve in the larger educational context of the country, since students in small towns and rural areas do not have access to the same quality of education as their counterparts in metropolitan cities.

The Indira Gandhi National Open University Act 1985 (para. 4) states:

The objective of the university shall be to advance and disseminate learning and knowledge by a diversity of means, including the use of any communication technology, to provide higher education to a larger segment of the population and to promote the educational well being of the community generally, to encourage the Open University

and distance education system in the educational pattern of the country and to coordinate and determine the standard of such systems....'

Teleteaching thus appears to be a vital means of achieving this goal. It uses a versatile communication technology; it reaches large numbers; and it engages the best teachers and resource persons in the field. However, there is one aspect of teleteaching which remains largely ignored; the *presentation* aspect. The current study seeks to investigate, analyse, and suggest ways to develop the methods of teleteaching presentation so as to improve the quality of distance education especially with reference to those systems that are entrusted with the task of responding to the needs of millions of students across India.

Beginning with the background of the study, the following sections of the thesis provide an overview of the various types of teleconferencing and their contribution to the distance education at an international level. They then discuss the role of instruction and interaction in teleteaching with reference to the specific context of this study. This leads to a statement of the problem and its analysis with reference to the present scenario of the distance education, and in particular the use of videoconferencing and educational television within Indian context.

## **1.2 Types of teleconferencing**

Teleconferencing can take place between two locations, known as point-to-point teleconferencing, or among many locations, known as multi-point teleconferencing (Graham, 1984). On the basis of the medium of transmission used, teleconferencing may be categorised as audioconferencing, audio/graphic-conferencing, computer

conferencing, and videoconferencing. The latest addition is desktop videoconferencing which is a convergence of computer conferencing and videoconferencing.

Audioconferencing connects people by voice alone (Murphy, 1988). This is the least expensive and the oldest form of teleconferencing. It uses a familiar technology, the telephone, and requires less planning than other forms of teleconferencing (Parker, 1984; Hatfield, Garrison & Adams, 1986). Audiographic conferencing is an advance over audioconferencing. An audiographic system supplements audioconferencing by transmitting static visual components such as charts, graphics and photographs (Graham, 1984). In an audiographic teleconference, participants in different locations speak with each other and write to each other on a computer. Audiographic conferences are especially useful when instructor includes technical information such as charts and diagrams.

Videoconferencing is the most expensive and sophisticated kind of teleconferencing. It involves full-motion video and audio transmission between two (point-to-point) or several (multiple) locations, via a satellite, cable or microwave network (Brock, 1994).

Videoconferencing falls into two categories:

- a) two-way video/ two-way audio; and
- b) one-way video/ two-way audio.

The two-way video/ two-way audio is the closest to face-to-face meeting. It allows participants at various sites to speak and see each other at the same time, but this is rarely



used in education due to its very high cost when several sites are linked up. More common in the use for distance education is the one-way video/ two-way audio videoconferencing which is comparatively less expensive (Archer, 1999). In this case, the participants at the transmitting end can be seen by the participants at the receiving sites, but not vice versa. The communication from the receiving sites back to the originating site is by audio link only. This is the kind of teleconferencing which serves as the basis for this study.

### **1.3 Contribution to distance education – An overview**

Various forms of teleconferencing have become an integral part of distance education systems in the world. In North America, videoconferencing have been used both at high school and higher education levels. In the USA, student groups in sparsely populated states such as Montana, Minnesota, Alaska, Dakotas and Arizona, interact with each other through videoconferencing (Massoummian, 1989). The University of Wisconsin has the world's largest and the most sophisticated audioconferencing system (Murphy, 1988). In Australian higher education system, where several universities and colleges have merged to form large multi-campus institutions to reduce duplication of services, teleconferencing plays a central role (Baker & Hansford, 1990). Several Canadian universities have been using audioconferencing for seminars and tutorials (Jeffery, 1980; Buchanan & MacIntosh, 1997). In the province of Alberta, as in many other Canadian provinces, access to higher institutes of learning can at times become problematic for remotely based and geographically dispersed aboriginal populations. In 1995, the University of Alberta, Fairview College and Kayas Cultural College started a distance

education project in partnership by offering faculty of Arts courses to communities in remote sites of North-western Alberta using multi-point videoconferencing as their primary mode of delivery (Keast, 1997). The British Open University uses audio and audio/graphic-conferencing called Cyclops for its tutorials (Murphy, 1988). The IGNOU (Indira Gandhi National Open University), India, and the Universiti Sains Malaysia in Malaysia, are using teleconferencing in a major way to provide tutorial support to their distant learners (Idrus, 1993). The IGNOU's teleconferencing facility used 483 hours of connection time in 1996, 495 hours in 1997, 530 hours in 1998 and approximately the same number of hours in 1999 to offer telelectures and provide tutorial support to its students in 500 locations.

Training is one area where teleconferencing has been extensively used in public and private sectors alike. The US Defense Intelligence Agency's Joint Military Intelligence Training Center (JMITC) started distance learning/ video teletraining (DL/VTT) programmes in 1992 using two-way audio/video system with multimedia capabilities (Gants, 1996). Similarly, the Florida Training Project (FTP) aimed at training military personnel based at centers in Florida, Alabama, and Rhode Island is an extensive project which involves the development, delivery and evaluation of five military courses (Bramble & Martin, 1995).

In certain situations, teleconferencing remains the only viable means to reach the target audiences. Nine thousand teachers and administrators were due to participate in a one-day training course about the health services, in Dallas, Texas. However, the organisers

could not find a single place to accommodate all the participants, and there were not enough resource persons to go to all sites, so they applied a videoconference solution to the problem (Fox, Loutsch & O'Brien, 1993). Schools that are thousands of miles apart are working together on projects with the aid of teleconferencing facilities (Verrecchia, 1995). In India, a programme in the "Orientation of Elementary Teacher Educators through Interactive Video Technology" held in October 1997, was attended by 700 hundred teachers distributed across 20 locations in Madhya Pradesh. Teleconferencing was the only option for this training, since it was not administratively possible to bring all these participating teachers at one location for want of space and equipment (Phalachander, 1997). Schools are opting for teletraining in the face of dwindling resources, declining budgets, and the lack of specialised laboratory equipment. In New York State, the use of videoconferencing to combine classes at 14 rural schools is proving very cost effective (Fox, *et al.*, 1993). It is evident from the literature, that teleconferencing in its various forms is contributing significantly to an unprecedented growth in distance education.

#### **1.4 Interaction and instruction: Context - related variables**

The 'lecture' or 'telelesson' is regarded as the central, non-interactive component of the videoconferencing, and is of prime interest to this study. This section provides a rationale why the 'interaction' component which is considered to be a key element of teleteaching via videoconferencing in other parts of the world, cannot be practiced in its true sense in Indian context.

Videoconferencing has been described as "the interactive electronic transmission method for real-time facilitating two-way conversation among groups of individuals in different geographical locations" (Brock, 1994, p. 126). Ideally speaking the 'real time interaction' between various sites or 'conferencing' is the main structural feature of teleconferencing technology. Large commercial organisations, multi-national companies and other public and private sectors are harnessing this potential of videoconferencing technology for information sharing and interchange of ideas during their long-distance corporate meetings (Gant, 1996; Wilson, 1997). When the same technology is used for academic institutions teaching in the distance mode, there is often a major shift in usage since uninterrupted 'instruction' (i.e. a 'lecture') occupies an significant place in their 'teleteaching' agenda. What is understood by teleteaching in the context of this study ? Unfortunately, it does not have a precise definition in the educational literature, but is described as a form of teaching in which the teacher's task is to elaborate the subject matter to the students by means of technical tools, since the teacher and learners are not in direct contact with each other (Kovacs, 1987). In other words, teleteaching involves delivery of the 'core of the subject matter' by a 'suitable medium.' For the purpose of this study, teleteaching is defined as a lecture carried out using the technology of videoconferencing. Typically, distance education institutions with teleteaching goals incorporate subject matter or instruction in the form of a 'lecture ' into their videoconferencing programmes. In fact, the 'lecture' component is the reference point for the initiation of any interaction, even in interactive teleteaching environments such as conventional classrooms. The 'lecture' component is the *sine-qua non* of videoconferencing in distance education in the developing world. This is not to reduce

the role of 'interactivity' in videoconferencing. Undoubtedly, interactivity is the crux of ideal videoconferencing technology and is successfully practiced in educational situations where the number of participants is limited to a few hundreds, or the number of sites linked together is not too large. This is largely true in the distance education context of North American, Australia, or European countries (Baker & Hansford, 1990; Fox, *et al.*, 1993; Keast, 1997; Murphy, 1988) where the total enrolment for telecourse is sometimes even much less than a hundred. But the learning scenario of developing countries, and notably of South-East Asia, is in severe contrast to this. In these regions, the total numbers of students attending a learning session is in the thousands. *Such circumstances do not permit effective interaction with the teacher or students from other sites on any equitable basis*, as can be seen in the case of IGNOU where approximately 500 sites are competing for interaction.

Owing to the demand of large numbers, limited time, and the institutions' responsibility to provide equal educational access to all, the 'lecture' becomes the priority and 'interaction' takes a back seat. Videoconferencing is used by these academic institutions more as a technology of transmission rather than the medium of interaction. Interaction and instruction are two highly context-related variables of videoconferencing that are dictated by the priorities of the systems which practice them. In the western model of distance education, a much smaller number of participants is typically involved, and the best styles of videoconferencing can include 'interaction', but in the Indian distance education model, videoconferencing has to keep 'lecturing' styles at the forefront, in order to distribute the learning experience on fair basis to all participants.

## **1.5 The history of Indian distance education**

This study has been designed to have specific application in the distance education of India. Today, India is a leading nation in the world having a larger network of distance education institutions. The beginning of distance education in India dates from 1962, when the Delhi School of Correspondence was established as an extension of Delhi University. This was followed by several other colleges and Universities offering correspondence courses. Such programmes, however, could not provide good enough quality education since they functioned under the limited budget umbrella of formal education institutions. The scene began to change in the early 1980s when the first full-fledged Open University (Andhra Pradesh Open University) was established. During the last two decades, India has seen an unprecedented growth in distance education with the establishment of IGNOU (Indira Gandhi National Open University) in 1986. Classified as one of the “mega universities” (Daniel, 1995) of the world, the institution caters to the needs of over 6,00,000 students spread all over the country by offering courses at certificate, diploma and degree levels. Besides IGNOU, seven other open universities in different states of the country, are also teaching students through distance education mode. Such efforts are also being made at the schools level. The NOS (National Open School) is one such institution that is extending education to over 3,00,000 students at secondary school level through distance and open learning methodology. Self-instructional print material is the primary mode of instruction in all of these institutions. However, specially prepared radio and television programmes and audio and video cassettes, available at local study centres, have been incorporated into the multiple media

learning package. Gradually, these institutions are adopting newer technologies such as videoconferencing to strengthen their student support system. It may be noted that many of the state open universities are region-specific, but IGNOU and NOS have been established to serve the student population at the national level. For this reason alone, videoconferencing is a potential medium of instructional delivery for these two institutions, IGNOU has already incorporated videoconferencing in its delivery system, whereas for NOS the videoconferencing is still in the experimental stage.

### **1.6 Educational television in India**

Educational television has played a major role in the development and strengthening of distance education world over. India recognized this earlier than many other nations - in 1959 when the television was first used in India as an educational tool with the help of Ford Foundation. Its primary objective was to broadcast educational programmes in Delhi and adjoining rural areas. The initial experimentation with the medium continued to serve some 300 schools and less than a hundred rural communities until 1965. Encouraged by the success of this pilot educational television experiment, Indian television was expanded to provide regular transmission from that time onward. The most important development occurred in 1975, with the beginning of project called Satellite Instructional Television Experiment (SITE). This remarkable experiment was the first of its own kind in the history of development communication. The SITE project was a joint effort of a INDO-US Agreement, under which the United States loaned its Application Technology Satellite - 6 (ATS-6) to India for a period of one year. Except for the satellite, all the hardware ground system was the responsibility of the Indian

Space Research Organization (ISRO). The SITE programme was organized in such a way that it would be received simultaneously in 2,400 villages located in six different states of India (Chander and Karnik, 1976). Apart from acquiring the technical competence of developing, testing, and managing satellite based television infrastructure, the major objective of the project was “upgrading and expanding education to suit the requirements of the country, health and nutrition, help in population control, modernizing agriculture, creating a scientific awareness and, in general, contributing to the betterment of life, in particular in rural areas”(Chander & Karnik, 1976, p.24).

SITE had three specific target audiences: out of School adults, school children, and primary school teachers. It was deemed that the presence of a new medium such as television would have an influential role in shaping the attitudes of audience (Kumar, 1995). This year-long experiment helped the researchers and producers learn a great deal about the effects of the programmes on the rural target audience who were exposed to television for the first time. It was found during the project’s evaluation phase that there were significant gains in language development and cognitive skills (Chaudhri, 1986). The SITE had demonstrated the feasibility of satellite communication for dissemination of information and education.

After the success of SITE experience, India launched its own communication satellite series: the Indian Satellite System (INSAT) which started transmitting programmes for Indian rural children and adults. The Central Institute of Educational Technology (CIET) was established to produce these educational television programmes, which were



primarily designed for 'out of school children'. The emphasis on programming for this group of children may be understood in view of the statistics that 60 percent of children in villages drop out by the grade 5, and about 64 percent are those who never go to school (Chaudhri, 1986). Therefore the non-formal education of such children is a matter of prime importance, and the community centres of the villages organize the viewing of educational transmissions. The programmes are not syllabus oriented, their main purpose is general enrichment, upgradation of knowledge, and development of skills. A variety of formats are used to achieve these goals.

The quality of secondary and tertiary level of education in the country is far from satisfactory implying that those who are going to schools and colleges are not getting access to good quality of educational facilities. The main reason for this is that the country cannot respond to the need of ever growing population on a fair basis by a proportionate increase in infrastructure and resources. Reddi (1987) aptly summarizes the situation, which led to the use of television for higher education in 1984. The policy makers had three options before them:

1. to continue investment in formal mainstream education, by developing and strengthening the existing infrastructures.
2. to exploit the new communication technologies in innovative ways to substitute the existing structures, and
3. to combine the use of existing structures and making investment in the new methods of education.

The third option was considered more viable. This led to two major developments; first the rapid growth and strengthening of the open university system in India which sought to employ the new communication technologies for the delivery of education; and secondly the reinforcement of the existing education systems through educational television at a national level. It was realized that the students need a great deal more than what an average classroom provides. In 1984, University Grants Commission (UGC) took a new initiative by launching the 'Countrywide Classroom' project, using the satellite system with the prime objective of enrichment of educational material that is imparted in the classroom. The primary target audience for this transmission is undergraduate college students, especially those located in small towns and rural areas. The approach aims to introduce new findings and disciplinary experts to the students, and to take students on 'virtual' tours of sites and laboratories that they would not otherwise have a chance to see (CEC, 1993).

Initially starting for one hour daily transmission on working days, the daily transmission has now been extended to a total of two hours, 1.00 to 2.00 p.m in the afternoon and again from 4.00 to 5.00 p.m. The first slot is being used for the new telecasts and the second slot is being used for the repeat telecasts. These time slots have been shifted from afternoon to morning and evening, but, unfortunately, prime time slots have never been allocated to Countrywide Classroom (Govindaraju & Bannerji, 1999). A decentralized approach has been taken for the production of these programmes. The nodal agency is Consortium for Educational Communication, with seven Educational Media Research Centres (EMRCs) and 10 Audio Visual Research Centres (AVRCs) producing the

programmes in selected universities. There are usually three type of programmes produced for the countrywide classroom: documentaries, laboratory-based demonstrations, and studio based lectures in science, social science, humanities, engineering and other areas. Since the broadcasts are not curriculum oriented, and moreover there is no common national curriculum, the Countrywide Classroom faces difficulties in having specific objectives for its programmes. This introduces much vagueness in the approach of these programmes (Govindaraju & Bannerji, 1999).

The IGNOU video programmes that are made available to students in their respective study centres are also telecasts on the national network during a half-hour slot each morning. These programmes are specifically curriculum-oriented and include a variety of formats including lectures, discussions, interviews, documentaries, and drama. The requirement of the course and the constraints of the time usually determine the program formats. The NOS programmes are also telecast on the national TV network, primarily on curriculum-oriented topics, and mainly aimed at secondary-level students.

One common problem that educational programming is facing on national network is the allocation of suitable time slots. The transmission time for most educational programmes are very inconvenient to students. For instance, IGNOU programmes on the national network are telecast between 6.30 to 7.00 a.m.. This is a very busy time for families, and most students are too busy, either in getting their children ready for school or travelling to their own workplace and therefore cannot watch these programmes. The same problem is noted in case of 'Countrywide Classroom', which never received a prime-

time slot (Govindraju & Bannerji, 1999). The allocation of time is being dictated by the other priorities of the national channel such as advertising revenues and national programmes, the educational institutions can not do much about it.

However, the educational television scenario in the country is likely to undergo a major change very soon with the launching of a television channel dedicated to education. The channel “Gyan Darshan” (which means vision of knowledge) will be functioning as soon as the uplink facility is commissioned. The Government of India (Ministry of Human Resource Development) has identified IGNOU as the nodal agency for coordination between the various educational institutions which will be telecasting their programmes through Gyan Darshan. The channel will be fully funded by the Government of India. This is a major achievement in the history of educational television in the country as mentioned in the message of Dr. A.W.Khan, Vice Chancellor of IGNOU:

“With the generous support of the Govt. of India, Doordarshan and the Indian Space Research Organization (ISRO), IGNOU has now the privilege of being the nodal agency for Gyan Darshan, the educational channel of Doordarshan which in effect is a cooperative venture involving a host of institutions and organisations. We hope that this initiative will be a big step forward in enriching a learning environment in our country with the applications of modern technologies”.

(Vice Chancellor’s message, Indira Gandhi National Open University, 2000)

This is the present day status of educational television in the country. The nation’s educational programmes operate at different levels, ranging from school television

services to higher level educational programmes for university students. Some projects are focussed on formal education whereas others address non-formal education. Some are curriculum-based TV programmes, such as those produced for IGNOU students, and some are enrichment programmes for college and university students in general. The educational institutions have different objectives, however, all converging with a single broad set of objectives: that is to improve the quality of the existing education system, to equalize the imbalance of access to knowledge, and to provide education for all.

### **1.7 Videoconferencing at IGNOU - Infrastructure and delivery**

A brief description about the IGNOU videoconferencing and delivery system will help us understand the problems involved in the teleteaching.

Videoconferencing at IGNOU is called 'The Training and Development Communication Channel (TDCC)'. This is a multi-point one-way video, two-way audio videoconferencing system. Jointly established by IGNOU and Indian Space Research Organisation (ISRO), the system has been under regular operation since 1993 for IGNOU and other educational institutions/government organisations involved in teaching, counselling, training, and other similar activities such as extended contact programs and academic seminars.

The teaching end consists of a full-fledged video studio with 3-camera set up, two cameras being used to cover resource persons, audience and other resource materials, and a third camera is reserved as a caption scanner to show the graphics, illustrations or text

needed during a session. The adjoining control room provides technical facilities like special effects, tape play back and a computer interface for feeding computer graphics into the instruction. The telephone calls ('talk back') from the learning ends are received in the control room and passed on to the speaker system in the studio. A fax line is also provided in the studio so that messages can be faxed from the receiving centres during the ongoing sessions.

A mobile uplinking facility TRACT (Transportable Remote Area Communications Terminal) is parked outside the studio. The TRACT converts the audio and video signals fed from the studio to the extended C-Band frequencies and transmits them to the satellite. The setup at each of the receiving ends comprises of a dish antenna of 12 feet diameter equipped with extended C-Band LNBC (Low Noise Block Converter). The signal picked up by LNBC passes to a satellite receiver located indoors which in turn feeds to normal domestic TV set at the receiving ends. The participants at the receiving end can see the picture coming from the teaching end. A telephone provided at the receiving end serves the purpose of return audio link from the learning end to the teaching end. For this purpose, there are approximately 26 regional centres and 500 study centres in the country which serve as receiving sites for videoconferencing.

On average, approximately 15 days each month are used for teleteaching (i.e four hours a day for IGNOU students). In addition, there are several other distance education institutions such as National Open School (NOS), the National Counsel of Educational Research & Training (NCERT), the National Institute of Public Cooperation and Child

Development (NIPCCD), all make use of facility located at IGNOU headquarters. A typical teleteaching session at IGNOU lasts at least an hour, during which two to three presentations are made by the teacher lasting approximately 20 minutes each, and followed by some interaction. Sometimes these sessions are recorded so that they can be made available to the students who could not attend a particular videoconferencing session. The sessions include lectures delivered by the experts in the field, so arranging live transmission for them is not always feasible. However, they can be recorded and played back for the courses in successive academic years.

### **1.8 Presentation concerns**

Teleteaching sessions have been observed over a long period of time by research teams (ISRO, 1998), and feedback reports have been received from the students and support staff at the receiving centres on a daily basis. A qualitative study on students' perceptions by the ERT Unit of IGNOU (1998), provided sufficient evidence to argue that the management of the hardware and technology is not the issue, the real challenge comes from the presentation aspect of teleteaching. Interestingly, 25 years ago when the country was experimenting with the SITE, somewhat similar observations were made: that the technology worked smoothly but production of television programmes was flawed (Mody, 1978). These two common experiences point to a lack of importance attributed to the planning phase of major educational projects involving television.

The studies (ISRO, 1998; ERT Unit of IGNOU, 1998), and the author's first-hand experience of working within the IGNOU videoconferencing facility, indicate that teleteaching suffers from the following major concerns:

1. The teacher is on the screen all the time, the teaching component is usually with out any breaks and with out visual support.
2. The teaching approach is unfriendly, tense and formal.
3. The graphic support is minimal, drab and unimaginative.
4. The arrangements at the teaching end are boring and restrict the movements of the teacher.

Interestingly, these teleteaching concerns are not confined to the Indian context but can be noted in many similar distance education institutions, where teleteaching via satellite plays a major role in the delivery of distance education programmes. One such example is the CCTU (The Central Broadcasting and Television University), which has adopted teleteaching as its basic mode of instruction consisting largely of long lectures of the order of 50 minutes, written out on blackboard as would be the case in a conventional classroom. McCormick (1982) noted that although the programmes were pre-recorded before transmission, little use was made of pre-prepared graphics or any other materials. In this blackboard oriented lecture format, the diagrams, and illustrations looked scrappy and their legibility was often very poor. McCormick stressed the need for improvement by more imaginative use of television, using animated graphics of chemical processes, demonstrations of experiments, and the use of location filming. As observed by Hawkrige and Chen (1991), the production values of teleteaching at CCTU have not



changed much over the years. The lack of attention to the presentation aspects of teleteaching has been noted by some scholars (Carl, 1986; Zimmer, 1988) in the north American context also. Moore (1989) has rightly pointed out that general tendency in a teleclass to use a talking head approach is an expensive misuse of technology.

### **1.9 Statement of the problem**

It is the argument of this thesis that concerns and problems of presentation discussed above are the symptoms of a much deeper problem: that, consciously or not, teachers in the teleteaching context tend to replicate classroom lecture methods instinctively. It is ironic that distance education claims to overcome the need for a classroom environment, and yet the distance-based teaching through videoconferencing is so often regarded as an extension of classroom methods and styles (Latchem & Rapley, 1992). In fact, the literature of distance education often refers the satellite-based teleteaching sites as “remote classrooms” (Daniel, 1995). Thus, all efforts are directed towards emulating a classroom instruction situation without the least concern for the fact that the medium of instructional delivery is a technological interface: that is, a TV screen. Teleteaching is not, and never will be, classroom instruction in its true sense. For instance fixation upon the TV monitor can be more stressful for participants than looking at a live presenter. Emery & Schubert (1993) have rightly argued that most videoconferencing fails to bring learners together with one another or with a teacher; thus it presents a new kind of challenge, and should aim to overcome barriers to communication by using its inherent strengths to improve teaching quality.

### **1.9.1 Learner - interface interaction**

In the context of distance education, Moore (1989) identifies three types of interactions, namely: “learner-content interaction”, “learner-instructor interaction” and “learner-learner interaction”. Interestingly, it may be noted that in the mediated learning environment of distance education, a technological support is indispensable for all of these interactions to take place. A learner has to interact with the interface before he /she can interact with the content, instructor or fellow learners. This brings into focus a fourth type of interaction: “learner-interface interaction” (Hillman, Willis, & Gunawardena, 1994). It has been very convincingly argued by Murray (1975), Newcomb (1987), Tarroni (1979), and Zetl (1978) that television is characterised by its unique features, functions and techniques that differentiate it from other media. When used as an interface in teleteaching, these features of television must be exploited to derive the maximum benefit and to minimise any adverse effect of technology such as the stress arising from having to watch a talking head on screen for several minutes without cease.

### **1.9.2 Gaining and maintaining learner’s attention**

There can be no doubt that good attention is a prerequisite for learning. In fact gaining and maintaining learners' attention is crucial to a learning situation, regardless of the medium used for instruction. In Gagné's ‘events of instruction’ (Gagné & Briggs, 1987), each event is expected to evoke a specific response in the learner. The cumulative effect of all the events leads to the ultimate learning. In most teaching situations, all the events of instruction are crucial for learning to take place - but Gagné's first event of instruction

(gaining and maintaining learner's attention) is probably the most vital in teleteaching since learners are only sensing the teacher's presence through a TV screen. This requires that the screen should be able to attract the learner's attention!

### **1.9.3 Teleteaching through videoconferencing : the potential for instruction**

Abbot, Dallat, Livingston, and Robinson (1994) have observed that "the principle of face to face contact highlights the fact that the use of videoconferencing is a means to an end in terms of effective teaching and learning and that it does command a delivery of its own" (p. 91). The authors further suggested that this style of delivery has more in common with TV presentation than live presentation. A teleclass provides better opportunities than classroom teaching to enrich the content by exploiting various sources of information.

The underlying perspective of the current study is that teleteaching is neither classroom teaching nor conventional educational television, but a hybrid form which should probably combine the presentational attributes from which television draws to show video clips, demonstrations, and experiments to best advantage, with good classroom practices such as the appropriate use of body language, nonverbal cues and real-time interactivity among the teacher and students.

Design and technical factors can greatly influence television's educational effectiveness. Researchers who have studied the evaluation use of videoconferencing agree that the impact of design factors on learning must be explored (Roblyer, 1997). Nevertheless, it

appears that to this day there has been very little systematic research into the design and presentation aspects of videoconferencing. This assumption is corroborated by a review of literature on videoconferencing which shows that there has been a general indifference to presentation aspects of videoconferencing. There is a plethora of research available on factors such as the management, delivery, and technology of television; however, only a handful of studies have discussed the presentation aspect of videoconferencing (e.g., Massoumian, 1989; Parker, 1984; Tykwinski & Poulin, 1991). Researchers have focused their work far more upon the technology and administration than on message design and presentation techniques. Of course, the focus of all research tends to be determined by the availability of funding; and the current indifference of videoconferencing researchers to message design and presentation variables may reflect the attitude of the funding decision makers. Whatever the reason, it is a sorry state of affairs. An important question to ask at this point is whether learning should be made a pleasurable experience or a painful one... The mathematician A.N. Whitehead (1929) once said that in learning one goes through three stages; romance, precision, and generalisation. By failing to incorporate the best visual attributes at our disposal, we deprive the learner of the romance stage of the learning experience, which could engage him or her more firmly for the second and third stage of 'precision' and 'generalisation'. Zimmer (1988) contended that "videoconferencing is television and the medium is much of the message" (p. 87), and that people who are exposed to commercial television are used to the production techniques of commercial television. He pointed that "good television is rarely boring, and many of the professionals for whom our programmes are designed have the same discriminating expectations that they have from television" (p.

87). So clearly there are numerous techniques that *could* be used to make learning from videoconferencing a more pleasant and less monotonous experience.

The learner today is keeping pace with the media available in his or her setting, and commercial television is one medium that is accessible to all. Further, with the penetration of TV channels from across the world, the concept of the 'world' as a "global village" (McLuhan, 1964) has been truly realised. Today's learners are exposed to events happening in most other parts of the world. If policy-makers still subscribe to the school of thought that all teaching and learning need not be stimulating or interesting, and at times even has to be dull in order to be effective (Gordon, 1970), they are lacking in vision and in years to come will be seen as a major source of wrong-doing in today's society.

## **CHAPTER 2:**

### **LITERATURE REVIEW**

It has been shown that the literature of educational videoconferencing is sorely lacking in the area of presentation design. The scanty amount that is available is based on the experience and intuitions of organisers and other personnel involved in teleconferencing, and generally take the form of simple guidelines for videoconferencing moderators. These guidelines are not typically based on any concrete research evidence, as becomes explicit in the following sections of the review. In the context of television, Schlater (1970) warned that if a grammar of television was to evolve, it must be based on a more concrete foundation than that of intuitive insights of individuals, regardless of their expertise. This applies to videoconferencing also which has its own idiosyncratic nature.

#### **2.1 Message design in teleteaching: performance factors**

Focusing on the performance aspect of an audioconference, Parker (1984) discussed the need to consider several communication skills or 'teletechniques' that a moderator or teacher must learn in order to conduct an audioconference:

- 1) Humanising: i.e. creating an environment of connectedness (addressing students by their names, for example);

- 2) Participation: enhancing students' participation in the programme (role-playing; question-and-answer strategy, etc.);
- 3) Message style: making presentations more interesting and persuasive by using a variety of expository formats;
- 4) Feedback: gathering feedback regarding the clarity and relevance of information (pausing and asking questions, etc.).

These tele-techniques are also applicable in a videoconference. However, the latter, because of its added visual component, demands more complex and additional techniques. For instance it has been suggested that a natural, relaxed, conversational teaching style can help to make the student more relaxed and involved in the session (Tykwinski & Poulin, 1991). Talking too fast will make the communication difficult to comprehend and will be construed as a sign of nervousness (Massoumian, 1989).

Clothing should be comfortable enough for ease of movement. For instance, solid stark colours in clothing are not appealing on the screen; and small and busy patterns, fine checks or stripes become distracting as they shimmer on camera (Tykwinski & Poulin, 1991). Students and teachers alike feel that the teaching end of the conference should resemble a classroom situation, with the teacher able to move freely so as to make him/herself more comfortable and natural (Sinha, Kishore & Hashmi, 1994). Similarly, it has been recommended that movement breaks the monotony and helps to engage as well as to maintain the interest level of students. But a teacher should be careful not to overdo certain actions, because the TV camera tends to exaggerate mannerisms. Some people struggle constantly with their ties or stroke their hair very frequently, and such actions

can be perceived as signs of nervousness or lack of credibility (Massoumian, 1989; Tykwinski & Poulin, 1991). It is strongly emphasized that a teacher should have frequent eye contact with the students by looking into the camera lens (Abbot, *et al.*, 1995).

Interestingly some suggestions by these authors are *not* in line with the conclusions derived from experimental research. While Abbot *et al.* (1995), and Massoumian (1989) have emphasized that teacher's frequent eye-contact with the telelearners adds to the credibility of the presenter, evidence from empirical television research (Baggaley, Ferguson, & Brooks, 1980; Coldevin, 1981) suggests that too much eye-contact with the students can have a negative influence on their perceptions of the teacher's credibility. In the teleteaching context, one needs to understand and investigate the conditions under which learners' attitudes towards the presenter's integrity, subject mastery, and poise are enhanced (Baggaley *et al.*, 1980; McNabb, 1994).

The effects of such conditions on cognition is an area of critical significance in a mediated environment, since students are in touch with the teacher through the interface of a TV screen. It is also important to realise that a teacher, however good, needs to be transformed into a TV instructor for an effective learning outcome to take place.

" Students confirm what faculty suspect, that they are poor TV performers, that it is boring to watch them on little screen" (Feenberg, 1999, p. 341). Several investigations of the concerns and attitudes of videoconferencing users also indicate that fear of the technology can have a negative impact (Treagust, Waldrip & Horley, 1993), and that teachers' main concerns are their lack of experience with the technology, and self-



consciousness about their performance and presentation (Tykwinski & Poulin, 1991).

These concerns need be addressed for videoconferencing to be fully productive (Bramble & Martin, 1995).

## **2.2 Message design in teleteaching: production factors**

The research literature has generally ignored the significance of television production values in teleteaching. Discussing the lack of production values, Carl (1986) feels that teleteaching is still regarded with suspicion by teachers as a means for the delivery of instruction. Academics tend to regard television as a passive medium, and its production techniques as merely frills to emulate commercial television. A similar line of thinking is being extended to videoconferencing also, and as a result the medium's visual attributes are largely ignored. This tendency clearly does harm to the reputation of videoconferencing as an educational tool, and it could benefit greatly from careful use of commercial television's attention-grabbing techniques. Salomon (1979) pointed out that treating technologies as invariant and discrete entities ignores the number of possible ways in which the media can interact with learners and content, and limits the perception of what can be accomplished by a given technology.

## **2.3 Research evidence from television**

In view of the paucity of research in presentation of videoconferencing or teleteaching, one is tempted to look for this evidence in the literature of mainstream television research. A great deal of work in exploring and investigating television production variables was conducted from the early 1960s to the late '70s, though the pace has slowed

in the years since. One major influence that inspired research in structural features of television, when the medium was still in its infancy, was McLuhan's rhetoric (1964) that more pronounced effects are produced by the technology of a medium than by its content: 'the medium is the message'. Two distinct approaches categorize research dealing in 'within-medium' variables of television. The aesthetic approach, which is exemplified by Zettl's (1973) advocacy of 'contextualistic aesthetics' for television, according to which life and art are inseparable and a television program should be live and artistic, so as to elevate viewers' involvement and appreciation. This approach has been used by scholars and researchers of the visual communication media, who have examined television's elements in terms of the viewers' aesthetic experience. The role of lighting and colour has been studied by theorists such as Arnheim (1974), Millerson (1972), and Zettl (1973). The space or compositional elements such as image size, camera angle, placement on screen, background factors have been addressed by many researchers (Baggaley & Duck, 1976; Coldevin, 1978; Kipper, 1986; Metallinos & Tiemen, 1977; Wurtzel & Dominick, 1972); and the time-motion factor has been investigated by Marks (1974), Schlater (1970), and others.

The second main approach has been based on investigating the effectiveness of television elements in terms of cognitive experience, as measured by learning gains. This emphasis has been placed by educational television researchers, including Anderson (1972), Chu & Schramm (1967), Dwyer (1971), Kanner (1968), and Salomon (1974). In terms of the current study, both the aesthetic and cognitive perspectives are significant.

Before we start seeking evidence for the importance of presentation variables in television, we should establish a clear definition of the terms ‘production variables’ and ‘performer variable’ in the present study. Zettl (1973) proposed that television effects can best be understood by isolating the four fundamental aesthetic elements or variables of television: light, space, time-motion, and sound, which can then be combined depending on the need of the medium. At a theoretical level, production variables can be defined as “different coding elements within a symbol system” (Salomon 1979, p.11). A production variable is manipulated by using a television production technique; thus, operationally speaking, a production variable is in effect a production technique. The concept of ‘production technique’ is not clearly defined in the most commonly cited television production textbooks: e.g., Millerson,1972; Wurtzel & Acker, 1989; Zettl, 1996. So, for the purpose of this study, a television production technique will be described as a specific approach that uses the basic television elements identified by Zettl to produce a desired effect.

Performer variables, as the term suggests are performer-related characteristics. Hawes (1978) describes a ‘performer’ as “any person who appears before cameras or speaks into a microphone, and forms impressions in the minds of the audience” (p.12). For instance, a teacher is validly defined as a performer in the classroom. Performer variables deal with appearance and delivery by the performer, that are either due to him/her or to other mediated effects that have an influence within a particular context. For instance, pace of delivery and diction can each be attributed to the performer alone. On the other hand, a frontal delivery by the performer to the audience/camera, versus a

profile delivery would be an example of a performer variable created or manipulated in association with a production technique.

The current review of literature on television production elements is framed from the specific vantage point of teleteaching. It includes the factors that seem to have a direct bearing on teleteaching and telelearning, at an aesthetic level, influencing attitudes or at the cognitive level of achievement.

### **2.3.1 Background setting and Screen factors**

There seems to be a general agreement on the creative value of the 'background' or 'set' in a programme. The question is whether background elements can influence actual perceptions of the TV presenter: i.e. s/he can be viewed differently in different visual environments. The effect of the background of a televised message on learning has been studied. Ellery (1959) reported no significant differences in the cognitive gains when viewers watched the presenter against a normal classroom setting versus a limbo background. Schlater (1969-70) found neither positive nor negative effects on learning from the juxtaposition of a presenter against a variety of unrelated abstract settings. Similarly Nielson (1979) found no significant differences in learning gains when he tested different backdrops using a five-minute documentary narration presented by a professional news anchor against four different backdrops (red, blue, wooden panel, and a series of slides).

However, the results of some studies which examined the effect of background on presenter enhancement have been encouraging. Baggaley and Duck (1976) investigated the effects of *relevant* keyed background on students' perceptions about the presenter. They used two versions of a 70-second 'news-type' report of an archaeological dig. The two versions were identical in all respects except that in one version the presenter appeared against a plain grey background whereas in the second version the presenter appeared against an archaeological site background (a still photograph). The two versions were shown to two groups of students, each group seeing one version. The subjects were asked to give their impressions of the presenter on semantic differential scales. It was found that the presenter who was viewed against the keyed-in background was rated as significantly more honest, profound, reliable, and fair than *the same presentation* superimposed on a plain grey background.

This finding was later replicated in a study by Coldevin (1978) that used a 90-second news report showing highlights of 1976 Olympic Games. Three versions of the material were produced. In the first version, the presenter was seen against a 'plain' setting; in the second version he was seated against a background shot of a stadium, projected on a rear screen and viewed in an over-the-shoulder placement. In the third version, the same visual was keyed in as a full-screen background. Keeping the same basic composition for the two versions, three different visuals were used representing three sections of the report. The videotape was shown to three randomly selected groups of undergraduate students. Semantic differential scales were used for the assessment of the speaker's performance and overall delivery. The analysis revealed that the both the corner-screen

and full-screen treatments had significant effects on presenter enhancement in comparison to the plain background. In the case of the corner-screen treatment, significant effects were found on two factors (perceived honesty and clarity), whereas the full-screen treatment group rated the presenter significantly higher on all the factors: i.e. credibility, clarity, interest, relaxedness, professionalism, straightforwardness, and strength.

The significant effects of background found in the two studies (Coldevin, 1978, agreeing with Baggaley and Duck, 1976), have direct implications for teleteaching designers. For if the credibility of a teacher is important for students in general, it becomes even more important for distance learners who are not in direct touch with their teacher. Does a relevant and interesting background have an effect on the way learners perceive the presenter and his/her presentation? More importantly, does it have an effect on learning of the topic? Furthermore, the telelecture activity requires that the teacher be seen on the screen for a fairly long period of time.

In a qualitative study by Sinha *et al.* (1994), students' reactions to the setting of the teleteacher were sought. The study observed that students expressed their dislike for plain monotonous backgrounds used during the teleconferencing sessions, and that they preferred either a classroom environment or the use of some appealing pictures or backdrops to add attraction to the otherwise dull setting. The question of whether a teleteaching session should present a plain TV studio, or a simulated, interesting

backdrop relevant to the content can be studied through manipulation of background as a variable.

'Asymmetry of the screen', a concept initially proposed by Zettl (1973) suggests that the left and right side of the screen are perceived differentially by the viewer. This theory proposes that viewers pay more attention to one side of the screen than the other.

Metallinos & Tiemens (1977) tested the differential effect on viewers' perceptions of placement within the television screen, by measuring a) perceived prominence, interest and attractiveness; and b) retention of the visual content. Three versions of a 12-minute newscast tape were prepared. The first version placed all visuals representing news stories on the right side of the screen and the newsreader on the left side. In the second version, the visuals were placed on the left side and the newsreader on the right. A third version randomly placed the sequence of visuals on left or right; and a fourth version reversed the sequence of visuals to the opposite of that in the third version. A Likert-type test was used for testing attitudes. The visual retention test consisted of identifying visuals from the slides that the viewers had seen earlier in the newscast. The results of the study did not yield significant differences between viewing groups in terms of perceived values for attitude variable, but the visual retention data indicated that group 2 (shown the visuals on the left), and group 3 (shown randomly oriented visuals from left to right) scored significantly higher than group 1 (visuals on the right) and group 4 (randomly oriented visuals from right to left). The researchers concluded that visual retention data support the theory of asymmetry in favour of left-hand placement of visuals in news-oriented programmes.

The apparent preference of the viewers for left-side placement received further support from Metallinos (1984) in a study conducted on children. Is this preference for the left side of screen universal, or could a different cultural setting such as India generate different results? The results of such studies, if replicated in other cultural contexts, could have an important bearing on the placement of the teacher and other visual aids in the teleteaching presentation.

It has been explained that the basic teleteaching situation, as at IGNOU, involves a presenter, and a caption scanner to show graphics, text or illustrations. While composing a medium-wide shot of the caption scanner and presenter, the scanner is either seen on the right or the left-hand side of the presenter. This applies to blackboard and teacher relationship as well, as appropriate. The asymmetry of the visual field view (Metallinos & Tiemens, 1977) could provide an interesting testing ground in terms of the effects of framing the teacher and the blackboard, or the teacher and caption scanner. It might also help us understand if there is a better way of mounting teleteaching demonstrations, in terms of left/right screen or frame placement. This assumption also gives rise to questions about the seating arrangements in the viewing rooms. One would not expect that, in large classrooms, everyone would receive the same viewing experience, for some students are towards the right of the screen and others are nearer to the left side. Do these factors affect or interact in terms of learning from the screen?



Screen size is a further interesting aspect, in terms of whether television can evoke 'presence' or increase participatory experience on the learner's part by the use of larger-sized screens. A recent study of this by Lombard, Reich, Grabe, Bracken, and Ditton (2000) is extremely pertinent to the teleteaching context. In this study, two groups watched stimuli prepared from a variety of exciting, fast and adventurous sequences. After watching each sequence, the viewers were self-assessed on a test for valence, arousal, and dominance; and their physiological arousal was also measured using a computer-based recording of electrodermal activity. The study concluded that screen size played a critical role in generating the responses that constitute 'presence' or participatory experience. The viewers of the large screen did not report any greater enjoyment of the stimulus than the viewers watching the same stimulus on the small screen.

Although, this study dealt with action-oriented visuals, the notion that screen size may contribute to a feeling of 'presence' provides an interesting perspective for teleteaching. It has been suggested that the capacity for mediated but almost live contact through the screen is one of the key reasons that satellite-based courses are as effective as face-to-face instruction (Boverie, Murrell, Lowe, Zittle, & Gunawardena, 1997). It is also said that learning is facilitated by the 'social presence' of the teacher which they describe as "the degree to which the on-screen instructor is seen as a real person, with a genuine interest in the distance learner's progress" (Boverie *et al.*, p.2). Thus, seeing a teacher during a telelecture on a big screen helps the telelearners to develop a sense of immediacy or closeness with the on-screen teacher in space and time, and gives them a

feeling of genuine presence rather than of mere ‘telepresence’. This notion renders the variable of screen size well worth exploring in the teleteaching environment.

### **2.3.2 Camera factors (shot, angle, movement, lens) and editing**

The use of wide-angle and long lenses as a deviation from the more normal focal lengths of the television camera lens, is quite common in film cinematography as a means to achieve particular desired aesthetic effects. The ways in which focal length is used in educational television was examined by Acker (1983), who experimented with various focal lengths (using a wide-angle camera lens in one condition, and a long lens in another, all other factors being kept constant), and established their effects on perceptual judgements by the subjects. The latter were asked to judge the velocity and distance of two trains travelling on the screen. The results suggested that the focal length of a camera lens affects perceived velocity and distance in televised events. Only a small number of subjects were sophisticated enough to notice how production technique affected their perception of the images. This finding cautions us that such techniques should be used with special care when the goals of mediated experience are education and not entertainment alone.

‘Camera movement’ techniques such as trucking or dollying through a scene are generally associated with the entertainment media. Nonetheless, researchers have speculated that a moving camera technique that takes viewer ‘into the scene’ (Zettl, 1978) can influence the viewer’s comprehension and understanding of depth and formal dimension. Kipper (1986) focused his study on camera movement in order to address the

question of whether the moving television camera provides the viewer with more information about the physical properties of objects than is suggested by fixed images. He also investigated whether viewers receive more information about the 'three-dimensional layout' of the scene from a moving-camera presentation than from fixed-camera presentations. Viewers were shown colour videotapes of the cluttered bedroom of a child. It was made sure that camera angles in the two versions remained identical throughout. After viewing the scene, subjects were tested for their recall of objects and comprehension of the three-dimensional reality of the scene. The study indicated that, on measures of both recall and comprehension, viewers in the moving-camera condition achieved significantly higher scores than the fixed-camera condition viewers. Two implications seem to follow from this study. Firstly, a moving camera may provide viewer with more information about the physical forms of objects and the three-dimensional layout of the scene. Second, the recall scores of the two treatment groups, as well as differences in their ability to reconstruct the scene, suggested that the groups were not receiving the same kind of information. Kipper recommends that camera movement can be used as a powerful technique for structuring the experience of viewers in situations where the task requires them to learn about the physical nature of the scene or to perceive its three-dimensional depth. In the types of teleteaching that feature demonstrations and experiments, camera movement 'into the scene' may have specific implications for the efficient presentation of the details of objects and procedures.

Whether a shot taken from a 'subjective or objective' camera angle is also an important pedagogic consideration. This was shown in a study by Grant and Merrill (1963) into the

effects of subjective versus objective camera angle using a programme on nursing skills. One group of students watched a programme prepared using shots taken from an objective angle (i.e. the viewing angle of the demonstrator), and the other group watched a programme based on shots taken from a more subjective angle (i.e. from the viewing angle of the students sitting opposite the demonstrator). The study revealed that students who watched the programme from the subjective angle performed significantly better on 'recognition learning' than the group that watched the programme from the objective angle. Sometimes, when recording in a laboratory setting or operation theatres, the producer may be handicapped in camera placement due to limitation of space or some other factors. But where there are no such limiting factors, a knowledge of objective versus subjective camera effects could have great value for task and skill-oriented teaching and learning activities.

Much has been written about the aesthetic effects of 'low versus high angle' shots in every visual medium. The effects of camera height are apparently based on real life experiences, whereby, when one has to look up to another person, the latter has the advantage of being elevated, both physically and figuratively. Zettl (1973) describes "above and below eye level shooting" as evoking a strong aesthetic reaction in the viewer, who "readily assumes the camera's viewpoint and identifies with its superior above eye level position and its inferior below eye level position" (p.227). How does this effect affect perceptions of a television presenter? Tiemens' (1970) study failed to demonstrate any relationship between camera angle and 'communicative ability' or 'knowledgeability' of the newscaster on the screen; whereas Mandel and Shaw (1973)

found just the reverse - that the low angle shot increased the perceived potency and activity of a speaker. McCain, Chilberg, & Wakshlag (1977) conducted two studies in this connection: firstly, one that examined the effects of high and low camera angles on the televised speaker's source credibility; and a second that examined the effect of sequences of camera-angle treatments on source credibility as well as on mediated interpersonal attraction. These researchers found evidence for increased ratings of the perceived credibility of the newscaster and mediated interpersonal task attractiveness when the primary shot (appearing for most of the time) was of a higher angle than the referent shot (appearing the rest of the time). They concluded that a low angle shot, if used sparingly as a referent, may increase a speaker's credibility and attractiveness. However, the application of such findings in practical settings would require far more evidence for them to be generalisable.

Editing techniques have also been shown to have effects in some studies. Salomon and Cohen (1977) studied differential learning/ knowledge acquisition as a function of exposure to the same story with varying emphases in shot and editing technique.

Researchers chose five versions of the same story, each version differing in its emphasis on what the researchers called 'coding elements'. One version predominantly employed 'zoom-ins and zoom-outs' whereas the other version consisted of close-ups and long shots. A third version was based on 'fragmented spaces' (prepared by using shots from different point of views), and a fourth made use of 'logical gaps' (prepared by leaving brief gaps in the continuity of the plot). A fifth condition, containing no unique emphasis, was used as a control. Different patterns of correlation between the pre-test

and post-tests of groups across the five versions of the story indicated that the knowledge acquired from each version was different. For example, the children who watched the 'logical gaps' version showed a good understanding of the logical structure and continuity of the story, and their acquisition of specific knowledge correlated highly with their visual memory of the subjects. The 'fragmented space' treatment, on the other hand, called on skills for relating details to the conceptual whole, and for closing visual gaps. It was also observed that children who viewed the 'close-up/long shot' version learned more about the relations between parts and wholes than those who saw the zoom version.

### **2. 3. 3 Redundancy of channels/audio-visual reinforcement factors**

It has been generally agreed that television has a great instructional potential due to the quantity of symbol systems or channels available to the medium. What effects do these symbol systems have on learning? Does their simultaneous employment in a learning situation have an advantage or disadvantage over the information presented by a single channel? These are some of the questions that have been raised by media scholars and researchers in this area. Two distinct emphases are apparent in research dealing with visual reinforcement. One group of studies examines the nature of graphics, whether they be simple captions or animated ones, and whether superimposed or appearing at the bottom of the screen. The other cluster studies the visual redundancy of video clips as it arises in the presentation of moving pictures that are related or unrelated to the context.

Research into the effects of televised graphics has dealt mainly with TV news-type situations. Schwarzwald (1960) found that a presentation in which a newscaster was accompanied by captions had a significantly greater impact on recall than one in which the newsreader was seen in isolation. In a Swedish study, Findahl and Hoijer (1976) found that superimposed captions of keywords significantly improved recall of news items. Coldevin (1975) found that graphics that are superimposed as reinforcers of programme content produce better retention and recall than no-graphic versions of the same newscast. Bernard and Coldevin's (1985) study was only partially consistent with the previous research. These researchers investigated the effects of recapitulation in learning from television news, using 'oral recaps', 'oral plus caption recap' and 'no recap' treatments. They found that recapitulation in general increased the retention of the news stories to a greater extent than a 'no recap' presentation, but that it did not produce any significant effect on retention of the details of individual news items. Moreover, no differences were observed between 'oral recaps' and 'oral plus graphic recaps'. Since no significant differences were found, the researchers concluded in favour of Nugent's (1982) argument that oral information dominates formal variables (as represented by graphic recaps) in terms of effects on learning.

Graphics and illustrations are clearly of great interest in teleteaching. However, despite their obvious significance as information carriers, they have not often been used effectively in teleteaching (Sinha *et al.*, 1994; Massoumian, 1989). Therefore, studies carried out in learning from television news should be replicated, adapting their design to the specific needs of the teleteaching environment. It is generally acknowledged that

video footage can enhance the understanding of content in situations where a learner needs a visual account of the content. As with graphics research, the studies conducted on visual redundancy have also concentrated on television news situations that rely on visuals to provide the context for the stories. Television news research has consistently shown the informational superiority of items that are enriched with pictorial material, by comparison with simple talking head presentations (Edwardson, Grooms & Proadlove, 1981; Gunter, 1979). In general the educational media literature concludes that “effects of television visuals on the uptake of information are important for TV practice and for the design of educational A-V material” (Berry, 1983, p. 171). It has been proposed that redundant graphics in the programme provide conceptual “pegging” that helps in retention of information and recall to construct events at a later time (Edwardson, Kent, & McConnel, 1985).

There seems to be a general agreement on this general issue. More hotly disputed is the way that visuals are used: whether they should carry redundant information, or additional information, and how their coding affects learning. Gunter (1980) found slightly poorer overall learning from picture-accompanied news stories than from stories presented by a newscaster in isolation. He suggested that the precise influence of visuals on televised learning depends upon the task requirement: i.e. whether simple recall, or comprehension, or a more complex kind of learning. Drew and Grimes (1987) examined the different effects of high and low visual redundancy levels. In the high-redundancy condition all news stories contained redundant audio and video; in the low-redundancy condition the video did not match the audio in any of the stories. The researchers



reported reversed effects of redundancy levels on the audio and visual recalls. The audio recall and understanding was higher in the higher-redundancy condition, whereas visual recall and understanding was higher in the low-redundancy condition. In explaining the high auditory recall for their high visual redundancy treatment, the researchers suggested that the video might be helping to focus attention on the auditory information since the two were complementary. Son, Reese, and Davie (1987) experimented with two techniques of visual message reinforcement: visual-verbal redundancy and visual recapitulation. Their experimental groups were assigned to four experimental conditions: 1) redundant pictures and audio with recaps; 2) redundant pictures and words without recaps; 3) non-redundant pictures and words with recaps; and 4) non-redundant pictures and words without recaps. Their results showed a significant increase in news recall owing to redundancy, but the same effect was not observed on understanding of the stories. This study supports similar findings by Drew and Grime (1987).

Pezdek and Stevens (1984) studied a *Sesame Street* programme, a deviation from the news settings predominant in most studies in this genre. These researchers examined the relationship between children's processing of information from audio and video channels of television. The study used the audio/video match and mismatch strategy for two experimental conditions, and audio-alone and video-alone treatments for a further two conditions. It was found that in the audio/video mismatch condition, memory for audio information was reduced more than memory of video information, though comprehension of audio information was not significantly different from the audio-only and audio/video match condition. The researchers concluded that in regular television programming the

video channel does not interfere with audio information, but that video materials are more predominant and more memorable.

On the basis of the studies conducted in the concerned area, it can be suggested that redundancy of channels does not interfere with learning in general. A combined audio-visual approach may serve as a better pedagogic strategy (Kozma, 1991).

In teleteaching, situations often require visual support by the use of previously recorded video footage or film to clarify and enrich the content delivered by the talking head. Video clips or films can be used to show events, historical and geographical sites, science demonstrations and other similar experiences. Studies of visual reinforcement in settings other than news may offer interesting and valuable insights to teleteaching designers.

#### **2. 3. 4 Use of simple versus complex special effects**

Many educational programmes employ special effects, animations, exciting graphics and illustrations that may be having more than a simple redundancy effect on viewers. When several sophisticated production values are added to a programme, their effect can probably be best understood by studying them together rather than as isolated techniques (Morris, 1984). Several studies have taken this approach in attempting to study the combined effects of a number of production techniques on broad measures of learning gain, and increase in attention and interest in stimuli.

To investigate whether students pay more attention to a complex and dynamic video than to simple video presentation in a learning situation, Mitchell (1978) analyzed the viewing behaviour of students as a function of attention on a moment-by-moment basis. Ten instructional concepts were presented through three versions of a video programme. All versions contained the same audio track but different video inputs. A version containing a video presentation only was described as 'simple'. Two other versions were 'complex' in that one of them included film footage and slides added to the presentation, and the other contained graphics. Attention was found to be higher for the complex version of the video programme.

Morris (1984) designed two different versions of a video lecture, one being a straight classroom presentation, and the other an 'innovative' version prepared from the same original tape but by modifying it in two ways: 1) by replacing all the chalkboard portions with the video animations using white characters on a blue background ; and 2) by presenting conclusions at the end of the lecture to demonstrate the relevance of the presentation in the first part of the lecture. The results showed that overall performance of the two groups of students watching different versions was not significantly different, but on conceptual questions involving both immediate and delayed recall, the experimental group watching the 'innovative' version performed better than the control group. Silbergleid (1992) investigated the effects of different levels of visual production technique on undergraduate students' comprehension and liking for a programme. Three versions of a videotape were prepared. The first version, called 'basic', consisted of simple shots (cuts using single-source editing), on camera graphics, and computer-

generated simple graphics. The second version, called 'advanced', included the techniques of the first version plus other methods including dissolves and fades. The third version, called 'extravagant', utilized digital video effects (using multi-source editing). The length and audio of each version was the same. All groups were tested immediately after viewing the video. Interestingly, the results of the study did not show any significant difference either in terms of comprehension or liking among the three groups. The researcher speculated that the study was impeded by its use of volunteered communications students for whom the topic of the presentation was not a part of their curriculum, and that a lack of interest could therefore account for the lack of significant differences in the treatment groups' performance. Silbergleid (1992) suggested that since there is no overall positive or negative effect of complex production techniques, producers should use these techniques where they find them logistically and economically appropriate.

On the basis of this review it can be concluded that many production variables can have important implications for teleteaching. However it can also be noted that much of the major research in this field, being conducted in the 1960s or '70s, may well be outdated, and that similar studies in the '80s and '90s have been relatively isolated. This fact alone limits the value of their results in the present-day context, for television has since undergone major developments at all levels. The last decade particularly has seen unprecedented growth in the technology of all communication technologies, television included. These older types of media research need to be revalidated before confident conclusions can be drawn as to the impact of production variables in modern teleteaching

contexts. The previous research can at best offer suggestions about the types of production technique that may be influencing students' learning in these situations.

Besides, many previous studies have distinct limitations that obstruct their direct applicability in the design of videoconferencing practices. Firstly, the nature of the materials used in most of the studies was not always purely educational, for a majority of the studies were focused on television news, on short public awareness messages, or on brief segments of instruction that were of a more general nature. By contrast, videoconferencing in higher education usually deals with content involving higher-order learning, and an information overload is often justified by economies of scale. This is not to say that regular educational television does not deal with higher-order learning, but that the pressures of information overload are likely to be less in that medium since television is a longer-standing and better understood medium and its limitations are known and accepted (Bates, 1980). Secondly, the length of the video materials and amount of information presented are likely to have strong effects on learning. In the teleteaching context, the demands made by a complete unit of instruction on learners' understanding and recall are probably more complex than those of short televised news items. Thirdly, a number of variables that could possibly influence learning have been studied only as to their effects on audience attitudes.

The scarcity of research on presentation aspects in the literature of videoconferencing, and the relevance of work done in television, have indicated that we should look to general television research for useful guidelines. However, this evidence cannot be

blindly used in teleteaching in view of the limitations discussed in this chapter. It is therefore concluded that the production variables of teleteaching need to be systematically explored in their own right, so that we can identify their own grammar.

#### **2.4 Implications for the current study**

From the literature review of the previous section, many production variables have emerged as being significant in terms of their effects on learning and attitudes. A systematic investigation of all of these variables is likely to have many practical implications for the design of effective teleteaching.

From the wide range of television production techniques and variables, a few specific ones will be selected for investigation in the current study, as being likely to have more practical significance in teleteaching situations than others. Since Indian teleteaching is a lecture-based activity, its presentation elements must be investigated within the parameters prescribed by the typical lecture-style format. With this goal, the current study aimed to investigate the visual reinforcement of the lecture by using specific visual production variables.

In the earlier discussion of Indian teleteaching at IGNOU, it was pointed out that the usual experience with telelectures is that the graphics are poorly used, the teaching environment is boring, and there is not much visual support for the presentation. In view of such concerns, and in view of the relative ease with which one can produce visual

reinforcement for a telelesson without building in too many unnecessary frills, the following variables were chosen for empirical investigation:

- 1) *simple and animated graphics;*
- 2) *video clips; and*
- 3) *chromakeyed background.*

#### **2.4.1 Theoretical perspective**

The present study has two theoretical underpinnings. One is multiple-channel theory recommending redundancy of channels; and the other is attribution theory considered in terms of mediated experience.

Dwyer (1978) has pointed out that in multiple-channel communication, redundancy or repetition of the message content is the key factor in improving the quality of communication. Hartman (1961) has succinctly summarised the proposed advantage of a multiple communication source:

“If one stimulus complex is to be distinguished from another, the subject may use any of a number of cues or stimuli in which the complexes differ to make discrimination between them, although a single cue is obviously sufficient. Increasing the number of cues increases the likelihood of a single subject’s making the correct discrimination over a period of time , and of a higher percentage of subjects making the discrimination simultaneously. The more handles there are , the easier it is to find one particularly suited to a given individual” (p. 28 – 29).

It is assumed that the talking head approach of a lecture reinforced by other visual elements will enhance the instructional value of the lecture.

The manner in which enhancements of presentation are perceived by the viewers, can be considered in terms of attribution theory. The impact of presentation and performance factors in the educational media have been explained in terms of attribution theory by Baggaley (1980). This media researcher discussed the perspective that Heider (1958) and Kelley (1967) had developed to explain the attribution of meaning by individuals to the persons and events they experience. He extended their viewpoint to explain the ways in which students react to educational media. The effects of presentation and performance are seen as critical to this process, and to the perception and interpretation of educational material. These effects become part of the 'variable manifold of mediating events' described by Heider (1958). In the experimental work that Baggaley reported, the strongest and most significant variable affecting reactions to educational messages was identified as being visual reinforcement, as provided by cutaway and background shots. For example:

“Highly consistent effects are generated by (shots illustrating) the apparent reactions of other persons to (the presenter). Both factors are predicted by attribution theory, and each of them may interact with other factors to produce a cumulative effect detrimental to the presentation’s impact. Producers should pay close attention to this possibility in the direction of performers and in their usage of, for instance, visual cutaway shots.” (Baggaley *et al.*, 1980, p. 168).



## 2.5 Hypotheses of the current study

The study aims to test the following two main hypotheses.

- 1) Students watching a telelecture which is visually reinforced either by *inserted video graphics, video clips, or chromakeyed background* will exhibit higher levels of achievement and more positive attitudes towards the presenter and presentation than students watching the telelecture which does not have its content visually reinforced in this way.
  
- 2) Students watching a telelecture which is visually reinforced by combined use of *inserted video graphics and video clips* will exhibit higher levels of achievement and more positive attitudes towards the presenter and presentation than students watching the telelecture which does not have its content visually reinforced in this way.

## **CHAPTER 3:**

### **METHOD**

Three aspects of the experimental design are presented: the null hypothesis; the independent variables; the dependent variables; and the design scheme.

#### **3.1 Statement of the null hypothesis**

There is no difference in the achievement and attitudes of students watching a telelecture which is visually reinforced by certain production techniques (i.e. insertion of graphics, video clips, and keyed-in background), from those students who are watching a telelecture that is not reinforced by these production techniques.

##### **3.1.1 Independent variable**

Visual reinforcement of content through the use of following production techniques :  
*inserted graphics; inserted video clips; and chromakeyed-in background*

##### **3.1.2 Dependent variables**

- 1) content recall, comprehension; and
- 2) attitude towards assessment of the presenter and presentation.

### 3.1.3 Design scheme

The experimental design was a completely randomized single-factor post-test design, which can be represented schematically as follows:

<b>control group:</b>	R	---	O1
<b>experimental groups:</b>	R	X1	O2
	R	X2	O3
	R	X3	O4
	R	X4	O5

(in which R denotes randomization of participants; X represents experimental treatment; and O indicates observation).

There were several reasons for choosing a post-test only design. In an open learning or distance education situation, regular classes are not held, and in most programmes, attending the PCP (personal contact programmes) is only mandatory for students. Thus, if a pretest were included in the design and the study were conducted on different days, sample mortality (Campbell & Stanley, 1963) would have become a point of concern. On the other hand, if the pretest and posttest were held on the same day, the maturation factor would have become a threat to internal validity. Organising the activity on a single occasion was likely to give greater control over these factors. In order to eliminate any initial biases between the groups, a complete randomization of the sample was conducted. The study's schedule of testing is represented in Table 1.

**Table 1. Types of visual reinforcement in the experimental and control conditions.**

		<b>TYPE OF VISUAL REINFORCEMENT</b>			
		<b>Simple lecture</b>	<b>Graphics</b>	<b>Video clips</b>	<b>Chromakeyed-in background</b>
<b>control group</b>		✓			
<b>experimental groups</b>	1)		✓		
	2)			✓	
	3)				✓
	4)		✓	✓	✓

Following aspects of the experimental method are discussed: the population and sample used in the study, the institution which sample belonged to; the experimental materials; the selection of the presenter; production of the lesson, instruments and the procedures.

### **3.2 Population and Sample**

Out of the two major distance education student populations, IGNOU and NOS, it was decided that the sample for the study would be drawn from NOS population, for the following reasons.

- 1) Availability of large sample. The experiment requires a large number of conditions.

It was planned that each group should have at least 25 subjects. Thus, a total sample

of 125 subjects was required, all associated with a particular study centre or accredited centre. At any particular point of time, at either IGNOU or any other distance education institution, it was not possible to create such a large sample comprising students enrolled for the same course of study and attending the same study centre, unless specially arranged. In the case of NOS, however, it was observed during prior visits that the number of students attending the Personal Contact Program (PCP) at any one study centre is between 300 to 400 on an average day. This number further increases as examination time approaches. Thus NOS students represented an ideal sample in terms of size.

- 2) Homogenous sample. The students of NOS comprise a fairly uniform sample, unlike those of other distance education institutions where the age differences between them are often large. In general, students' ages range from 16-23 years. NOS has 30 study centres in Delhi, and students living within a vicinity of 10 kilometers are registered at a local centre. By selecting the subjects from one of these centres, a relatively homogenous socio-demographic was created.
- 3) Seating Arrangements. It was necessary to have a large area in which the students could wait for the study to begin; also a classroom in which each of the treatment conditions could be administered; and a large adjacent room where students could write a post-test. The PCP (Personal Contact Programme) sessions are held in the Schools with the large number of classrooms required. Using these facilities, it was easy to implement the experiment without incoming subject groups having a chance to talk to outgoing groups (This kind of facility is not available at IGNOU study centres, which usually limited number of rooms available at a time.).

4) Exposure to teleconferencing. At IGNOU, learners are well exposed to teleconferencing, and may thus have already formed opinions and perceptions about it. Such perceptions could have influenced the experimental outcome. At NOS, the students' exposure to teleconferencing is limited to a few isolated occasions, as the medium is still in its experimental phase. This was also considered a point in favour of selecting a NOS population.

### **3.2.1 Profile of the National Open School (NOS)**

To have a better understanding of the population from which the sample was drawn, it is imperative to give a brief profile of the institution. The NOS was set up in 1989 by the Government of India's Ministry of Human Resource Development, as an autonomous institution primarily for those who, for one reason or another, could not continue their studies in the formal school system. It has attracted a large number of students from all over the country in its Foundation, Secondary and Senior Secondary programmes (Menon, 1998). The number of students enrolled in these programmes in the year 1999 has reached 3, 00, 000. In addition, some enrichment and professional skills development courses have also been introduced this year. The Foundation course is a non-certificate course. It helps those students who have completed schooling only up to grade V, to prepare for the Secondary Programmes. The students seeking admission to the Secondary Programme are those who have quit school after grade VIII. The eligibility condition for entrance to the Senior Secondary programme is a pass of the class X examination, either from a formal system or from NOS. The School attempts to

provide education for its students at their place of residence or work, with a flexibility of time, place and choice of subjects to suit their convenience and interest.

A wide range of subjects, both academic and vocational are available to choose from and in any combination. For instance, in a typical Indian School, a student opting for Chemistry cannot choose, History and Accountancy in combination with it, whereas a NOS student has total flexibility in terms of choice of combined subjects. The mission of NOS is universalization of education; and a special concern is the education of girls and women, handicapped and other disadvantaged groups. For this purpose, fees are also charged at a nominal rate only, and further concessions are made for the disadvantaged classes of society. The fees include the cost of learning materials and Personal Contact Programmes (PCPs). A student has 5 years to complete the secondary course, during which he/she gets nine chances to write the examination. A student also has the option to do one course or any number of courses at a time. The examinations are held twice a year. The medium of instruction is Hindi or English.

Discussions with the authorities of NOS lead the writer to believe that there are three common types of NOS student:

- 1) those who discontinued school after failing several attempts to pass in the conventional system where the student has to pass all the subjects in one go. Such students join NOS because of its flexible scheme of subject choice and examination, which allows a student to clear as many subjects as he/she wants in one attempt;

- 2) those who quit formal Schooling at some point, either for lack of interest/ motivation, or financial reasons, and who now want to resume studies through non-formal system; and
- 3) those who took up a job after class VIII, and came back to school through a non-formal system for upgrading their qualifications and better promotion avenues.

The NOS offers programmes through distance education modes comprising the following elements:

- 1) specially designed and written self-instructional learning materials as the primary mode of instruction; and
- 2) audio and video programmes as a supplementary component to printed materials (these have been introduced recently). Students can listen or view the programmes at their study centres. Now teleconferencing is also being included in the media support on an experimental basis. The radio and television programmes will soon be broadcast through the new educational channel “Gyan Darshan.”

### **3.2.2 Personal Contact Programs (PCPs)**

Personal Contact Programs (PCPs) are a crucial component of the student support system. Under PCPs, tutorials are held and counseling is given at recognised schools and institutions selected by NOS. These contact classes are not intended for covering the curriculum. The teachers are there to help and guide students with regard to their difficulties. Approximately 30 contact sessions are organised per subject in an academic



year. The contact sessions are not mandatory but are attended by a majority of the students, since students find them helpful and the timings (arranged on Saturdays, Sundays and other holidays) suit them. For courses which involve a practical component, arrangements are made for students to conduct practical in the laboratories of accredited institutions. Students can check their progress during the course of study by submitting Tutor Marked Assignments (TMAs). The teachers correct these assignments and provide feedback. However, it is not mandatory for students to do these assignments. The PCPs are large meeting grounds for students who share their concerns and interact with each other.

### **3.2.3 Accredited institutions (AIs) or study centres**

The PCPs are held at Accredited Institutions or study centres. The NOS has designated certain Schools in each town to serve as its Accredited Institutions. These usually operate during weekends and holidays for NOS students, whereas during the weekdays they function as any other school of formal education. The metropolitan areas have many study centres, while the smaller towns usually have only one. The number of students enrolled at or associated with a typical study centre/ Accredited Institution varies between 400 to 500 students. Students have to choose a study centre depending on his/ her convenience at the time of filling in the application for admission to NOS.

The study centre plays a very significant role throughout the period that a student is enrolled. It caters not only to academic needs, by tutorial help and counseling, but also performs most of the administrative functions such as enrolling the students, providing

them the learning materials, conducting contact programs, keeping them informed of their examination schedules, and conducting examinations. The Accredited Institutions which are approximately 800 in number are paid by NOS to provide its students with this service. Though some accredited institutions are more responsive to the needs of students than the others, it appears from student feedback and the experience of NOS staff members that the Accredited institutions are rendering a good service to distance learners.

#### **3.2.4 Selection of Accredited Institution or study centre**

The following factors influenced the selection of the study centre for conducting the experiment:

- a) Noise level. Locations with the least noise pollution were selected.
- b) Room conditions. Only spacious, bright, airy and properly maintained rooms were considered.
- c) Electricity. Delhi being a city where power failure is not uncommon, it was ensured that in case of power failure the institution would have an alternative power supply.
- d) Enthusiasm. In initial meetings with academic and non-academic staff of the institutions, it was clear that some were not so enthusiastic about the experiment as others. In fact they had many grievances about NOS and thought that the researcher was there to listen to their problems. Some institutions had practices to hide, hence were not keen to participate in the study.

- e) Gender. We concentrated upon institutions which had a roughly equal proportion ratio of boys and girls as students.

Initially five accredited institutions or study centres were identified which fitted the above criteria. Some of the Accredited Institutions are located in areas where more affluent people live, whereas others are situated in colonies which are inhabited by rather low-income families. It was decided to choose an accredited institution situated in an area representing a medium-income group. After talking to the staff members of the institutions about their yearly schedule of PCPs, and the practices used to distribute course materials, the researcher zeroed down on the accredited institutions of the Senior Secondary School level in Shrinivaspuri area in Delhi. It was observed during the preliminary visits that the teaching faculty of this School, who are managing the PCPs as well as teaching, are quite cooperative, and understood that they should not interfere in the researcher's plans. The teachers' cooperation and help was crucial for the systematic implementation of the experiment.

### **3.2.5 Sample**

PCPs are held for three levels of academic programme: that is, foundation level, secondary level and senior secondary level. The foundation course, being a non-certificate course, does not have a high enrollment, and those who attend the classes are not very regular. The maximum number of students registered as well as regularly attending PCPs is FROM class X, leading to secondary school certificate. Usually 300 students of class X attend the PCP sessions for different subjects at a given time at one

centre. The number of class XII or senior secondary level students enrolled at a centre is between 100 to 150, of which 50 to 70 students turn up for the PCPs. The class X or secondary level students seemed to be the most appropriate sample for the purpose of this study.

### **3.3 Materials**

For a number of reasons, Economics was selected as the subject discipline for the study's materials. It was believed that this subject would permit the delivery of a simple lecture in which various videoconferencing production techniques could be incorporated. After talking to subject experts, it was planned that the lesson selected for the experiment should not be complex in nature, but simple enough for non-specialists to understand, as well as interesting for students of economics. However, the subjects should not have prior knowledge of the material. The topic 'The Concept and the Law of Demand' (Appendix I, II, III, and IV) was selected from the class XII textbook for the course of Economics of NOS (1996), so as to eliminate the chances of the class X students' being familiar with it. The selection of lesson from two levels above the standard of the sample groups also helped in making the lesson slightly difficult in nature.

It was made sure before working on the lesson that it had not been covered during the previous three months in popular newspapers, magazines, educational radio or television programmes. Since the penetration of the Internet is not yet felt in the average Indian home, this was not a matter of concern. Despite these precautions, a complete randomization of the sample was planned to cater for the eventuality of some chance

exposure of the content. The researcher made sure, while talking to the teachers in advance, that the ratio of Economics and Non-Economics students was almost equal in the study centre.

The experiment was conducted on January 8, 1998. By this time, the newly admitted students have settled down in their routine and reading materials have been distributed to them. The lesson was prepared with the help of an NOS teacher. Though the lecture was fully scripted, a professional scriptwriter was not used for fear that the lesson might lose its feel of a lecture and become an educational video programme. The format was of an expository lecture, a generally used format in teleclasses. Many expository examples and non-examples were incorporated, since some instructional designers (for example, Romiszowski, 1981) claim that conceptual information can best be taught and learned by explaining concepts through examples and non-examples, and also by conducting tests and practice using different examples, non-examples and analogies.

Most of these students have opted for Hindi as a medium of instruction. They may have taken English as a subject but not as a medium of instruction. This implied that materials and tests should be prepared in Hindi for easy comprehension by all. All students used Hindi for their assignments and written examinations. If the materials had been produced in English, the language factor could have become a confounding variable, since the many students not well versed in English would have faced difficulty in understanding the lecture. However, many technical terms were mentioned in English, since teachers and even text books frequently use English technical terms which are simpler than the

corresponding Hindi terms. The subject matter experts were asked to verify that the content and language of the lesson were a good test of technical as well as non-technical knowledge of the subject. This ensured the seriousness and easy understanding of the lesson. These experts were also asked to identify the kind of visual inputs that should be incorporated in the lesson.

It was decided that the duration of the lesson would be kept between 17 and 20 minutes. For the lecture to be shorter than this might defeat the purpose of the experiment, which implies that, in practice, videoconferencing is predominantly a long lecture which can be stressful at times. When finally delivered by the presenter, the duration of the lesson was 17 minutes and 40 seconds. The scripted lesson was given to three students of class X, enrolled in a different centre for formative evaluation of the lesson. Revisions were made to the script, based on student feedback about sections where they found the text difficult or unclear, or where they had problems with the examples.

### **3.3.1 Selection of the presenter**

The perceived credibility of the presenter as a teacher played a key role in selecting a presenter. A polished performance by a professional actor was not considered, since such a performer might not look like a teacher. Various real-life classroom presentations were studied, and it was assumed that students expect a teacher to be sober and slow but clear in delivering the lecture. The teacher's accent was not considered important, as long as the message was clear enough to comprehend. Attention was paid to the looks and

presentation style of the presenter. A teacher of Economics in his mid-fifties was identified for use as the presenter of the lesson. He was called for a screen test, in which he was asked to deliver a five minute lecture. During this time, he was also watched for any peculiar mannerism that might distract the learners. The presenter appeared to be a reasonably relaxed and efficient teacher.

### **3.3.2 Production of the lesson**

Once the scripting had been completed, points were identified which needed visual support or captions and illustrated computer graphics. Relevant video clips required for one of the treatment conditions were recorded in the market. They were mostly to reinforce or illustrate the examples used in the lecture. Simple captions as well as animated computer graphics were prepared for another treatment condition which required graphic support. The 3: 4 aspect ratio of television screen, legible font sizes, high visual contrast, the spacing between words, and use of horizontal rather than vertical formats are some of the important considerations in the design of TV graphics (Zettl, 1996). While preparing graphics for the experiment above mentioned factors were taken into account.

For the third treatment condition, a chromakeyed-in background was to be prepared. Chromakey is an effect which can be achieved immediately with the help of a device provided even in the most elementary type of television studio. Technically speaking, “any object or subject can be inserted into a background picture to create a reality that exists only in the videospace” (Wurtzel, 1979, p. 319). The technology of 'chromakey'

combines the image of presenter with a still photograph, slide or pre-recorded video footage. The combined picture creates an illusion that the presenter is set against a particular background or is a part of it without losing the sharpness of either of the object or the background unlike a 'dissolve' effect in which one picture becomes sharper at the expense of other losing sharpness. The chromakey background was prepared with the help of a computer, by making an electronic composite picture of freeze shots (video, still pictures, and some TV commercials merging with each other smoothly) so that the background elements appeared in harmony with each other. The background image suggested a marketing theme, with products on display, salesman selling items, currency notes, shops, etc.. The background was revised a few times after receiving the feedback from pilot viewers regarding the density of the picture, prominence of some items over the other, clarity, interest level, distraction due to background, and most importantly whether the picture was relevant to the topic under discussion.

The lecture was simultaneously recorded on two cameras. On one camera, the presenter was seated in a medium shot against a plain blue background. This videotape was used as the basis for preparing three treatment conditions:

- 1) presenter-only against plain blue background;
- 2) presenter and inserted graphics against blue background; and
- 3) presenter and inserted video clips against blue background;

The second camera recorded the presenter sitting against the chromakeyed-in background. This videotape was used for preparing two treatment conditions:



- 1) presenter-only against chromakeyed background; and
- 2) presenter against chromakeyed background with both video clips and graphics.

While videotaping the lesson, the two cameras were placed side by side with their lenses almost touching one another to make the shot composition of the two images as similar as possible.

Before the actual videotaping, the presenter rehearsed the whole script as if he were actually delivering the lecture. A Teleprompter was not used since the presenter felt uncomfortable every time he tried to use the device, and his style while using it became unnatural. Since the presenter was an expert in the subject matter, he did not find it difficult to perform the entire script without actually having to see it. On the whole, he kept track of the script well except for minor changes to sentences and sequences which he considered less appropriate on the basis of his own experience as a teacher. These changes in no way affected the content or visual aspects of the script. It was ensured that the presenter covered everything in the script.

The recording was completed in one shot, without any break or change of shot. The entire lesson was done in mid-shot, a generally used framing in teleteaching. The presenter kept some notes by him on a piece of paper for check during the presentation; however, these were not visible. The presenter looked into camera while presenting. A simple caption of the title of the programme was given in Hindi at the beginning of the

lesson: 'The Concept and the Law of Demand.' Five versions of the material were produced as follows.

- 1) Version I (Simple lecture served as control condition). The recording of the lesson in which the presenter was seated in the mid shot against a plain blue backdrop served as the Control condition, whereas the other versions were experimental conditions.
- 2) Version II (Blue background + graphics). A copy of the recording in which the presenter was seated against the blue background was made onto another tape, and simple and animated computer graphics were then inserted into the shot at relevant points. In this way, a version was created consisting of presenter against blue background and captions.
- 3) Version III (Blue background + video clips). Using another copy of the recording with the presenter against the blue background, video clips were inserted at relevant points. This version consisted of the presenter against blue background and supporting video clips.
- 4) Version IV (Chroma-keyed-in background). The recording that was made simultaneously on the second camera formed this version, the difference being that the blue backdrop was replaced by the chroma-keyed-in background.
- 5) Version V (Chroma-keyed-in background + graphics + visual clips). This version of the lecture contained all the visual variables combined in a single tape. It contained chroma-key in the background throughout the lecture, as in version IV. The graphics and video clips were added as in version II and III, thus combining all the three variables: that is, chroma-keyed-in background plus graphics plus video clips.

### **3.4 Rationale for a pre-recorded TV lesson**

The lecture recorded in advance was a simulation of a teleteaching lecture. In fact many times these lectures are recorded in advance and played during the videoconferencing. Further, since teleconferencing at IGNOU usually continues uninterrupted for at least 45 minutes, therefore an uninterrupted lecture was considered reasonable for the experiment. However, the rationale for using a pre-recorded lesson is that a pre-recorded TV lesson enables better control over many live programming related problems. In a live teleteaching session, it is quite normal for the strength of the audio/video signals to vary. The reasons for such varying signal strength can be bad weather, poor satellite linkage, malfunctioning of hardware at the originating end or the receiving ends. A varied signal strength could jeopardize the reliability of the stimuli presented to the groups, and thereby contaminate the experiment. In addition, such a lesson was likely to eliminate possible threats to the internal validity of the data, such as:

- 1) Performance. The same teacher must appear in all versions with the same amount of enthusiasm, eye contact, physical appearance and exactly the same lesson text; pre-recording of the lesson left nothing to chance in relation to the biases due to such factors.
- 2) Viewing quality. Inconsistencies in viewing quality due to different adjustment levels of television and video cassette player were prevented by careful adjustment of the television and videocassette player prior to the experiment. Once adjusted, the equipment was not tampered with throughout the experiment.

3) Consistency of procedures. Distractions to participants – for example, waiting for the satellite linkage to be established; adjusting the incoming transmission; being thrown off the air; and being subjected to viewing sessions of different lengths; - was prevented by the pre-recording of versions.

### **3.5 Rationale for preventing follow-up interactions**

As discussed in the introduction section of the study, in Indian context, the teleteaching is usually lecture based activity, and interaction component is usually missing. Further, the focus of the present study is on “improving the lecture” which is the non-interactive component of videoconferencing. Had such follow-up interaction taken place, it would have differed from one treatment condition to another. It was impossible to control the amount or quality of interaction in the five treatment conditions.

The interaction could have affected the quality of teaching and learning in each treatment condition, and thus would have become a strong confounding variable jeopardising the internal validity of the experiment.

In view of these considerations, it became necessary for interaction to be omitted from the study’s design. Furthermore, in most teleteaching situations, at least 30-40 minutes of the session are devoted to uninterrupted presentation by the teacher; so a lecture of such duration without interaction did not appear to be a contrived situation.

### **3.6 Instruments**

The posttest questionnaire comprised three parts. The first one was a personal information sheet to obtain demographic data. Then the main body of the questionnaire (that is, the achievement test) was administered; and lastly the attitude test. The questionnaires were given an identification symbol for the groups under different treatment conditions, in order to avoid any confusion during testing or analysis and were put in five separate envelopes in advance of the study.

#### **3.6.1 Personal information**

The demographic details or personal information sheet comprised 9 items (see Appendix V). Since there was no pre-test involved, no identification question was given in the questionnaire, in the hope that anonymity would encourage the participants to be more honest in their responses. The participants were asked to state their age, gender, whether working or non-working, resident of Delhi or outside, their mother tongue, the language that they speak at home, their chosen subjects, if they have a TV set at home, their frequency of watching TV, and finally their prior knowledge of the subject. Only details which were considered directly relevant for the purpose of the study were sought. Questions such as parents' income or parents' educational level were not asked, since the researcher felt that these kinds of questions are often embarrassing for participants belonging to uneducated or poor income families and are therefore not truthfully answered despite the condition of anonymity. Other questions for which the participant were likely to give socially acceptable answers were not asked.

The literature on questionnaire development indicates that brevity is important so as to keep the activity within the attention span of the participants (Borg & Gall, 1989). It was this researcher's observation in some previous projects that students do not pay much attention to written instructions; so the written instructions were kept to a minimal. The team member who was supervising the test read out the instructions from his own notes and explained the procedures. During the time that the instructions were being read to the participants, it was made sure that everybody listened carefully.

### **3.6.2 Achievement measure**

The main hypothesis of the study is that visual reinforcement of content in a teleteaching situation will result in better learning. The treatment given in this study was based on an Economics topic. The topic dealt with the concept of demand, the definition of demand, relationship between demand and supply, the factors affecting demand, kinds of demand, rules and how are they applied in practice. As the research conditions in the study called for a measure of specific knowledge, a standardized test cannot be used. Instead, a domain-referenced achievement test was developed to measure the learning or achievement of groups in different treatment conditions (Borg & Gall, 1989). The main advantage of a locally developed achievement test under such circumstances is that it can be tailored to the precise content area dealt with.

For teaching and learning goals, the widely used Bloom's taxonomy (Bloom *et al.*, 1956) divides the cognitive domain into six components which progress in hierarchical order, that is, comparatively less complex skills such as knowledge and comprehension lead to

the development of more complex skills such as application, analysis, synthesis, and evaluation. Similarly, in Gagne's (1965) scheme of sequencing instruction, lower order learning such as associations and chains (considered a manifestation of verbal information) lead to the next higher-order skill of discrimination. This in turn becomes a step towards the next higher learning skills of concepts, rules, and higher order rules. It is also explained that skills of higher-order learning (such as, analysis, synthesis) with reference to any given context do not occur immediately but over an extended period of time by successive presentations of new problem situations: either as a result of one's own- thinking process or owing to an external stimulus. In other words, knowledge, comprehension, and application - classified by Romiszowski (1981) as 'reproductive skills' - are expected to develop immediately in response to the stimulus, whereas the development of second-order skills such as analysis, synthesis, and evaluation ('productive skills') develop as a gradual process.

The implication of this theoretical perspective for the development of the test items was as follows. Since participants were to write the test immediately after the treatment, they would be tested only for first-order learning, knowledge, comprehension, and not for the complex skills which develop over a longer period of time. Further, since knowledge, and comprehension are the prerequisites for any higher-order learning, measuring them is a valid test and the first step in this process. Knowledge and comprehension in terms of action are translated as remembering and understanding, and their related skilled behaviours are recalling and explaining or recognizing (Romiszowski, 1981). A test requiring the learners to recall the concepts and rules, as well as to recognize instances of

a given concept by application of knowledge and comprehension, was considered an appropriate measure of learning outcome in the current study.

On this basis, a multiple-choice questionnaire (see Appendix VI) was developed on the precise content of the presentation, requiring the participants to tick the answer they thought was most appropriate. The test did not require writing skills on the part of the participants, as writing skill might become a threat to validity if it affected their performance in the study. The prototype questionnaire contained 25 items, which were later reduced to 17 after being evaluated by two subject matter experts separately: the items discarded were those which were not considered relevant by one or more of the three experts. The questionnaire was then tested on a sample of three students of class X from another accredited institution, and questions and possible responses that were found unclear or ambiguous were rephrased for clarity. The time taken by the pilot-study participants in writing the test was also noted down. These participants took 12 to 13 minutes to complete the achievement test. The scoring key was prepared with 1 mark for each correct answer and 0 for each wrong answer. Failure to respond to any item was also considered equivalent to getting a 0 in that item.

### **3.6.3 Attitudes towards the presentation and presenter**

Another objective of the study was to identify attitude shifts towards the presenter and presentation of the programme, as a function of the visual effects incorporated in the programme. For example, students' positive attitude towards the presentation may result in increased interest in the content. Moreover, viewers' perceptions of the learning



experience may influence the mental effort they invest in the acquisition of information from the stimulus (Salomon, 1984). These considerations have important implications in a distance learning situation.

To measure students' attitudes towards presenter in the context of the experimental conditions administered, semantic differential type (Osgood, Suci & Tannenbaum, 1957) bipolar scales was used. For the purpose of the present study, semantic differential scales with five -point intervals (see Appendix VII) were used to measure the effects of the three visual variables (Graphics, Video clip, and Chromakeyed background) on the control and treatment groups' perceptions of the performer's personality and performance. At the top of the measuring instrument page, participants were simply asked for, "Your impression about the presenter and the programme." It was verbally explained by the team member supervising the test that first impressions only are needed, and that participants do not need to think hard in responding to this part of the questionnaire. In order to keep the questionnaire brief, assessment data of presenter and presentation were collected on seven items. The positive and negative poles of the scales were randomly sequenced. The framework that was kept in mind in devising the scales (Appendix VII) was as follows:

- 1) Do certain visual inputs (graphics + visuals + chromakeyed in-background) in teleteaching influence the perceived authenticity of the teacher? Do participants perceive the person on the screen as a teacher, or not. A background different than the classroom might make viewers think differently about the person on screen,

perhaps as a professional TV performer, a consultant from the industry, an entrepreneur, etc.? A relevant adjectival pair in this connection is 'authentic <-> unauthentic.'

- 2) The next underlying question for attitude measurement was that, whether or not the presenter was seen as a teacher, what is the participants' impression of his expertise in the subject area? What is the effect of the added presentation variables on the presenter's perceived knowledge? A relevant adjectival pair in this connection is 'expert <-> novice'.
- 3) Did the use of chromakey background, graphics, and visuals effect viewers' perceptions of the presentation style? Was the presenter's style seen as personal and intimate, or not? Relevant adjectival pair: personal <-> impersonal.
- 4) Further, there was a question to see whether the experimental variables would affect the viewers' impression of whether the presenter appeared relaxed and comfortable, or nervous and tense. Adjectival pair: relaxed <-> tense.
- 5) A question focused on the content presentation. Did the use of visual variation influence viewers' perceptions of the presenter's effort to make the subject matter easy? Adjectival pair: easy <-> difficult.
- 6) A question was related to whether or not the visual conditions had a positive effect on interest value of the presentation. Adjective pair: interesting <-> boring.
- 7) Related to the last two questions was the issue of whether the topic was to the participants' liking. Adjectival pair: like <-> dislike.

All the above items are easily accommodated within the evaluative factor proposed by Osgood (1957). The validity and clarity of the items was checked informally, by collecting feedback from a small sample of two male and two female students, as to the meaning of each item. In light of this feedback, some questions and possible responses were rephrased for clarity and re-evaluated with the help a second, comparable sample. The scoring key was developed by giving a number to each interval, from 0 for the negative extreme, to 4 for the positive extreme. In the final questionnaire the attitude items were preceded by the achievement items. Further, a blank page in between separated one from the other. This precaution was taken to minimise chances of students' positive or negative responses to the perception-related questions confounding with their performance in the achievement test.

### **3.7 Administration**

The research team comprised eight members and one technician. Three of these were allocated to the treatment room where different versions of the lecture were shown to groups; and three others were allocated to the posttest room where the questionnaires were administered. One technician was in the adjoining room, from where the input was coming for the TV monitor. The final two team members served as ushers, to get the group into the treatment room after their random selection.

The team members arrived an hour before the actual start time of the classes, to set up the hardware required for the study. In the viewing room, only the TV set was placed, and the video cassette player and video cassettes were located in the adjoining room. This

was done so as to give the impression that the students were watching a live teleteaching session.

The television set and video cassette player were tuned for audio and video quality. The seating arrangements were decided in such a way that all the participants could see and hear the lesson properly. Clear instructions were given not to tamper with the audio and video quality throughout the study. Once such arrangements were in place, the following steps were taken.

### **3.7.1 Viewing conditions**

The viewing of the recorded lesson took place in a large TV room which accommodated all the participating students in each group. The posttest was conducted in a separate room in order to bring in the next group for viewing a different version of the lesson. The distance between the viewing and posttest rooms was sufficient that the activities in one room did not interfere with those in the other room. Care was taken that both rooms were comfortable in terms of noise level, lighting conditions, temperature level and space.

### **3.7.2 Randomization**

It was already known that approximately 300 students would be attending class X PCP sessions in different classrooms, with approximately 30 students in each classroom. For a sample of 150 students, and for each treatment condition (including the control group), 30 participants were required. Slips bearing seat numbers from 1-32 (the maximum

capacity of the classroom) were prepared beforehand. After mixing them well and placing them in a box, the class teacher was asked to randomly pick out 16 slips. The students sitting on the seat numbers shown on the slips were asked to join the session. A similar exercise was conducted in the next classroom, by replacing the old slips with the new ones, leading to the random selection of 15 or 16 participants, depending on whether the class was full to its capacity. Selecting 15 or 16 participants from any of the two classrooms provided a sufficient number of participants for each treatment condition. On this basis, the groups' composition ranged from 28 to 32. In the event that this number fell short of 30 in any condition, it was decided to use participants from two classrooms only, so as to keep the selection method uniform, and to avoid delays due to confusion. The same steps were repeated for the random selection of each group, the selection process took four to five minutes for each group.

- 1) The selected participants were guided to the viewing room and were asked to sit comfortably wherever they preferred. No seats were placed close to windows in order to minimize distraction.
- 2) The participants were told in brief about the special teleteaching session, and were asked to pay attention to the lesson.
- 3) They were also told that after the viewing was over they would be taken to a separate room to fill out a simple questionnaire.
- 4) In order to make the situation more realistic, the participants were told that a few minutes' wait was required while a satellite link was made.
- 5) During this waiting period, the operator of the video cassette player was contacted in the adjoining room and was asked to play the cassette at a specific time. This time

was not fixed earlier, in view of the unpredictable amount of time required for the participants to arrive in the viewing room and to be comfortably seated.

- 6) While in the video cassette player room, a PCP (Personal Contact Programme) in-charge was requested to pick one slip from a selection of five slips. The selected slip determined which video treatment would be played.
- 7) At the specified time the cassette was played. Once the lesson was over, the participants were asked to follow one of the team members to another room for the questionnaire session.
- 8) When each group had left the viewing room for the questionnaire session, the next class was selected according to the randomization procedure, and brought in for the next viewing session.
- 9) In the questionnaire room, posttest sheets with serial numbers on them were already placed on the desks in order to save time, and no restriction was made in terms of who sat where. This facilitated another level of random assignment of the answer sheets to the participants.
- 10) The participants were told that the test was based on the lesson they had just watched. They were reminded that their performance in this test had nothing to do with their academic performance, and that it was only a test of how much of the lesson they had been able to understand.
- 11) The participants were thanked in advance for their participation in the study.
- 12) They were told that the data collected would be confidential and used only for the purposes of this specific study. No personal information would be made public.

- 13) The posttest was in two parts, the first entitled 'Personal Information.' The team member supervising the questionnaire session read loudly each and every piece of information regarding the Personal Information sheet, and helped the participants to understand and to write the responses they judged appropriate. This saved time and provided clarity for the participants.
- 14) Once the Personal Information sheet had been filled in by all participants, they were asked to start answering the questionnaire, and a time limit of 15 minutes was set for them to complete the test.
- 15) Some of the participants finished the test a few minutes earlier than others. However, they were asked to stay seated until the end of the testing period. This was to ensure that the participants who were still writing the test would not be disturbed or distracted by those who were leaving. Most of the participants finished the questionnaire in 13-14 minutes. None needed or asked for additional time.
- 16) Once all the participants had finished the test, the answer sheets were packed in a labeled folder.
- 17) The viewing session and posttest session were coordinated in such a way that no viewing session ended before the posttest session had ended. This allowed participants to leave the complex after the posttest session without having a chance to talk to incoming participants.
- 18) This procedure for random selection of the video condition and posttest was repeated for each successive session. The viewing session and posttest session were conducted by different team members, neither of whom left their respective rooms

until the entire study was over. This ensured that they approach to the respective sessions was consistent.

It took approximately 40 minutes for each group to go through the selection, treatment and writing of the test. The experiment began at 10.00 a.m., and was completed by 12.20 p.m. The research team planned and rehearsed the procedure rigorously so that participants would not become tired by delays in the procedures.

### **3.7.3 Pre-experiment procedure**

- 1) The institution was sent an official letter from NOS, outlining the purpose of the experiment, and were requested to cooperate in the experiment. It was made clear to the institutions that their participation was voluntary and that the data collected would remain confidential, and would only be used for the purposes of the experiment. The posttest would not be taken as a test of the academic performance of the students and in no way would affect their academic results. It was also emphasised that no special session would be arranged, and that the experiment would form a part of the regular class teaching routine.
- 2) The academic staff of the institution was requested to make an announcement about the study in their classes, but not to give any details about it, except that the students' participation would involve watching a satellite-based teleteaching session followed by a simple questionnaire session. We made sure that the students were not told about the nature and purposes of the study.



3) A day before the study, a final check of the institution was conducted, regarding the availability of staff, functional electrical sockets, water supply, maintenance of the rooms, smooth operation of the hardware, and completion of all the administrative formalities for the study.

### **3.7.8 Post-experiment procedure**

The researcher thanked the study centre staff and students for participating in the study. They were told that the lesson they saw was not an actual satellite-based teleteaching, but a video recording, so that:

- a) they would have the same kind of experience as students watching a satellite-based teleteaching session;
- b) it would be easier to ensure good quality of audio and video signal;
- c) the time limit of the lesson would be under the strict controls associated with teleteaching; and that
- d) no time would be wasted in waiting for satellite linkage to be established.

Participants were also told that the study was an attempt to understand the ways in which educational materials may be improved. They were assured their performance in the study would have no bearing on the assessment of their academic performance at the end of the year.

## **CHAPTER 4:**

### **RESULTS**

#### **4.1 Descriptive analysis**

Table 2 provides the demographic details of the sample. A total of 150 students participated in the study. The subjects were randomly assigned to the five groups. The sample size of the control group shown the simple video lecture with the presenter sitting against a plain blue background was 29; the experimental group 1, exposed to the lecture with graphic input (blue + graphics) had 32 participants; the experimental group 2 that saw the version with video clippings (blue + video clips) had 32 participants; the experimental group 3 that saw the video in which the blue background was replaced by another relevant background (chromakeyed-in background) comprised 28 participants; and the experimental group 4 shown the video lecture with all the inputs combined (graphics + video clip + chromakeyed-in background) had 29 participants.

Since the design of the experiment featured a single test conducted immediately after the treatment, problems due to missing responses (sample mortality) did not arise.

Demographic data were obtained on 9 variables. These included Age, Gender, Working/non-working, City of residence (i.e. Delhi/ outside Delhi), Language spoken at

home, Choice of economics as a subject, Ownership of a TV set, Frequency of watching TV, and Prior knowledge of the topic.

**Table 2. Demographics of the sample (N = 150): descriptive statistics.**

Var #	Variable		Freq		Freq
1	<b>Exp. Condition</b>	Control	29		
		BI/Graphic	32		
		BI/Visuals	32		
		Chroma-key	28		
		Vis/Gr/Chr	29		
2	<b>Age</b>	16-18	69	19-21	49
		22-24	31		
3	<b>Gender</b>	Male	81	Female	69
4	<b>Working</b>	Yes	56	No	94
5	<b>Residence</b>	Delhi	138	Outside Delhi	12
6	<b>Mother Tongue</b>	Hindi	121	Urdu	12
		Punjabi	9	Other	8
7	<b>With economics</b>	Yes	76	No	74
8	<b>Have TV</b>	Yes	140	No	9
9	<b>TV Viewing</b>	< Once/wk	2	Once/wk	6
		2-3/wk	21	Every day	121
10	<b>Prior Knowledge</b>	Yes	79	No	70

The age of the sample ranged from 16 years to 24 years; the majority (69) was in the youngest age group of 16- 18; 49 belonged to the 19-21 year age group; and a smaller number (31) were in the oldest age group of 22-24 years. The number of male participants (81) was slightly higher than that of the females (69). Only 56 participants were in part-time or full-time employment, whereas a larger number (94) were non working. The majority of the participants (138) lived in Delhi, and only a small number came from other nearby places. The language spoken was predominantly Hindi (121);

eight members of the sample indicated Urdu as their first language (having a different style of script but a speaking style is similar to Hindi) ; nine indicated Punjabi, and eight subjects indicated other languages. The sample as a whole was composed of students who had opted for various combinations of subjects from the wide range of courses that they had to choose from. However, for the purpose of this analysis, they were classified as having chosen Economics or not. This variable was used because the video lecture dealt with a topic in Economics. It was found that the Economics/ non-Economics split (76/74) was almost equal. Most subjects watched TV, 140 participants indicated that they have TV sets. Seventy-nine subjects indicated that they did have some prior knowledge of the topic; 70 indicated that they had no prior knowledge of the topic.

#### 4.1.1 Descriptive analysis for Achievement measure

The post-test questionnaire consisted of 17 objective-type questions. As can be seen in Table 3, there were 140 correct responses for Question 1; 90 correct responses for Question 2, 89 for Question 3; and so on to 118 for Question 17.

**Table 3. Learning scores indices(total scores for the sample = 150 subjects)**

Question	Total	Question	Total
1	140	10	101
2	90	11	44
3	89	12	58
4	64	13	76
5	66	14	81
6	65	15	98
7	84	16	103
8	91	17	118
9	63		

#### 4.1.2 Descriptive analysis of Attitude towards presentation/ presenter

The second area of measurement (Table.4) was Attitude towards the presentation and presenter.

**Table 4.** Perception ratings of presentation and presenter for the sample.

Q.1	<b>Presenter was perceived as teacher or not</b>	Certainly not Probably not Can't decide Probably yes Certainly yes	11 26 33 52 28
Q.2	<b>Perceived knowledge of presenter in Economics</b>	None Very little Can't decide Moderate Expert	1 17 34 63 35
Q.3	<b>Style of presenter</b>	Very impersonal Impersonal Can't decide Personal Very personal	16 32 28 44 30
Q.4	<b>Relaxedness of presenter</b>	Very tense Slightly tense Can't decide Somewhat relaxed Very relaxed	19 33 36 39 23
Q.5	<b>Presenter made the content Easy</b>	Very difficult Somewhat difficult Can't decide Easy Very easy	13 32 27 42 27
Q.6	<b>Presenter made the content interesting</b>	Very boring Boring Can't decide Interesting Very interesting	19 40 20 42 2
Q.7	<b>Topic appeal of the content</b>	Not at all Not much Can't decide To some extent Very much	16 46 11 56 21

As can be seen in Table 4, this was measured by seven questions, dealing with whether presenter was a teacher (1), his subject knowledge (2), style factor, personal or impersonal style (3), degree of relaxedness or tension (4), effort of the teacher to make the lecture comprehensible (5), whether the teacher made the topic absorbing, interesting, or boring (6), and the appeal of the topic (7).

The overall frequency of answers in the five categories for these scalar variable fell into the central range rather than at the two extremes. For instance, regarding the presenter's perception as a teacher, 52 participants thought he was probably a teacher, and only 28 were certain that he was teacher. On the negative side, only 11 participants were certain that the presenter was not a teacher; a larger number (26 participants) was slightly unsure of presenter was a teacher or not ; and 33 were undecided.

Again, regarding the teacher's subject knowledge, the largest number (63) was found in the moderate knowledge range; 35 considered the teacher an expert in the subject; 34 could not decide; there were only 17 who regarded the teacher as having very little knowledge of the subject; and only one felt that the teacher had no knowledge of the subject.

Similarly, regarding the presenter's style, a comparatively large number of participants (44) regarded the presenter as having a moderate level of personal touch' a lesser number (33) gave extreme positive responses ('very personal'), and a relatively low number (16) gave extreme negative responses ('very impersonal'). On another factor related to

the presenter’s style, whether relaxed or tense, relatively few extreme responses were given, and most were in the moderately relaxed/tense range. The responses to the three aspects of the presentation content (i.e. subject difficulty, interest, and appeal) also indicated a moderate perception, neither extremely negative nor positive.

#### 4.2 Statistical Analysis

The Minitab software package was used for the statistical analysis of the data. The analysis was run as three independent experiments (shown below in Table 5) to avoid any possible confounding of treatment conditions (chromakeyed-in background was included in some conditions and blue background in others).

**Table 5. The design for the statistical analysis of the study**

**Experiment 1. Compared among the following three treatment conditions**

<b>presenter against blue background</b>		<b>Presenter against blue background + inserted graphics</b>		<b>Presenter against blue background + inserted video clips</b>
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**Experiment 2. compared the following two treatment conditions**

<b>presenter against blue background</b>		<b>Presenter against Chromakeyed-in background</b>
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**Experiment 3. compared the following two treatment conditions**

<b>Presenter against chromakeyed-in background</b>		<b>Presenter against Chromakeyed-in background + Inserted graphics + inserted video clips</b>
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In the first experiment, only treatments with like backgrounds could be compared. In the second comparison, the two backgrounds were tested against one another. In the third experiment, chromakeyed-in background condition was compared against the condition which had all the three variables included, that is, chromakeyed-in background, inserted graphics, and inserted video clips.

The Pearson product-moment correlation coefficient was calculated for the dependent variables Achievement and Attitude. The value of  $r$  for the sample was  $+ .48 (< .60)$ . It was concluded that the two dependent variables were not highly correlated, and can therefore be treated separately for analysis. Since there were two dependent variables, Multivariate Analysis of Variance (MANOVA) commonly used to analyse such data was initially considered as inferential statistical test of significance. However, the scores showed a non-normal distribution (as shown in Appendices VIII to XII) and since multivariate statistics is based on the assumptions of normal distributions (Tabachnik & Fidell, 1983), therefore it was decided *not* to use MANOVA. Non-parametric tests were used instead, the Mann-Whitney test for the statistical analysis of the experiments which compared two groups and because Mann-Whitney is for two groups only, Kruskal-Wallis test was used for the experiment which had three groups (Siegal, 1956).

#### **4.2.1 Statistical Analysis for Experiment 1: Achievement and Attitude measures.**

The main hypothesis underlying the statistical analyses was that the experimental conditions would affect achievement and attitudes of students.



**Table 6. Kruskal -Wallis one-way analysis of variance : Relationship of experimental treatment (IVs) to Achievement (DV)**

Treatment	No. of Obs.	Median	Ave. Rank	Z Value
Control Group	29	7.0	32.4	-3.50
Expt. Group 1	32	12.0	74.4	7.10
Expt. Group 2	32	7.0	32.8	-3.68
Overall	93		47.0	

**H= 51.08      d.f = 2      p =<.01 (adjusted for ties)**

**Table 7. Kruskal -Wallis one-way analysis of variance : Relationship of experimental treatment (IVs) to Attitude (DV)**

Treatment	No. of Obs.	Median	Ave. Rank	Z Value
Control Group	29	11 .0	37.2	-2.35
Expt. Group1	32	21 .0	70.3	6.03
Expt. Group2	32	11 .0	32.5	- 3.74
Overall	93		47.0	

**H= 37.15      d.f = 2      p =<.01(adjusted for ties)**

As may be seen in Tables 6 and 7, the results of the Kruskal-Wallis one-way analysis of variance test showed that the treatment conditions had statistically significant effect (H = 51.08 ; p< 0.01) on the Achievement measure, and a statistically significant effect (H = 37.15 ; p< 0.01) on the Attitude measure. The means and standard deviations of the Achievement measure and Attitude measure are shown in Table 8.

**Table 8. Means and standard deviations for Achievement and Attitude measures.**

Treatment	Achievement		Attitude	
	Mean	St.dev	Mean	St.dev
Control Group	7.30	1.51	12.17	4.34
Group 1	12.40	2.06	19.47	4.89
Group 2	7.40	2.09	11.16	2.69

As may be seen in Table 8, the means for the treatment condition (lecture with inserted graphics) have highest values among the three treatment conditions, 12.40 on Achievement measure and 19.47 on Attitude measure, whereas means of control group and group 2 (lecture with inserted visuals) are much lower 7.30, and 7.40 respectively for Achievement measure and 12.17 and 11.16 for Attitude measure. From the mean values, it can be concluded that only group 1 had significant effect on learning and attitude measures.

#### **4.2.2 Statistical Analysis for Experiment 2: Achievement and Attitude**

The hypothesis underlying the second experiment was that there would be significant differences between the group that watched the lecture version (plain blue background only), and the group that watched the version in which the plain background was replaced by the chromakeyed-in background on Achievement and Attitude measures.

**Table 9. Mann-Whitney Confidence Interval and Test: Relationship of experimental treatment (IVs) to Achievement (DV)**

Control group                      N = 29    Median =    7.000  
 Expt. Group 3                      N = 28    Median =    7.000

W = 896.5

The test is significant only at p = 0.36 (adjusted for ties)  
 Cannot reject null hypothesis at alpha = 0.05

**Table 10. Mann-Whitney Confidence Interval and Test: Relationship of experimental treatment (IVs) to Attitude (DV)**

Control group                      N = 29    Median =    11.000  
 Expt. Group 3                      N = 28    Median =    18.500

W = 554.5

The test is significant at p < 0.01 (adjusted for ties)  
 Reject null hypothesis

**Table 11. Means and standard deviations for Achievement and Attitude measures.**

Groups	Achievement		Attitude	
	Mean	St.dev	Mean	St.dev
Control Group	7.28	1.51	12.17	4.34
Expt. Group 3	7.14	1.92	18.21	3.51

As shown in Table 9. Mann-Whitney Confidence Interval Test indicates that experimental condition 3 (chromakeyed-in background) had no significant effect on Achievement, therefore the null hypothesis cannot be rejected. However Table 10. shows a significant effect of experimental condition 3 (chromakeyed-in background) on Attitude measure (  $W = 554.5, p < 0.01$  ). As shown in Table 11. the mean for experimental group 3 on Attitude measure is 18.21 a much higher value than that of control group which is 12.17.

#### **4.2.3 Statistical Analysis for Experiment 3: Achievement and Attitude**

One of the study's hypotheses was that the lecture containing a combined use of the three visual inputs (chromakeyed-in background, video graphics, and video clips) would have a significant effect on learning and attitudes by comparison with the condition in which only the chromakeyed-in background was used. The Mann-Whitney Test was conducted on the data of the experimental condition 3 and experimental condition 4.

**Table 12. Mann-Whitney Confidence Interval and Test: Relationship of experimental treatment (IVs) to Achievement (DV)**

<b>Group 3</b>	<b>N = 28</b>	<b>Median =</b>	<b>7.000</b>
<b>Group 4</b>	<b>N = 29</b>	<b>Median =</b>	<b>14.000</b>

**W = 433.5**

**The test is significant at  $p < 0.01$  (adjusted for ties)  
Reject null hypothesis**

**Table 13. Mann -Whitney Confidence Interval and Test: Relationship of experimental treatment (IVs) to Attitude (DV)**

**Group 3**      **N = 28**    **Median = 18.500**  
**Group 4**      **N = 29**    **Median = 19.000**  
**W = 740.5**

**The test is significant at p = 0.25 (adjusted for ties)**  
**Cannot reject at alpha = 0.05**

The results of the Mann-Whitney test (Table 12.) showed that experimental treatment in which graphics and video clips were inserted had a significant effect on Achievement ( $W = 433.5, p < .01$ ), however as shown in Table 13., there was no significant effect of the treatment on Attitude measure. As may be seen in Table 14. the mean for experimental group 4 (chromakeyed-in background + inserted graphics + inserted video clips) on Achievement measure 13.17, a much higher value than 7.14 for the treatment group 3 (chromakeyed-in background).

**Table 14. Means and standard deviations on Achievement and Attitude scores.**

<b>Groups</b>	<b>Achievement</b>		<b>Attitude</b>	
	<b>Mean</b>	<b>Stdev</b>	<b>Mean</b>	<b>Stdev</b>
<b>Experimental Group 3</b>	<b>7.14</b>	<b>1.92</b>	<b>18.21</b>	<b>3.51</b>
<b>Experimental Group 4</b>	<b>13.17</b>	<b>2.48</b>	<b>19.34</b>	<b>3.05</b>

To sum up the results of all three experiments: it can be concluded that in experiment 1, the treatment had a statistically significant effect on both measures that is Achievement

and Attitude. The values of means suggest that the visual reinforcement of the lecture by inserted graphics had significant effects both on achievement and attitude towards the presentation, in comparison with the lecture which had no visual reinforcement and in comparison with the lecture which had video clips.

In the case of experiment 2, it was observed that the chromakeyed-in background had a significant effect on attitude towards the presentation but did not have a significant effect on the achievement measure.

The results of experiment 3 indicate that the combination of graphics and video clips with the chromakeyed background had a significant effect on only the achievement measure when compared with the condition in which the presenter was seen against a chromakeyed background alone. There was no significant difference between the two conditions in terms of attitudes towards presenter and presentation.

## **CHAPTER 5:**

### **DISCUSSION**

#### **5.1 Discussion of results**

As discussed in the Introduction chapter, teleteaching in India does not usually exploit the production techniques of television that are actually at its disposal because the medium of television is employed as part of the videoconferencing system. This study was an attempt to investigate whether incorporation of some improved values of simple production variables could enhance learning or attitudes towards a telelecture.

The study's main hypothesis was that the students watching a telelecture that is visually reinforced by specific production techniques, used singly (inserted video graphics, video clips, and chromakeyed-in background) or in combination, will exhibit higher levels of achievement and more positive attitudes towards the learning activity than students who watch the telelecture which does not have its content visually reinforced in this way.

Let us review the results of the three experiments conducted in this study. The results of the first experiment which compared the plain lecture version (control condition) against the lecture with inserted graphics (experimental condition 1) and the lecture with inserted

video clips (experimental condition 2) effectively demonstrated the effect of inserted graphics in the lecture. The lecture with inserted video clips could not produce any significant effect on either achievement or attitude.

The finding that video lectures supported by graphics can make a significant difference to student learning is consistent with the results of previous TV research on news oriented programmes (Coldevin, 1975; Findahl & Hoijer, 1976; Schwarzwald, 1960). In these studies viewers' learning from news items, with and without graphics, was compared, and retention and recall were found to be better in response to the graphic-aided news items. The participants in these earlier studies were tested only for direct recall and retention: i.e., they had to reproduce what they heard or watched. Also, the information featured in these studies usually was more factual and topical in nature than the content of the current lecture.

The present study aimed to test content acquisition, and required the participants to exercise higher level learning skills i.e. the application of rules and concepts, comparisons and distinctions and analysis, than may be expected in the viewing of TV news. On the basis of the results of the present study it can be concluded that graphics, when used for visual reinforcement of verbal content in the videolecture, can lead to increased retention and comprehension of the lesson content. This conclusion provides support to the argument (Edwardson *et al.*, 1985) that relevant graphics accompanying the words heard in a televiewing context provide conceptual 'pegging' that aids in retention and reconstruction of the information for further use. The above mentioned



earlier studies did not throw any light on the effects of captions or graphics on attitudes. In the present study a significant difference on attitude is observed. The results showed that both learning and favourable attitudes to the presentation were enhanced by the addition of graphic information, further research could now be conducted to determine whether the students' favourable attitudes lead to the increased learning, or vice versa.

The insignificant effect of video clips in the present study is not entirely compatible with previous research findings. As discussed earlier, researchers have authenticated the superiority of information gained from visually supported TV information, by comparison with verbal accounts (Edwardson *et al.*, 1981; Gunter, 1979). However, the present study did not show a negative effect of visual reinforcement by video clips as was indicated by Gunter in his later study (1980) on which he based his conclusion that dynamic visualization might interfere with learning at deeper levels. Some other studies (Drew & Grimes, 1987; Son *et al.*, 1987) have asserted that visuals help in focussing the attention on the auditory information if the two are complementary in nature.

The studies cited in the discussion of video clips so far were based on news programmes. However, Pezdek's and Stevens' (1984) study was conducted by using a children's television programme, and researchers still reached the same conclusion that the visual information when used for redundancy is more memorable than the audio information. The ineffectiveness of video clips in producing a significant impact on learning in the first experiment raises the question of whether the lesson content did not provide as much

opportunity to choose strongly reinforcing video clips, as it did for graphics which also led to using a greater number of graphics than video clips.

Another possible explanation could be that this content was self-explanatory and the particular examples illustrated by the video clips were more familiar to the viewers, being of a more mundane, day-to-day nature. As such, they required no additional effort of the viewers in their attempts to visualise the situations being treated. For instance, one segment of the lecture explained the concept that in summer the price of wool garments comes down heavily and yet the demand does not increase. The video clips inserted at this point made the moment visually more interesting, though probably did not provide information that was not already obvious to learners from their own experience and observation. The video clips did not specifically facilitate the process of learning. Thus, the effect of the video clips treatment was not significantly different from the control group that did not see them, while the graphic treatment was more robust owing to the scope and appropriateness of its visual content for the particular lesson content of Economics used in the current study.

The results of the second experiment comparing the lecture version in which presenter was sitting against a plain blue background with the version in which this background was replaced by a chromakey background did not find a significant effect of the chromakey background on achievement and this corresponds with the work reported by Ellery (1959), Schlater (1969-70), and Nielson (1979). This experiment, however, detected a significant effect on the attitudes in line with Baggaley & Duck (1976) and

Coldevin (1978) who investigated the visual impact of chromakeyed-in background variable on student's perceptions of the presenter and found significant effects on factors such as presenter's credibility, clarity, interest, relaxedness, professionalism, straightforwardness. In the present study, the variable of chromakeyed-in background was included to enhance the total attitude towards the presentation (by using a composite attitude score in analysis), and to test for any possible cognitive effects of the treatment.

It may be recalled that in a qualitative study of teleconferencing presentation effects (Sinha *et al.*, 1994) indicated that students do not like a monotonous plain background to remain on the screen throughout, especially when they are expected to watch it for several hours. The chromakey background used in the present study was a composite picture representing glimpses of market scene. It was designed to add visual richness and a relevant ambiance to the programme, and to set a positive mood for the lecture. It was not meant to illustrate any rules or concepts in its own right that could have directly helped in learning. Nonetheless, the assumption underlying the selection of this background imagery was that enhancement of interest would lead to better information gain also. The results of the study did not support this hypothesis. One explanation for this might be that the same picture stayed on the screen throughout the programme, which may have reduced the participant's interest in it. Baggaley *et al.* (1980) showed that such presentation variables do tend to have limited-time effects, and are overwhelmed by other variables over time in this way.

The third experiment investigated the effect of the graphics and video clips as a composite reinforcement variable. In this experiment the condition 3, which was prepared by replacing blue background with the chromakey background, was compared with experimental condition 4 which further included inserted graphics and inserted video clips (combined treatment) in the chromakeyed version of lecture. The results showed a significant effect of combined use of inserted graphics and video clips on achievement but did not show significant difference on attitudes.

On the basis of results of this experiment and the first one, which tested individual effects of video clips and graphics, it may be concluded that the visual reinforcement by using either inserted graphics or a combination of graphics and video clips leads to higher achievement scores. Possibly, the statistically significant effect on achievement may be attributed to the graphics alone since the video clips did not show a significant effect on achievement in the first experiment, but the results of separate experiments cannot be used to substantiate this claim vigorously. A study comparing the cumulative effect of all the variables against each other used singly is required to test this assumption.

Inserted graphics were also found to contribute to favourable attitudes towards the presenter and presentation. Interestingly, in the first experiment, the inserted graphics condition led to a positive effect on attitude also, but this effect was not significant in the third experiment which combines graphics and video clips. This intervention probably needs to be interpreted in the light of the fact that in the third experiment the control version already had a chromakey background which has shown a significant positive

effect on attitude. Addition of other visual elements might not have any further enhancement effect on attitude. But again, it can not be argued on the basis of the results of the present study.

## **5.2 Need for further research**

One noteworthy difference between the present study and the earlier ones is that the graphics used were not merely plain captions, but included animated illustrations and visual or pictorial inputs designed to help the audio content in the best possible ways. In future, it would be interesting to compare the effects of static graphics with those of animated ones. Such research findings would be of interest to educators for economical as well as pedagogical reasons, since animation and artwork means more time and financial investment and teleteaching works under tight budget constraints.

The clear evidence for the superiority of information gain of using appropriate graphics over the other two treatment conditions has far-reaching practical implications. Graphics are the most popular, cost-effective and convenient pedagogical support for telelearning, compared with other visual support techniques. The study highlights the need for systematic investigation of graphic production variables in teleconferencing a medium traditionally governed by the assumptions of individual researchers and popular thinking which tends to emphasize the audio variables discussed elsewhere, such as humanising, participation, message style and feedback also grouped under ‘teletechniques’ by experts in the field (for example, Parker, 1984).

The inconclusive findings of the current study for the use of video clips should not be taken to undermine their value as a pedagogical tool. As discussed earlier, the content of the lesson featured in this study constrained the scope, design, imagination and duration of the video clips that could be used, and this may have prevented an optimal demonstration of the technique's effectiveness. It will be recalled that several previous studies have shown the advantage of video clips in learning from television generally. Further research is therefore warranted using various types of video images to supplement or complement the spoken word. It is possible that the video clips would have had a stronger effect in a science demonstration, or in coverage of a graphic historical event, or a lecture dealing with a less abstract topic. In view of previous support in the literature for the superiority of visual information, it is important that more studies be conducted in which the video clips are playing a more obviously instructive role.

Apparently as the first attempt to investigate the educational effects of a chromakeyed background in teleconferencing, the present study has failed to establish a conclusive relationship between background visuals and learning. Nonetheless, the study raises several research questions for future examination. For instance, a variety of meaningful chromakey backdrops during different segments of the lesson might have more effect on learning, rather than a single backdrop representing the general theme of the programme, as was used in this case.

### **5.3 Generalizability**

The nature of the demographic sample used in the current study prevents us from generalising from these results to educational situations beyond that of the National Open School level in India. The demographic data provides some interesting information about the NOS sample. Since the sample used in this study is probably fairly representative of the NOS population in any other metropolitan city, with some degree of caution, it can be said that data obtained for this specific sample reflect characteristics which could be common to student population of NOS in general. The details of NOS structure, functioning and sample selection procedure have already been described in sections 3.3.1 to 3.3.5 of chapter 3. As indicated in the results, 150 students were randomly selected from among all the students who were enrolled for class X at one of the study centres of NOS, located in an area called Srinivaspuri, in the city of Delhi, a metropolitan city. Two particular factors are noteworthy regarding the sample. First, the majority of participants belonged to the 16-18 year age range, or the 19-21 years range. These are the ages at which students in India are enrolled in class X to class XII in the formal school system. Even the oldest students in the current sample were 24 years old or less.

Apparently, the NOS students belonging to this younger age group tend to be regular school-going students who are drop outs from the conventional school system and opted for NOS. This gives some support to one of the reasons for joining NOS indicated by NOS authorities (section 3.3.1) that students who cannot continue in the formal schooling system owing to its lack of flexibility, after failure in the formal system join NOS. There is a general belief that distance education students are mostly the individuals who are

employed. But from the responses on working/not working status of students, it is very clear that the number of those who were not working was much larger than those who are involved in some kind of full time or part-time jobs. So they have not been compelled to opt for distance education because of work status.

Both of the above mentioned factors - their transfer into distance education at a young age from the formal school system, and their non-working status lend some support to the current view in India that distance and open education are now attracting more and more mainstream students who have the option of attending conventional schooling, but would prefer to join a distance education system because of the rigidity of the former and the relative openness of the latter (Menon, 1999). The representation of women students in the sample was quite encouraging, approximately 46% compared to 54% males. This presents an especially optimistic picture, when considered in the larger framework of Indian society. The 1991 Indian census showed 925 females for every 1000 males, and a literacy level of 64.1% for men and 39.3% for women. Many have noted that, in practice, distance education has not been fully successful in creating a favourable environment for women learners. In fact, distance education institutions worldwide tend to have a lower female than male enrolment (Faith, 1988). One of the main objectives of distance education in India is to overcome the barriers of access, particularly for women. The current sample shows that many women are taking advantage of the distance education at school level. From the responses coming from a number of students who have TV sets and their frequency of watching, it can be said that TV access is not a



problem for the NOS population of metropolitan cities, since most of our current sample watch TV almost on a daily basis.

#### **5.4 Conclusions**

The results of this study provide empirical support for guidelines for the improvement of teaching via videoconferencing. They should draw the attention of decision-makers and teachers to the importance of message design and effective presentational techniques in the teleteaching part of videoconferencing, an area which remains neglected in the educational media literature.

The effects of graphic treatments on student achievement are possibly the most salient finding of the study. The evaluations of most teleconferencing experiences in India has almost invariably shown that graphic support was minimal and the graphics were very poorly made (Joshi, Trivedi, 1992; Joshi & Pande, 1994; Sinha *et al.*, 1994). Based on a long research association with the major telelearning experiments in India, Dr. Usha Reddi maintains (1999, personal communication) that in Indian contexts that do not allow for sufficient planning time, computer graphics can prove to be the cost-effective learning aids, especially now with the staff's comparatively easier access to computers in India. Furthermore, Dr. Reddi feels that graphics are usually not so region-specific as other kinds of visuals, and that they can therefore be used more liberally to overcome the difficulty of visual biases at the national level. This understanding is especially important and relevant in a country which has so much diversity in lifestyle as India, and in which viewers in one region find difficulty in identifying with the programmes prepared in

another. In addition, Dr. Reddi mentions that, in Indian situations where the materials are not always freshly generated, and in which the same course runs over several years, the updating of the graphic-based telelessons is also easier and more economical.

The significance of graphics evident in the present study, coupled with the knowledge gained from previous teleconferencing projects, is thus a stepping-stone towards encouraging educators to improve the quality of their teleconference graphics in order to enhance the pedagogy of the Indian telelearning experience.

The chromakeyed-in background variable has clearly shown its superiority over a plain background in terms of effects on attitudes. The current study predicted that replacement of the plain background with an interesting and relevant background incorporated through chromakey technique (showing relevant images such as shops, commodities on display, currency notes, customers, and salespersons) would affect perceptions of the on-screen presenter and presentation which was measured by using seven items in all (discussed in results section, 4.1.2). The results supported this prediction in terms of the participants' attitudes to the presenter, though not in terms of their actual learning from him. However, a significant effect of keyed-in background even on attitude is important as backgrounds through chromakey technique can be easily incorporated in a telelecture in a very cost effective way.

As discussed earlier also, the insignificant effects of video clips shown in this study must not mean that video clips are not useful for visual reinforcement, it is perhaps that they

are more effective in context of lecture content which requires the kind of visual support that the video clips can provide. The present lecture content was more graphic oriented.

However, special consideration must be given to the fact that teleconferencing is also a medium that from my experience and the literature often suffers from a serious lack of understanding on the part of administrators as to the amount of preparation time which is needed. Incorporation of such visual reinforcement variables will require some extra effort, time and expenses that must be kept in view while planning teleteaching if the goal is to improve the quality of learning.

The findings of teleteaching research have significant implications for Indian educational television, for formal and non-formal education, since a fairly large proportion of programmes are based on lecture format. This is true for IGNOU programmes as well as Countrywide Classroom which telecasts approximately 2600 lectures in a year (CEC, 1993). The improvement in the production and design of telelecture, whether it is delivered via the medium of videoconferencing or via national television network helps achieve the same goal – improvement in the quality of education.

In the first chapter of the thesis, it was indicated that ‘interaction’ despite being most important component of videoconferencing takes a back seat in distance education contexts such as India. Two major opportunities exist to enhance interaction in the present teleteaching in India. Firstly, that we find ways to incorporate interaction by shifting the other responsibility of videoconferencing ‘instruction’ to the new educational channel,

Gyan Darshan, which can telecast the lecture in suitable time slots and can reserve the videoconferencing sessions for student-teacher interaction alone. Second, we can also find ways to make teleteaching 'virtually' interactive in the sense suggested by Dr. Brown (2000, personal communication), who observed that when students are present in the studio where the lecture was being delivered, and asked questions or interacted with the studio teacher, the remote students at the learning end got a vicarious feeling of interaction. Moreover, as pointed out by Russell (1994), this approach can help the teacher as well, because he/she can give a relaxed, natural flow to the instruction if students are asking questions and giving feedback. Moreover, students at the far end, may get some breaks that are useful not only to avoid monotony, but also to provide some time for assimilation of the content.

To conclude, teleteaching has much to offer to distance teachers and learners. To further harness the benefits of technological innovations, distance education institutions must take a lead and develop more effective instructional designs for all of their delivery media. Research efforts of this kind should be particularly helpful in the field of teleteaching, and for the pursuit of excellence in distance education generally.

## REFERENCES

- Abbot, L., Dallat, J., & Robinson, A. (1995) Video-conferencing in continuing education: an evaluation of its application to professional development at the University of Ulster, *Educational Media International*, 32 (2), pp. 77-82.
- Abbot, L., Dallat, J., Livingston, R. & Robinson, A. (1994) The application of videoconferencing to the advancement of independent group learning for professional development. *Educational & Training Technology International*, 31 (2), pp. 85-92.
- Acker, S. (1983) Viewers' perceptions of velocity and distance in televised events. *Human Communication Research*, 9 (4), pp.335-348.
- Anderson, C.M. (1972) In search of a visual rhetoric of instructional television. *AV Communication Review*, 20, pp.43-63.
- Anderson, D.R., & Levin, S.R. (1976) Young children's attention to "Sesame Street", *Child Development*, 47, pp. 806-811.
- Archer, W. (1999) Delivering university-level communication programs at a distance: Benefits, costs, and disruptions, *Canadian Journal of Educational Communication*, 24, pp. 369-383.
- Arnheim, R. (1974) *Art and visual perception*, Berkeley: University of California Press.
- Baath, J. (1979) *Correspondence Education in the Light of a Number of Contemporary Teaching Models*. Malmö: Liber Hermods.

- Baggaley, J.P (1973) Analysing TV presentation techniques for educational effectiveness. *Educational Broadcasting International*, March, pp. 17-21.
- Baggaley, J.P., & Duck, S.W. (1976) *Dynamics of Television*. Farnborough: Saxon House.
- Baggaley, J.P., Ferguson, M., & Brooks, P. (1980) *Psychology of the TV Image*. Farnborough: Saxon House.
- Baker, R.A. , & Hansford, B.(1990) Evaluation of a cross-campus interactive video teaching trial. *Distance Education* 11 (2), pp. 286-307.
- Bates, A.W. (1995) *Technology, Open learning and distance education*. London: Routledge.
- Bates, A.W. (1980) Towards a better theoretical framework for studying learning from educational television. *Instructional Science* 9, pp. 393-415.
- Bernard, R.M., & Coldevin, G. O. (1985). Effects of recap strategies on television news recall and retention. *Journal of Broadcasting & Electronic Media*, 29 (4), pp. 407-419.
- Berry, C. (1983) A dual effect of pictorial enrichment in learning from television news: Gunter's data revisited. *Journal of Educational Television* 9 (3), pp. 171-174.
- Bloom, B.S. (1956) *Taxonomy of educational objectives, Handbook 1: Cognitive Domain*. New York: McKay.
- Boone, M.E. (1985) Teleconferencing moderator skills: research as a basis for training (pp. 55-110), In T. B., Cross (Ed.), *Teleconferencing state of the art people*. London: Pergamon.

- Borg, W.R. & Gall, M.D. (1989) *Educational research An introduction* (5th ed.). New York: Longman.
- Boverie, P., & Murrell, W. G., & Lowe, C.A., & Zittle, R. H., & Gunawardena, C. H. (1997) Live vs. Taped: New perspectives in satellite -based programming for primary grades. University of New Mexico, Albuquerque, (ED 407939).
- Bramble, W. J., & Martin, B. L. (1995) The Florida teletraining Project: military training via two -way compressed video. *American Journal of Distance Education* 9 (1), pp. 6-26.
- Brock, P.A. (1994) *Educational Technology in the Classroom*. Englewood Cliffs, NJ: Educational Technology Publications.
- Brown, B. (2000) Personal Communication.
- Buchanan, J., & MacIntosh, J. (1997) Trust : A process and an outcome in an audio-teleconferencing learning environment, *Canadian Journal of University Continuing Education*, 23 (1), pp. 49 - 60
- Campbell, D. T. & Stanley, J.C. (1963) *Experimental and Quasi-experimental Design for Research*, Chicago: Rand McNally.
- Carl, D. R. (1986) Developing faculty to use videoconferencing to deliver university credit courses over cable and satellite. *Canadian Journal of Educational Communication*. Fall, pp. 235-250.
- CEC (1993). Consortium for Educational Communication, Project Report, New Delhi: Consortium for Educational Communication.
- Chander, R., & Karnik, K. (1976) Planning for satellite broadcasting: The Indian Instructional Television Experiment. Paris: UNESCO

- Chaudhri, M. M. (1986), India: From SITE to INSAT: Education and Management, *Media in Education and Development*, 9, pp.134-140.
- Chu, G. L. & Schramm, W. (1967) Learning from television: What the research says, Washington, D. C: National Association of Educational Broadcasters.
- Coldevin, G. (1975) Spaced, massed and summary treatments as review strategies for ITV production. *AV Communication Review*, 23, pp. 289-303.
- Coldevin, G. (1978) Experiments in TV presentation strategies II: effectiveness of full screen vs. corner screen 'symbol establishment' background visuals, *Educational Broadcasting International*, 11, pp. 158-159.
- Coldevin, G. (1981) Experimental research in television message design: implications for ETV. *Programmed Learning & Educational Technology*, 8 (2), pp. 86-99.
- Dallat, J., Fraser, G., Livingston, R., & Robinson, A. (1992) Teaching and learning by video-conferencing at the University of Ulster. *Open Learning* 7 (2), pp. 14-21.
- Daniel, J. S. (1995) The mega-universities and knowledge media: Implications of new technologies for large distance teaching universities, M. A Thesis, Department of Education, Concordia University, Montreal, Canada.
- Drew, D. G., & Grimes, T. (1987) Audio-visual redundancy and TV news recall, *Communication Research*, 14(4).
- Dwyer, M. F. (1971). Color as an instructional variable, *AV Communication Review*, pp.399 –416.
- Dwyer, M. F. (1978) *Strategies for improving visual learning, a handbook for the effective selection design, and use of visualized materials*, Pennsylvania: Learning Services.



- Edwardson, M., Grooms, D., & Proudlove, S. (1981) Talking news information gain from interesting video vs. talking heads. *Journal of Broadcasting* 25 (17), pp.15-24.
- Edwardson, M., Kent, K. & McConnel, M. (1985) Television news information gain: Videotext versus a talking head. *Journal of Broadcasting* 29 (4), pp. 367 - 378.
- Ehrhard, B., & Schroeder, B. L. (1997) Videoconferencing what is it and how is it being used? *Tech Trends* 42 (3), pp. 32- 34.
- Ellery, J. B.(1959) A pilot study of the nature of aesthetic experiences associated with television and its place in education. Wayne State University, Detroit.
- Emery, M. & Schubert, M. (1993) A trainer's guide to videoconferencing. *Training*, 30 (6), pp. 59-63.
- ERT Unit (1998). *A report on the feedback for IGNOU teleconferencing*. Unpublished manuscript, Indira Gandhi National Open University.
- Faith, K. (Ed.) (1988) Naming the problem. In *Towards new horizons for women in distance education: International perspectives* (pp. 3-15). New York: Routledge.
- Feenberg, A. (1999) Reflections of the distance learning controversy, *Canadian Journal of Educational Communication*, 24, pp.337 –348.
- Findahl, O. & Hoijer, B. (1976) *Fragments of Reality: an experiment with news and TV news*. Stockholm: Swedish Broadcasting Corporation.
- Fox, J., Loutsch, K., & O'Brien, M. (1993) ISDN: linking the information highway to the classroom. *Tech Trends* 38 (5), pp. 18-20.
- Gagne, R.M. (1965) *The Conditions of Learning*, New York: Holt Rhinehart & Winston.

- Gagne, R.M. & Briggs, L. (1987) *Principles of Instructional Design* (3rd Ed.), New York: Holt Rinehart & Winston.
- Gant, L.P. (1996) Lessons in developing distance learning, *Performance & Instruction* 35 (2), pp. 22-25.
- Gaskell, A. & Mills, R. C. (1989) Interaction and independence in distance education: what's been said and what's being done ? *Open Learning*, 4 (2),pp. 51-54.
- Gay, G.& Lentini, M (1995) Communication Resource use in a networked collaborative design environment. Paper presented at the Annual Meeting of the American Educational Research Association (San Francisco, CA, April 18 - 22, 1995.) (ED 385 226).
- Gay, R. L. (1992) *Educational Research Competencies for Analysis and Application* (4th ed.). New York: Macmillan Publishing Company.
- Gordon, G. N. (1970) *Classroom Television: New frontiers in ITV*, New York: Hasting House Publication.
- Govindaraju, P. & Bannerji, I.(1999). A retrospective view of the Countrywide Classroom in India, *Journal of Educational Media*, 24(2), pp. 103-116.
- Graham, M. (1984) *New Technologies in Canadian Education*. Toronto: Ontario Education Communication Authority, Paper 14.
- Grant, T. S., & Merrill, I. R (1963). Camera placement for recognition of complex behaviours. *Television in health Science education*. Chapter 6. US Office of Education, Washington.

- Gunter, B. (1979) Recall of brief television news items: effects of presentation mode, picture content and serial position. *Journal of Educational Television* 5, (2), pp. 57-61.
- Gunter, B. (1980). Remembering television news: Effects of picture content. *Journal of Psychology*, 102, 127-133.
- Hartley, G., & Burnhill, P. (1977) Fifty guidelines for improving instructional text. *Programmed Learning & Educational Technology* 14 (1), pp. 65-73.
- Hartman, F. R. (1961) Recognition learning under multiple channel presentation and testing conditions, *AV Communication Review*, 9, pp. 24-43.
- Hatfield, P., Garrison, D., & Adams, K. (1986) Audio teleconferencing for the physically disabled. *Open Learning* 1 (2), pp. 51-52.
- Hawes, W. (1978) *The performer in Mass Media*, New York: Hastings House Publishers.
- Hawkridge, D. & Chen, C.E. (1991), Evaluating a World Bank Project: China's Television Universities, *International Journal of Educational Development*, 11 (2), pp. 135-148.
- Hedberg, J. G., & Stee l, J. (Ed.) (1992) Educational technology for the clever country. Selected papers from the conference of the Australian Society for Educational Technology, (ED 366307).
- Heider, F. (1958) *The Psychology of Interpersonal Relations*, New York: Wiley.
- Hillman, D.C. A., Willis D. J., & Gunwardena, N.C. (1994) Learner-interface interaction in distance education: an extension of contemporary models and strategies for practitioners. *American Journal of Distance Education* 8 (2), pp. 30-42.

- Holmberg, B. (1988) Guided didactic conversation in distance education. In D. Sewart, D. Keegan, & B. Holmberg (eds.), *Distance Education: international perspectives*. New York: Routledge.
- Idrus, R. (1993) Collaborative learning through teletutorials. *British Journal of Educational Technology* 24 (3), pp. 179-184.
- IGNOU Vice Chancellor's message (2000), Indira Gandhi National Open University, <http://www.IGNOU.org>.
- IGNOU (1998) *Effectiveness of IGNOU teleconferencing system*. Mimeograph.
- ISRO(1998) Feedback on TDCC, Ahmedabad: Indian Space Research Organisation, Unpublished manuscript.
- Jeffery, G. H. (1980) *Multi-point Teleconference and Regular Classroom Teaching*. St. John's: Memorial University of Newfoundland.
- Joshi, S.R., & Pande, M., & Joshi, M. (1994) *Satellite for Higher Education: an evaluative study of UGC Talk back experiment*, Ahmedabad: Social Research Group Space Applications Centre, Indian Space Research Organisation.
- Joshi, S.R., & Trivedi, B (1992) *Engineering education through satellite: an evaluation study of ISRO-IETE Experiment*. Ahmedabad: Social Research Group Space Applications Centre, Indian Space Research Organisation.
- Kanner, J. H. (1968) *The instructional effectiveness of color in television: A review of the evidence*. Standford, California: ERIC Clearninghouse on Educational media and Technology.
- Karnik, K., & Chander, R. (1976) *Planning for Satellite Broadcasting*, Paris: UNESCO Report no. 78.

- Keast, D. A. (1997) Access to university studies: Implementing and evaluating multi-point videoconferencing. *Canadian Journal of University Continuing Education*. 23(1), pp. 29 -47.
- Keegan, D. (1990) *Foundations of Distance Education* (2nd ed.) London: Routledge.
- Kelley, H. H. (1967) In Levine, D. (ed.) *Nebraska Symposium on Motivation*, Lincoln: Nebraska University Press.
- Kipper, P. (1986) Television camera movement as a source of perceptual information. *Journal of Broadcasting and Electronic Media*, 30, 295-307.
- Kovacs, G.(1987) Teleteaching as the most important means of the information of the society,( pp. 3-8),In F. Lovis (Ed.),*Remote education and Informatics: Teleteaching. Proceedings of the IFIP TC 3 international conference on remote education and informatics: teleteaching 86 Budapest, Hungary, 20-25 October*, Netherlands: Elsevier Science Publishers B.V.
- Kozma, R. B. (1991) Learning with media. *Review of Educational Research*, 61 (2), pp. 179 - 211.
- Kumar, S. (1995)*Emergence of television in a traditional culture: An Indian study*. Unpublished manuscript.
- Latchem, C. & Rapley, P. (1992) Trial by Satellite: videoconferencing for continuing education for rural area nurses. *Distance Education* 13 (1), pp. 118-130.
- Lombard, M., Reich, R., Grabe, M. ,Bracken, C., & Ditton, T.(2000) presence and television, the role of screen size, 26 (1),75-98.

- Mandell, L. M. and Shaw, D. L. (1973) Judging people in the news – unconsciously: effect of camera angle and bodily activity, *Journal of Broadcasting*, 17, pp. 353-62.
- Massoumian, B. (1989) Successful teaching via two-way interactive video. *Tech Trends* 34 (2), pp. 16-19.
- McCain, T. A., Chilberg, J. and Wakshlag, J. J.(1977) The effect of body type and camera shot on interpersonal attraction and source credibility, (ED 099917).
- McCormick, R (1982) The Central Broadcasting and Television University, People's Republic of China,(54 – 71). In *The distance teaching universities* , (ed.) G. Rumble & K. Harry,. London: Croom Helm.
- McLuhan, M. C. (1964) *Understanding Media: the extension of man*, New York: McGraw-Hill.
- McNabb, J. (1994) Telecourse effectiveness: findings in the current literature. *Tech Trends* 39 (5), pp. 39-40.
- Metallinos, N. & Tiemens, R .K. (1977), Asymmetry of the screen: the effect of left versus right placement on television images. *Journal of Broadcasting*, 21,1, pp.21-33.
- Metallinos, N. (1984). *Children's perception, retention, and preference of asymmetrical composition in pictures*. Canadian Journal of Communications, 13, pp.10-15.
- Menon, M.B. (1998), Address to the students, Prospectus 1997-98, National Open School, New Delhi, India.
- Menon, M.B. (1999), Personal communication.

- Millerson, G. (1972) *The technique of television production*, (9th Edn.), New York: Hasting House Publication.
- Millerson, G. (1997) *TV Scenic Design* (2nd Edn.) Oxford: Focal Press.
- Mitchell, P. D. (1978) Do students pay more attention to complex than simple ETV images? Paper presented to Canadian Educational Researcher's Association, London.
- Mitchell, J. (1991) The TAFE video-conferencing breakthrough: a brief report on the pioneering achievement of the South Australia Department of Employment and TAFE in video-conferencing. ASPESA paper (ED 338226).
- Mody, B. (1978). lessons from the Indian satellite experiment. *Educational Broadcasting International*, 11(3), 117-120.
- Moore, M.G. (1989). The three types of interaction . *The American Journal of Distance Education* 3(2), pp. 1-6.
- Morris, J.D. (1984) Florida study: improving achievement through the use of more dynamics in TV production. *Technological Horizons in Education*, 12 (3), pp. 104-107.
- Murray, M. (1975), *The Video-tape Book: A basic guide to portable tv production*, New York: Tapling Publishers.
- Murphy, K. L. (1988) The Integration of Teleconferencing in Distance Teaching, Paper to the 4th Annual Conference of the Association of European Correspondence Schools, Istanbul, April (ED 328227).
- Neilson, J. (1979) Does the background affect televised message reception? *Educational and Instructional Television*, 11(2), 61-4.

- Newcomb, H. (1987) *Television: The critical view* (4th ed.). New York: Oxford University Press.
- Nugent, G. C. (1982) Pictures, audio, and print: Symbolic representation and effect on learning. *Educational Communication and Technology*, 30, pp.163-174.
- NOS (1996) *Economics I*. New Delhi: Aravali Printers and Publishers.
- Osgood, C.E., Suci, G. & Tannenbaum, P. (1957) *The measurement of meaning*, Chicago: University of Illinois Press
- Parker, L. A. (1984) *Teletraining Means Business*. Wisconsin: Center for Interactive Programs.
- Pezdek, K. & Stevens, E.(1984) Children's memory for auditory and visual information on television, *Developmental Psychology*, 20(1-3),pp. 212-218.
- Piskurich , G. M. (1997). Reconsidering the promise of satellites as a distance learning technology. *Performance Improvement* 36 (2), pp. 19-23.
- Phalachandra, B. (1997) NCERT trains primary teachers in Mathematics through satellite, Conference Proceedings, ICDE Conference.
- Rao, V. R. & Khan, Z. (1998) Satellite-based interactive learning system at IGNOU: retrospect and prospects, Conference Paper presented at International Conference on Collaborative Networked Learning, 16-18 February, Indira Gandhi National Open University, New Delhi.
- Reddi, U. (1987). Television in higher education: the Indian experience, *Media in Education and Development*, 128 – 133.
- Reddi, U. (1999) Personal Communication.
- Romizowski, A. J. (1981) *Designing Instructional Systems*, London: Kogan Press.



- Roblyer, M.D. (1997) Videoconferencing. *Learning and Leading with Technology* 24 (1), p. 58 - 61
- Roblyer, M., Edwards, J., & Havriluk, M. (1997) *Integrating Educational Technology into Teaching*. New Jersey: Prentice-Hall.
- Rumble, G. (1992) The competitive vulnerability of distance teaching universities, *Open Learning* 7 (2), pp. 31 – 45.
- Russell, T. L. (1984) Interactivity in television-based learning: is it necessary? *Open Learning*, 4(3), pp. 56-7.
- Salomon, G. (1984) Television is "easy" and print is "tough". *Journal of Educational Psychology* 76 (4), pp. 647-658.
- Salomon, G. (1979) *Interaction of Media, Cognition, and Learning*. San Francisco: Jossey-Bass.
- Salomon, G. (1974) What is learned and how it is taught: the interaction between media, message, task and learner (383 – 406), In D.R.Olson,(Ed.) *Media and Symbols: the forms of expression, communication and education*, Chicago University Press.
- Salomon, G., & Cohen, A. A. (1977) Television formats, mastery of mental skills, and the acquisition of knowledge. *Journal of Educational Psychology*, 69, 612-19.
- Schlater, R. (1969-70). Effect of irrelevant visual cues on recall of television messages. *Journal of Broadcasting*, 14, pp. 63-69.
- Schlater, R. (1970) Effect of speed of presentation on recall of television messages. *Journal of Broadcasting*, pp. 207-14.
- Schwardzwaldler, J. C (1960) An investigation of the relative effectiveness of certain specific TV techniques on learning,(ED 014913).

- Siegel, S. (1956) *Nonparametric Statistics: For the Behavioral Sciences*  
USA: McGraw-Hill Book Company, Inc.
- Silbergleid, M. I. (1992). *Instructional Television: Visual production techniques and learning comprehension* (ED349942)
- Sinha, A, Kishore, D. & Hashmi, J. N. (1994) *Report of Training & Development Communication Channel Experiment*. EMPC: Indira Gandhi National Open University.
- Son, J. Rees, S., & Davie, W. (1987) Effects of visual-verbal redundancy and recaps on television news learning, *Journal of Broadcasting & Electronic Media*, 31(2), pp. 207-216.
- Souder, W. E. (1993) The effectiveness of traditional vs satellite delivery in three management of technology Master's Degree Programme. *The American Journal of Distance Education* 7 (1), pp. 37 - 52.
- Tabachnick, B. & Fidell, L. (1983) *Using Multivariate Statistics*, New York: Harper & Row.
- Tarroni, E. (1979) The aesthetics of television, In H. Newcomb (ed.) *Television: The critical view*, New York: Oxford University Press.
- Treagust, D. F., Waldrip, B. G., & Horley, J. R. (1993) Effectiveness of ISDN video conferencing: a case study of two campuses and two different courses. *Distance Education*, 14 (2), pp. 315-330.
- Tiemens, R. K (1970) Some relationships of camera angle to communicator credibility. *Journal of Broadcasting*, 14, pp. 483-90.

- Tykwinski, J. R., & Poulin, R. C. (1991) North Dakota interactive video network: a practical guide to teleconferencing and distance education. (ED 348945).
- UGC-ISRO (1992) National Talkback Experiment, Nov. 25 - 30, 1991, Final Report.
- Verrecchia, F. P. (1995) Distance learning and teleconferencing fever. *Media and Methods* 31 (4), pp.26-31.
- Walsh, J., & Reese, B. (1995) Distance learning's growing reach, *Technological Horizons in Education* 22 (11), pp. 58-62.
- Wilson, J. M.(1997) Distance learning for continuing education, *Educom Review*, 32(2), pp.12-16.
- Whitehead, A. N. (1929) *The aims of education and learning*, New York: Macmillan.
- Wurtzel, A.H. & Dominick, J. R. (1971-72) An evaluation of television drama:interaction of acting styles and shot selection. *Journal of Broadcasting*, 16, pp. 103-10.
- Wurtzel, A. & Acker, R. S. (1989) *Television Production*, New York: McGraw-Hill Book Company.
- Wurtzel, A. (1979) *Television Production*, New York: McGraw Hill.
- Zettl, H. (1973) *Sight, Sound, Motion: Applied media aesthetics*, Belmont, Calif.: Wadsworth Publishing.
- Zettl, H.(1978) The rare case of television aesthetics, *Journal of the University Film Association*, 3 – 8, 30.
- Zettl, H.(1996) *Television Production Handbook* (6th Edn.) New York: Wadsworth Publishing Company.
- Zimmer, M.B. (1988) A practical guide to videoconferencing. *Training & Development Journal*, 42 (5), pp.84-89.

## APPENDIX I

### Script for Version I (control treatment) & Version IV (chromakeyed-in background)

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*Version I shows the presenter in the medium shot against a blue background as a talking head. No other visual inputs have been used. Version IV has the same medium shot of the presenter against a chromakeyed-in background. No other visual inputs have been used.*

### Title: THE CONCEPT & LAW OF DEMAND

#### VIDEO

#### AUDIO

In today's discussion, we will look at the concept of demand and its related factors. The related factors are: the relationship between demand and supply, the factor affecting demand, kinds of demand, law of demand and why is the law applied in practice.

To begin with, let us understand that in common usage demand and desire are understood to mean the same thing i.e. the aim to acquire something. But in economics, there is a difference between demand and desire. When we talk of demand in economics then we have to keep in mind that besides desire there should be required income or buying capacity or money to buy the good. If a man desires to own a car, let's say a poor person thinks that he should buy a car but if he doesn't have sufficient income, then we cannot classify such desire as demand. In addition to having the desire to buy something and the ability to pay for it, the other thing required is the willingness to pay for it. For example, if a miser desires to buy a car and

is able to pay for it, even then such a desire will not be called demand if he doesn't want to spend the money. Thus we can use the term demand when all the following three conditions are fulfilled: want for that good, ability to pay, willingness to pay for it.

Additionally, demand is possible only when expressed in terms of price and the time-frame because demand is always at a given price and at a particular time. For example, we find an increased demand for woollen clothes during winter season despite the prices being high, but the demand for the same clothes will not rise in summer even at low prices. The main reason for this is the change in season i.e. not at the same time. So, whenever we talk about demand in economics we have to keep the following five things in mind: want for the good, ability to pay for it, willingness to pay for it, a particular time time-frame, at a particular price

Now we will talk about the kinds of demand. The example I just gave was that of price and demand, meaning thereby demand depends on price. Any change in the price of a commodity affects its demand. In addition to price, any change in income also affects the demand of goods.

Usually with an increase in income a person starts buying better quality products and the demand for such products increase. This positive relationship of increase in demand due to increase in income is called normal behaviour for normal goods. But then there are goods whose demand does not increase due to increase in income, such goods are called inferior goods. The man who pointed out to this aspect of demand was Robert Giffin. Robert Giffin of England found that the poor people who were eating potatoes earlier started

consuming bread and butter after an increase in their income. In this context we deem potatoes as inferior goods because even after an increase in income the demand for potatoes did not increase.

So, in every society there are goods whose demand does not increase despite a change in its price or an increase in income of the buyers. With this we can safely assume that there is an inverse or negative relationship between a change in income and the demand of some goods i.e. an increase in income does not force an increase in the demand of the goods.

We must also keep in mind that the demand does not depend on these two things alone i.e. price and income. There is another factor, known as related demand which also affects the demand of goods. In technical terms this is called cross demand. Cross demand means the price of one commodity affects the demand of another commodity. Such related commodities are classified in two categories. One such type is the commodity which can be used in place of another commodity, for example, usage of tea instead of coffee. This category of commodities is called Substitute Goods. Remember, with any increase in the price of tea will reduce its demand and increase coffee's demand because there has not been any change in the price of coffee. The other category of related commodities is known as Complementary commodities. Complementary commodities imply that one needs both the commodities in order to full-fill a demand, for example one cannot drive a car without petrol. In such a situation both car and petrol will be called complementary commodities. Let's presume there is increase in the price of cars, this will induce a decrease in car's demand, additionally this will also

decrease the demand for petrol.

Once again, let's look at the factors which affect demand. One is the price of commodities, second is the price of related commodities, another thing which influences demand is the fashion. If a man's taste, liking or disliking changes then it influences the demand of goods as well. In the long run, even the population also influences the demand. Population here means the size of population and its corresponding effect on demand. So these were the forces which influence the demand.

Now let's talk about the relationship between demand and price. There is a common knowledge that demand goes down if prices increase and demand goes up if the prices decrease, and this is exactly what we call "Law of Demand". But in economics we have to add another factor to this Law of Demand. The factor is that other things remaining constant. What are these other things which we presume do not change? Such other things are, No change in income of the person, no change in the prices of related commodities. And no change in the fashion pattern, preferences, habit and liking, disliking of the person.

If we keep the above mentioned things constant, then we will find that with any increase in prices, the demand decreases and with any decrease in prices the demand increases, and this is the universal law of demand. But the question here is that why does a change in price influence the demand. Here we have to pay attention to four to five important points.

One generally experienced fact is that when a person buys many units of the same commodity, each additional unit bought

does not give the same utility as the first unit bought. In economics this is known as “Law of Diminishing marginal utility” meaning thereby that a person can be persuaded to purchase more units of the same commodity only if the prices are decreased. With reduced prices a person will buy more units and the utility of each additional unit bought keeps on declining.

The second decisive factor which affects the relationship between demand and price is known as the effect of income. Here income means the real income and not the money income, which as I told you earlier is fixed. Then what do we mean by ‘real income’? The ‘real income’ means that a person can buy more units of a commodity with the same amount of money, such increase in units of a commodity is referred as real income. For example let us assume that an man used to spend Rs. 50 per week on apples but due to decrease in apple prices, he can buy the same quantity of apples with Rs. 30. Now he can buy more apples with that extra Rs. 20, so in terms of the quantity of apples his income has increased.

The third factor which explains an increase in demand due to decrease in price is the substitution effect. The substitution effect means that due to decrease in the price of a specific commodity a person tries to use it in place of other commodity which results in increase in demand of such reduced price.

The forth factor to be kept in mind is that with the increased price of apple, poor people stopped consuming because they cannot afford it. But due to fall in prices of apples such poor people also enter the market and can now afford to buy apples, and due to this the demand for apples increases again. The above four reasons



explain how due to fall in price demand for a commodity increases.

Once again, let me repeat the four reasons we just discussed. These are the law of diminishing marginal utility, increase in real income, effect of substitution and the entry of new buyers in the market. In addition to this, let me tell you about another factor. In the context of demand, there can be “individual demand” i.e. how much of a particular commodity is in demand for. But there are many individuals like me who go to the market and collectively we all demand for many commodities. Such demand which is created by me and others in the market for a specific commodity if combined, will be called “market demand” for that specific commodity. So the demand is considered in terms of individual and market demand.

Also keep in mind that often the distribution of income also influences the demand. The distribution of income means how the income is being distributed in the society. In any society, let’s take Indian society where some people are very affluent and some people are very poor, the demand of poor people is different from that of affluent people, that’s why the distribution of income also influences the demand.

In short, we will now discuss about today’s lesson. In the beginning I told you what demand is and also that it is different from the way we understand it in common language. In economics, demand means the want for a commodity, availability of purchasing power and the willingness to spend such purchasing power. Along with this, you are told that the demand is within a specified time-frame. So these are the important things to be kept in mind while discussing about demand. So far as the

kinds of demand are concerned, there are three kinds of demand. One is the price demand, second is the income demand and the third is related demand. The price demand means there is a relationship between price and demand. The income demand relates to income and demand. Here you were told that generally with an increase in income people buy more commodities. But in every society, there are certain commodities whose demand does not increase despite an increase in income and such commodities are known as Griffin goods or inferior commodities. This is an important aspect to be kept in mind.

Then there is related demand, and complementary demand is part of such related demand. Complementary demand means that you need another commodity to complete a specific demand. In this connection, I gave you an example of car and petrol. Second type of related demand I told you was substitution demand meaning thereby that you can use one commodity in place of another one. And in this context the generally given example is that of tea and coffee. In the beginning of our discussion we talked about the simple relationship between demand and price called as, "the law of demand" that demand goes down if prices increase and demand goes up if the prices decrease. The law holds good if other factors such as income, the prices of related commodities, fashion patterns, preferences of the consumers remain constant.

Now we also know that when prices reduce a customer can be persuaded to purchase more units of the same commodity because with reduced prices a person will buy more units and the utility of each additional unit

bought keeps on declining. This we call "Law of Diminishing Marginal Utility". Both these laws are important for understanding the concept of demand.

We have also seen the effect of income and learnt what is meant by "real income"? The real income of a person is when he can buy more units of the same commodity with less money. We used the example of buying apples to illustrate this. When new buyers enter the market, the demand of a commodity is positively effected. Then we talked about the individual demand and when several individual demands are put together it is called "market demand". In the end we discussed the effect of distribution of income in the society on demand.

## APPENDIX II

### Script for Version II (blue background + inserted graphics)

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*The words against the graphics are shown in bold. In the remaining segments, the presenter appears as a talking head in a medium shot against a plain blue background.*

#### **Title: THE CONCEPT AND LAW OF DEMAND**

##### VIDEO

##### AUDIO

In today's discussion, we will look at the concept of demand and its related factors. The related factors are: the relationship between demand and supply, the factor affecting demand, kinds of demand, law of demand and why is the law applied in practice.

To begin with, let us understand that in common usage demand and desire are understood to mean the same thing i.e. the aim to acquire something. But in economics, there is a difference between demand and desire. When we talk of demand in economics then we have to keep in mind that besides desire there should be required income or buying capacity or money to buy the good. If a man desires to own a car, let's say a poor person thinks that he should buy a car but if he doesn't have sufficient income, then we cannot classify such desire as demand. In addition to having the desire to buy something and the ability to pay for it,

### **Simple Text Graphic**

**want for that good  
ability to pay  
willingness to pay**

the other thing required is the willingness to pay for it. For example, if a miser desires to buy a car and is able to pay for it, even then such a desire will not be called demand if he doesn't want to spend the money.

**Thus we can use the term demand when all the following three conditioned are fulfilled: want for that good, ability to pay, willingness to pay for it.**

Additionally, demand is possible only when expressed in terms of price and the time-frame because demand is always at a given price and at a particular time. For example, we find an increased demand for woollen clothes during winter season despite the prices being high, but the demand for the same clothes will not rise in summer even at low prices. The main reason for this is the change in season i.e. not at the same time. So, whenever we talk about demand in economics we have to keep the following five things in mind:

### **Simple Text Graphic**

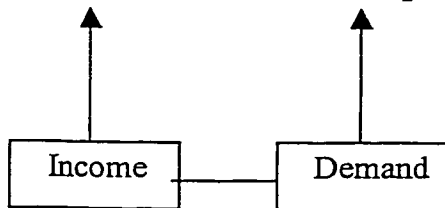
**want for the good  
ability to pay for  
willingness to pay  
a particular time-frame  
at a particular price**

**want for the good, ability to pay for it,  
willingness to pay for it, a particular time  
time-frame, at a particular price**

Now we will talk about the kinds of demand. The example I just gave was that of price and demand, meaning thereby demand depends on price. Any change in the price of a commodity affects its demand. In addition to price, any change in income also affects the demand of goods. Usually with an increase in income a person starts buying better quality products and the demand for such products increase.

**Animated Graphic**

**Positive relationship**



**This positive relationship of increase in demand due to increase in income is called normal behaviour for normal goods.**

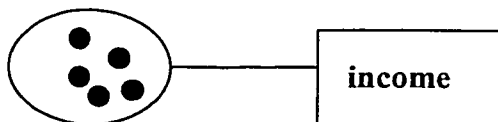
**Simple Text Graphic**

**INFERIOR GOODS.**

But then there are goods whose income rather the demand decreases, demand does not increase due to increase in such goods are called **inferior goods**.

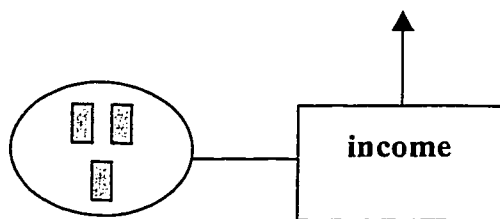
The man who pointed out to this aspect of demand was Robert Giffin. Robert Giffin of England found that the

**Animated Graphic**



**poor people who were eating potatoes earlier**

**Dissolves to**

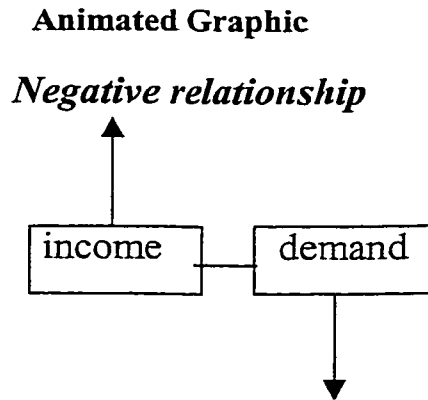


**started consuming bread and butter after an increase in their income.**

In this context we deem potatoes as inferior goods because even after an increase in income the demand for potatoes did not increase.

So, in every society there are goods whose

demand does not increase despite a change in its price or an increase in income of the buyers.



With this we can safely assume that there is an inverse or negative relationship between a change in income and the demand of some goods i.e. an increase in income does not force an increase in the demand of the goods.

We must also keep in mind that the demand does not depend on these two things alone i.e. price and income.

**Simple Text Graphic**

**There is another factor, known as related demand** which also affects the demand of goods.

## **RELATED DEMAND**

**Simple Text Graphic**

**In technical terms this is called cross demand.**

## **CROSS DEMAND**

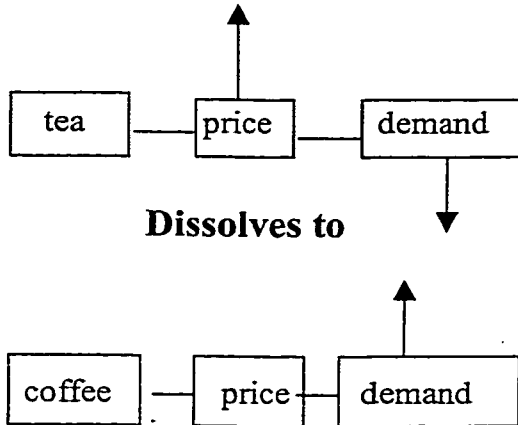
**Simple Text Graphic**

Cross demand means the price of one commodity affects the demand of another commodity. Such related commodities are classified in two categories. One such type is the commodity which can be used in place of another commodity, for example, usage of tea instead of coffee.

**This category of commodities is called Substitute Goods.**

## **SUBSTITUTE GOODS**

### Animated Text Graphic



(NO CHANGE IN PRICE)

### Simple Text Graphic

### COMPLEMENTARY GOODS

**Remember, with any increase in the price of tea will reduce its demand and increase coffee's demand because there has not been any change in the price of coffee.**

**The other category of related commodities is known as Complementary commodities.**

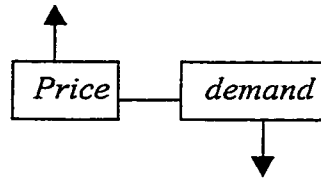
Complementary commodities imply that one needs both the commodities in order to full-fill a demand, for example one cannot drive a car without petrol. In such a situation both car and petrol will be called complementary commodities. Let's presume there is increase in the price of cars, this will induce a decrease in car's demand, additionally this will also decrease the demand for petrol.

Once again, let's look at the factors which affect demand. One is the price of commodities, second is the price of related commodities, another thing which influences demand is the fashion. If a man's taste, liking or disliking changes then it influences the demand of goods as well. In the long run, even the population also influences the demand. Population here means the size of population and its corresponding effect on demand. So these were the forces which

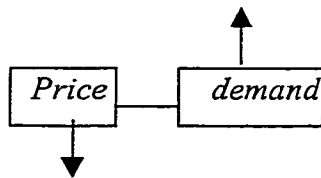


## Animated Graphic

### Law of Demand



Dissolves to



influence the demand.

Now let's talk about the relationship between demand and price. There is a common knowledge that demand goes down if prices increase and demand goes up if the prices decrease, and this is exactly what we call "Law of Demand".

But in economics we have to add another factor to this Law of Demand. The factor is that other things remaining constant. What are these other things which we presume do not change? Such other things are, No change in income of the person, no change in the prices of related commodities. And no change in the fashion pattern, preferences, habit and liking, disliking of the person.

If we keep the above mentioned things constant, then we will find that with any increase in prices, the demand decreases and with any decrease in prices the demand increases, and this is the universal law of demand. But the question here is that why does a change in price influence the demand. Here we have to pay attention to four to five important points.

One generally experienced fact is that when a person buys many units of the same commodity, each additional unit bought does not give the same utility as the first unit bought.

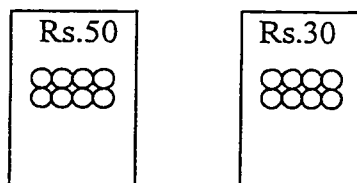
## Simple Text Graphic

### Law of Diminishing Marginal Utility

In economics this is known as “Law of Diminishing marginal utility” meaning thereby that a person can be persuaded to purchase more units of the same commodity only if the prices are decreased. With reduced prices a person will buy more units and the utility of each additional unit bought keeps on declining.

The second decisive factor which affects the relationship between demand and price is known as the effect of income. Here income means the real income and not the money income, which as I told you earlier is fixed. Then what do we mean by ‘real income’? The ‘real income’ means that a person can buy more units of a commodity with the same amount of money, such increase in units of a commodity is referred as real income.

### Animated Graphic



For example let us assume that an man used to spend Rs. 50 per week on apples but due to decrease in apple prices, he can buy the same quantity of apples with Rs. 30. Now he can buy more apples with that extra Rs. 20, so in terms of the quantity of apples his income has increased.

The third factor which explains an increase in demand due to decrease in price is the substitution effect. The substitution effect means that due to decrease in the price of a specific commodity a person tries to use it in place of other commodity which results in increase in demand of such reduced price.

The fourth factor to be kept in mind is that with the increased price of apple, poor people stopped consuming because they cannot afford it. But due to fall in prices of apples such poor people also enter the

market and can now afford to buy apples, and due to this the demand for apples increases again. The above four reasons explain how due to fall in price demand for a commodity increases.

### Simple Text Graphic

#### Factors affecting change in demand

**Law of diminishing marginal utility**

**Change of real income**

Once again, let me repeat the four reasons we just discussed. **These are the law of diminishing marginal utility, increase in real income, effect of substitution and the entry of new buyers in the market.**

In addition to this, let me tell you about another factor. In the context of demand, there can be “individual demand” i.e. how much of a particular commodity is in demand for. But there are many individuals like me who go to the market and collectively we all demand for many commodities. Such demand which is created by me and others in the market for a specific commodity if combined, will be called “market demand” for that specific commodity. So the demand is considered in terms of individual and market demand.

Also keep in mind that often the distribution of income also influences the demand. The distribution of income means how the income is being distributed in the society. In any society, let's take Indian society where some people are very affluent and some people are very poor, the demand of poor people is different from that of affluent people, that's why the distribution of income also influences the demand.

In short, we will now discuss about today's lesson. In the beginning I told you what demand is and also that it is different from the way we understand it in common language. In economics, demand means the want for a commodity, availability of purchasing power and the willingness to spend such purchasing power. Along with this, you are told that the demand is within a specified time-frame. So these are the important things to be kept in mind while discussing about demand.

### Simple Text Graphic

**Price demand**  
**Income demand**  
**Related demand**

So far as the kinds of demand are concerned, **there are three kinds of demand. One is the price demand, second is the income demand and the third is related demand.**

The price demand means there is a relationship between price and demand. The income demand relates to income and demand. Here you were told that generally with an increase in income people buy more commodities. But in every society, there are certain commodities whose demand does not increase despite an increase in income and such commodities are known as Griffin goods or inferior commodities. This is an important aspect to be kept in mind.

Then there is related demand, and complementary demand is part of such related demand. Complementary demand means that you need another commodity to complete a specific demand. In this connection, I gave you an example of car and petrol. Second type of related demand I told you was substitution demand meaning thereby that you can use one commodity in place of another one. And in this context the generally given example is that of tea and coffee. In the beginning of our discussion

we talked about the simple relationship between demand and price called as, “the law of demand” that demand goes down if prices increase and demand goes up if the prices decrease. The law holds good if other factors such as income, the prices of related commodities, fashion patterns, preferences of the consumers remain constant.

Now we also know that when prices reduce a customer can be persuaded to purchase more units of the same commodity because with reduced prices a person will buy more units and the utility of each additional unit bought keeps on declining. This we call “Law of Diminishing Marginal Utility”. Both these laws are important for understanding the concept of demand.

We have also seen the effect of income and learnt what is meant by “real income”? The real income of a person is when he can buy more units of the same commodity with less money. We used the example of buying apples to illustrate this. When new buyers enter the market, the demand of a commodity is positively effected. Then we talked about the individual demand and when several individual demands are put together it is called “market demand”. In the end we discussed the effect of distribution of income in the society on demand.

## APPENDIX III

### Script for Version III (blue background + inserted video clips)

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*The words against the video clips are shown in italics. In the remaining segments, the presenter appears as a talking head in a medium shot against a plain blue background.*

#### Title: THE CONCEPT AND LAW OF DEMAND

##### VIDEO

##### AUDIO

In today's discussion, we will look at the concept of demand and its related factors. The related factors are: the relationship between demand and supply, the factor affecting demand, kinds of demand, law of demand and why is the law applied in practice.

To begin with, let us understand that in common usage demand and desire are understood to mean the same thing i.e. the aim to acquire something. But in economics, there is a difference between demand and desire. When we talk of demand in economics then we have to keep in mind that besides desire there should be required income or buying capacity or money to buy the good. If a man desires to own a car, let's say a poor person thinks that he should buy a car but if he doesn't have sufficient income, then we cannot classify such desire as demand. In addition to having the desire to buy something and the ability to pay for it, the other thing required is the willingness to pay for it. For example, if a miser desires to buy a car and is able to pay for it, even then such a desire will not be called demand if he

doesn't want to spend the money. Thus we can use the term demand when all the following three conditioned are fulfilled: want for that good, ability to pay, willingness to pay for it. Additionally, demand is possible only when expressed in terms of price and the time-frame because demand is always at a given price and a particular time.

**Video clip**

winter season: shots showing great rush of customers in the stores of wool garments though the prices are very high.

*For example, we find an increased demand for woollen clothes during winter season despite the prices being high,*

**Video clip**

Summer season: Shots showing no customers getting into the stores for wool garments despite prices been slashed down to half.

*but the demand for the same clothes will not rise in summer even at low prices.*

The main reason for this is the change in season i.e. not at the same time. So, whenever we talk about demand in economics we have to keep the following five things in mind: want for the good, ability to pay for it, willingness to pay for it, a particular time time-frame, at a particular price

Now we will talk about the kinds of demand. The example I just gave was that of price and demand, meaning thereby demand depends on price. Any change in the price of a commodity affects its demand. In addition to price, any change in income also affects the demand of goods.

### Video clip

Shots of customers in the shops seemingly more interested in buying more expensive brands, e.g. double door fridges and fully automatic machines.

*Usually with an increase in income a person starts buying better quality products and the demand for such products increase.*

This positive relationship of increase in demand due to increase in income is called normal behaviour for normal goods. But then there are goods whose demand decreases, with increase in income, such goods are called inferior goods. The man who pointed out to this aspect of demand was Robert Giffin. Robert Giffin of England found that the poor people who were eating potatoes earlier started consuming bread and butter after an increase in their income. In this context we deem potatoes as inferior goods because even after an increase in income the demand for potatoes did not increase.

So, in every society there are goods whose demand does not increase despite a change in its price or an increase in income of the buyers. With this we can safely assume that there is an inverse or negative relationship between a change in income and the demand of some goods i.e. an increase in income does not force an increase in the demand of the goods.

We must also keep in mind that the demand does not depend on these two things alone i.e. price and income. There is another factor, known as related demand which also affects the demand of goods. In technical terms this is called cross demand. Cross demand means the price of one commodity affects the demand of another commodity. Such related commodities are classified in two categories.



**Video clip**

Shot showing different varieties of tea put on the Shelves.

*One such type is the commodity which can be used in place of another commodity, for example, usage of tea instead of coffee.*

**Video clip**

Shot showing the side of shop which has variety of coffee.

This category of commodities is called substitute goods. Remember, with any increase in the price of tea will reduce its demand and increase coffee's demand because there has been no change in coffee's price. The other category of related commodities is known as complementary commodities. Complementary commodities imply that one needs both the commodities in order to fulfil a demand,

**Video clip**

Shot of a petrol pump station, a car being filled with gasoline. Next car in line.

*for example one cannot derive a car without petrol. In such a situation both car and petrol will be called complementary commodities.*

Lets' presume there is an increase in the price of cars, this will induce a decrease in the demand of car., additionally this will also decrease the demand for petrol.

Once again, let's look at the factors which affect demand. One is the price of commodities, second is the price of related commodities, another thing which influences demand is the fashion. If a man's taste, liking or disliking changes then it influences the demand of goods as well. In the long run, even the population also influences the demand. Population here means the size of population and its corresponding effect on demand. So these were the forces which influence the demand.

Now let's talk about the relationship between demand and price. There is a common knowledge that demand goes down if prices increase and demand goes up if the prices decrease, and this is exactly what we call "Law of Demand". But in economics we have to add another factor to this Law of Demand. The factor is that other things remaining constant. What are these other things which we presume do not change? Such other things are, No change in income of the person, no change in the prices of related commodities. And no change in the fashion pattern, preferences, habit and liking, disliking of the person.

If we keep the above mentioned things constant, then we will find that with any increase in prices, the demand decreases and with any decrease in prices the demand increases, and this is the universal law of demand. But the question here is that why does a change in price influence the demand. Here we have to pay attention to four to five important points.

One generally experienced fact is that when a person buys many units of the same commodity, each additional unit bought does not give the same utility as the first unit bought. In economics this is known as "Law of Diminishing marginal utility" meaning thereby that a person can be persuaded to purchase more units of the same commodity only if the prices are decreased.

***With reduced prices a person will buy more units and the utility of each additional unit bought keeps on declining.***

**Video clip**  
Shots of sale/reduced prices on various items

The second decisive factor which affects the relationship between demand and price is known as the effect of income. Here income means the real income and not the money income, which as I told you earlier is fixed.

Then what do we mean by 'real income'? The 'real income' means that a person can buy more units of a commodity with the same amount of money, such increase in units of a commodity is referred as real income. For example let us assume that an man used to spend Rs. 50 per week on apples but due to decrease in apple prices, he can buy the same quantity of apples with Rs. 30. Now he can buy more apples with that extra Rs. 20, so in terms of the quantity of apples his income has increased.

The third factor which explains an increase in demand due to decrease in price is the substitution effect. The substitution effect means that due to decrease in the price of a specific commodity a person tries to use it in place of other commodity which results in increase in demand of such reduced price.

#### **Video clip**

Shots of fruit market, apparently a poorly clothed person entering a fruit market and buying apples

*The forth factor to be kept in mind is that with the increased price of apple, poor people stopped consuming because they cannot afford it. But due to fall in prices of apples such poor people also enter the market and can now afford to buy apples, and due to this the demand for apples increases again. The above four reasons explain how due to fall in price demand for a commodity increases.*

Once again, let me repeat the four reasons we just discussed. These are the law of diminishing marginal utility, increase in real income, effect of substitution and the entry of new buyers in the market. In addition to this, let me tell you about another factor. In the context of demand, there can be "individual demand" i.e. how much of a particular commodity is in demand for. But there are many individuals like me who go to the market and collectively we all demand for many commodities. Such demand which is created by me and others in the market for a specific commodity if combined, will be

called “market demand” for that specific commodity. So the demand is considered in terms of individual and market demand.

Also keep in mind that often the distribution of income also influences the demand. The distribution of income means how the income is being distributed in the society.

### **Video clip**

Contrasting shots of markets, one catering to the needs of rich people and other serving the needs of poor.

*In any society, let's take Indian society where some people are very affluent and some people are very poor, the demand of poor people is different from that of affluent people, that's why the distribution of income also influences the demand.*

In short, we will now discuss about today's lesson. In the beginning I told you what demand is and also that it is different from the way we understand it in common language. In economics, demand means the want for a commodity, availability of purchasing power and the willingness to spend such purchasing power. Along with this, you are told that the demand is within a specified time-frame. So these are the important things to be kept in mind while discussing about demand.

So far as the kinds of demand are concerned, there are three kinds of demand. One is the price demand, second is the income demand and the third is related demand. The price demand means there is a relationship between price and demand. The income demand relates to income and demand. Here you were told that generally with an increase in income people buy more commodities. But in every society, there are certain commodities whose demand does not increase despite an increase in income and such commodities are known as Giffen goods or inferior commodities. This is an important aspect to be kept in mind.

Then there is related demand, and

complementary demand is part of such related demand. Complementary demand means that you need another commodity to complete a specific demand. In this connection, I gave you an example of car and petrol. Second type of related demand I told you was substitution demand meaning thereby that you can use one commodity in place of another one. And in this context the generally given example is that of tea and coffee.

In the beginning of our discussion we talked about the simple relationship between demand and price called as, “the law of demand” that demand goes down if prices increase and demand goes up if the prices decrease. The law holds good if other factors such as income, the prices of related commodities, fashion patterns, preferences of the consumers remain constant.

Now we also know that when prices reduce a customer can be persuaded to purchase more units of the same commodity because with reduced prices a person will buy more units and the utility of each additional unit bought keeps on declining. This we call “Law of Diminishing Marginal Utility”. Both these laws are important for understanding the concept of demand.

We have also seen the effect of income and learnt what is meant by “real income”? The real income of a person is when he can buy more units of the same commodity with less money. We used the example of buying apples to illustrate this. When new buyers enter the market, the demand of a commodity is positively effected. Then we talked about the individual demand and when several individual demands are put together it is called “market demand”. In the end we discussed the effect of distribution of income in the society on demand.

## APPENDIX IV

### Script for Version V ( graphics + video clips + chromakeyed-in background)

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*The words against the graphics are shown in bold. The words against the video clips are shown in italics. In the remaining segments, the presenter appears as a talking head in a medium shot against a chromakeyed-in background.*

#### Title: THE CONCEPT AND LAW OF DEMAND

##### VIDEO

##### AUDIO

In today's discussion, we will look at the concept of demand and its related factors. The related factors are: the relationship between demand and supply, the factor affecting demand, kinds of demand, law of demand and why is the law applied in practice.

To begin with, let us understand that in common usage demand and desire are understood to mean the same thing i.e. the aim to acquire something. But in economics, there is a difference between demand and desire. When we talk of demand in economics then we have to keep in mind that besides desire there should be required income or buying capacity or money to buy the good. If a man desires to own a car, let's say a poor person thinks that he should buy a car but if he doesn't have sufficient income, then we cannot classify such desire as demand. In addition to having the desire to buy something and the ability to pay for it, the other thing required is the willingness to pay for it. For example, if a miser desires to buy a car and is able to pay for it, even then such a desire will not be called demand if he doesn't want to spend the money.

**Simple Text Graphic**  
**want for that good**  
**ability to pay**  
**willingness to pay**

**Thus we can use the term demand when all the following three conditioned are fulfilled: want for that good, ability to pay, willingness to pay for it.**

Additionally, demand is possible only when expressed in terms of price and the time-frame because demand is always at a given price and at a particular time.

**Video clip**

winter season: shots showing great rush of customers in the stores of wool garments though the prices are very high.

*For example, we find an increased demand for woollen clothes during winter season despite the prices being high,*

**Video clip**

Summer season: Shots showing no customers getting into the stores for wool garments despite prices been slashed down to half.

*but the demand for the same clothes will not rise in summer even at low prices.*

The main reason for this is the change in season i.e. not at the same time. So, whenever we talk about demand in economics we have to keep the following five things in mind:

**Simple Text Graphic**  
**want for the good**  
**ability to pay for**  
**willingness to pay**  
**a particular time-frame**  
**at a particular price**

**want for the good, ability to pay for it, willingness to pay for it, a particular time time-frame, at a particular price**

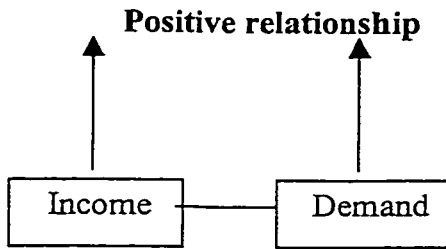
Now we will talk about the kinds of demand. The example I just gave was that of price and demand, meaning thereby demand depends on price. Any change in the price of a commodity affects its demand. In addition to price, any change in income also affects the demand of goods.

**Video clip**

Shots of customers in the shops seemingly more interested in buying more expensive brands, e.g. double door fridges and fully automatic machines.

*Usually with an increase in income a person starts buying better quality products and the demand for such products increase.*

**Animated Graphic**



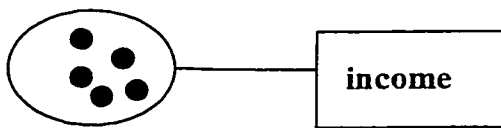
**This positive relationship of increase in demand due to increase in income is called normal behaviour for normal goods.**

**Simple Text Graphic**

**INFERIOR GOODS.**

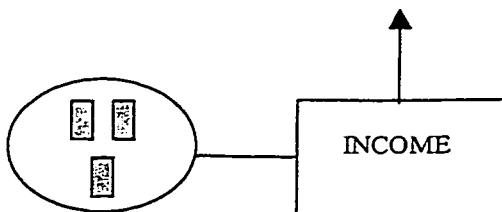
But then there are goods whose income rather the demand decreases, demand does not increase due to increase in such goods are called **inferior goods**.

**Animated Graphic**



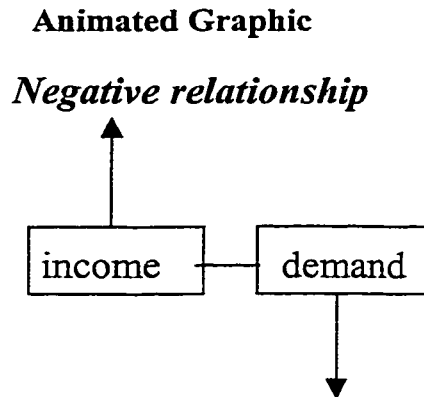
**poor people who were eating potatoes earlier**

**Dissolves to**



**started consuming bread and butter after an increase in their income.**





With this we can safely assume that there is an inverse or negative relationship between a change in income and the demand of some goods i.e. an increase in income does not force an increase in the demand of the goods.

**Simple Text Graphic**

We must also keep in mind that the demand does not depend on these two things alone i.e. price and income.

**RELATED DEMAND**

There is another factor, known as related demand which also affects the demand of goods.

**Simple Text Graphic**

In technical terms this is called cross demand. Cross demand means the price of one commodity affects the demand of another commodity. Such related commodities are classified in two categories.

**CROSS DEMAND**

**Video clip**

Shot showing different varieties of tea put on the Shelves.

*One such type is the commodity which can be used in place of another commodity,*

*for example, usage of tea instead of coffee.*

**Video clip**

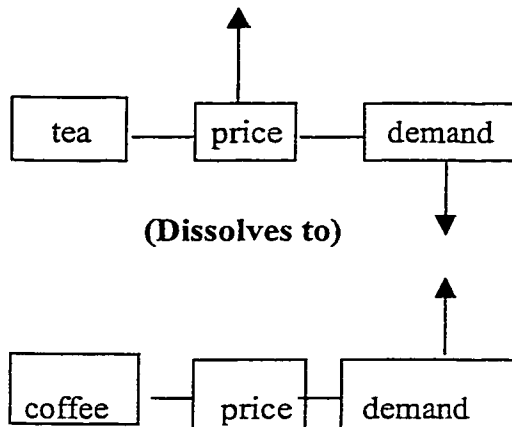
Shot showing the side of shop which has variety of coffee.

**Simple Text Graphic**

This category of commodities are called substitute goods.

**SUBSTITUTE  
GOODS**

### Animated Text Graphic



(NO CHANGE IN PRICE)

### Simple Text Graphic

### COMPLEMENTARY GOODS

#### Video clip

Shot of a petrol pump station, a car being filled with gasoline. Next car in line.

**Remember, with any increase in the price of tea will reduce its demand and increase coffee's demand because there has not been any change in the price of coffee.**

**The other category of related commodities is known as Complementary commodities.**

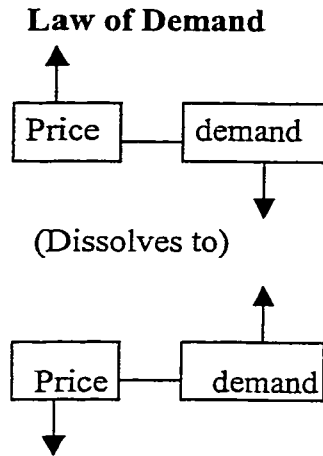
Complementary commodities imply that one needs both the commodities in order to full-fill a demand,

*for example one cannot drive a car without petrol. In such a situation both car and petrol will be called complementary commodities.*

Let's presume there is increase in the price of cars, this will induce a decrease in car's demand, additionally this will also decrease the demand for petrol.

Once again, let's look at the factors which affect demand. One is the price of commodities, second is the price of related commodities, another thing which influences demand is the fashion. If a man's taste, liking

### Animated Graphic



or disliking changes then it influences the demand of goods as well. In the long run, even the population also influences the demand. Population here means the size of population and its corresponding effect on demand. So these were the forces which influence the demand. Now let's talk about the relationship between demand and price. **There is a common knowledge that demand goes down if prices increase and demand goes up if the prices decrease, and this is exactly what we call "Law of Demand"**.

But in economics we have to add another factor to this Law of Demand. The factor is that other things remaining constant. What are these other things which we presume do not change? Such other things are, No change in income of the person, no change in the prices of related commodities. And no change in the fashion pattern, preferences, habit and liking, disliking of the person.

If we keep the above mentioned things constant, then we will find that with any increase in prices, the demand decreases and with any decrease in prices the demand increases, and this is the universal law of demand. But the question here is that why does a change in price influence the demand. Here we have to pay attention to four to five important points. One generally experienced fact is that when a person buys many units of the same commodity, each additional unit bought does not give the same utility as the

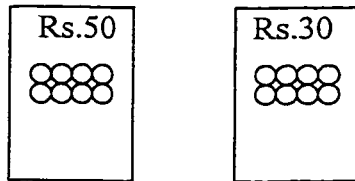
## Simple Text Graphic

### LAW OF DIMINISHING Marginal Utility

#### Video clip

Shots of sale/reduced prices on various items

#### Animated Text Graphic



first unit bought.

In economics this is known as “Law of Diminishing marginal utility” meaning thereby that a person can be persuaded to purchase more units of the same commodity only if the prices are decreased.

*With reduced prices a person will buy more units and the utility of each additional unit bought keeps on declining.*

The second decisive factor which affects the relationship between demand and price is known as the effect of income. Here income means the real income and not the money income, which as I told you earlier is fixed. Then what do we mean by ‘real income’? The ‘real income’ means that a person can buy more units of a commodity with the same amount of money, such increase in units of a commodity is referred as real income.

For example let us assume that an man used to spend Rs. 50 per week on apples but due to decrease in apple prices, he can buy the same quantity of apples with Rs. 30. Now he can buy more apples with that extra Rs. 20, so in terms of the quantity of apples his income has increased.

The third factor which explains an increase in demand due to decrease in price is the substitution effect. The substitution effect means that due to decrease in the price of a specific commodity a person tries to use it in place of other commodity which results in increase in demand of such reduced price.

### Video clip

Shots of fruit market, apparently a poorly clothed person entering a fruit market and buying apples

*The forth factor to be kept in mind is that with the increased price of apple, poor people stopped consuming because they cannot afford it. But due to fall in prices of apples such poor people also enter the market and can now afford to buy apples, and due to this the demand for apples increases again. The above four reasons explain how due to fall in price demand for a commodity increases.*

### Simple Text Graphic

#### Factors affecting change in demand

Law of diminishing marginal utility  
Change of real income

Once again, let me repeat the four reasons we just discussed. These are the law of diminishing marginal utility, increase in real income, effect of substitution and the entry of new buyers in the market.

In addition to this, let me tell you about another factor. In the context of demand, there can be "individual demand" i.e. how much of a particular commodity is in demand for. But there are many individuals like me who go to the market and collectively we all demand for many commodities. Such demand which is created by me and others in the market for a specific commodity if combined, will be called "market demand" for that specific commodity. So the demand is considered in terms of individual and market demand.

Also keep in mind that often the distribution of income also influences the demand. The distribution of income means how the income is being distributed in the society.

### **Video clip**

Contrasting shots of markets, one catering to the needs of rich people and other serving the needs of poor

*In any society, let's take Indian society where some people are very affluent and some people are very poor, the demand of poor people is different from that of affluent people, that's why the distribution of income also influences the demand.*

In short, we will now discuss about today's lesson. In the beginning I told you what demand is and also that it is different from the way we understand it in common language. In economics, demand means the want for a commodity, availability of purchasing power and the willingness to spend such purchasing power. Along with this, you are told that the demand is within a specified time-frame. So these are the important things to be kept in mind while discussing about demand. So far as the kinds of demand are concerned

### **Simple Text Graphic**

**Price demand**  
**Income demand**  
**Related demand**

**there are three kinds of demand. One is the price demand, second is the income demand and the third is related demand.**

The price demand means there is a relationship between price and demand. The income demand relates to income and demand. Here you were told that generally with an increase in income people buy more commodities. But in every society, there are certain commodities whose demand does not increase despite an increase in income and such commodities are known as Griffin goods or inferior commodities. This is an important aspect to be kept in mind.

Then there is related demand, and complementary demand is part of such related demand. Complementary demand means that you need another commodity to complete a specific demand. In this connection, I gave you an example of car and petrol. Second type of related demand I told

you was substitution demand meaning thereby that you can use one commodity in place of another one. And in this context the generally given example is that of tea and coffee.

In the beginning of our discussion we talked about the simple relationship between demand and price called as, “the law of demand” that demand goes down if prices increase and demand goes up if the prices decrease. The law holds good if other factors such as income, the prices of related commodities, fashion patterns, preferences of the consumers remain constant.

Now we also know that when prices reduce a customer can be persuaded to purchase more units of the same commodity because with reduced prices a person will buy more units and the utility of each additional unit bought keeps on declining. This we call “Law of Diminishing Marginal Utility”. Both these laws are important for understanding the concept of demand.

We have also seen the effect of income and learnt what is meant by “real income”? The real income of a person is when he can buy more units of the same commodity with less money. We used the example of buying apples to illustrate this. When new buyers enter the market, the demand of a commodity is positively effected. Then we talked about the individual demand and when several individual demands are put together it is called “market demand”. In the end we discussed the effect of distribution of income in the society on demand.

## APPENDIX V

### Post-Questionnaire (Personal Information)

The instructions will be given verbally on how to fill the form.

		Participant No.....
Date of Birth	:	
Male/ Female	:	Male                      Female
Are you working	:	yes                      No
Resident of	:	Delhi....                      Outside Delhi....
Language spoken at home	:	Hindi, Urdu, Punjabi, other.....
Subjects	:	
Hindi,		
English,		
Economics		
Science		
History		
Maths		
Commerce		
Other.....		
Do you have TV?		Yes                      No
If yes, how often do you watch?		Everyday 2-3 times a week Once a week Never
Did you have prior knowledge of the subject before watching this program?		Yes                      No



## APPENDIX VI

### Achievement Post-Test

Mark ✓ for the correct answer.

1. In Economics, it is necessary for demand to have
  - a) a desire and purchasing power.
  - b) a desire and willingness to spend.
  - c) a desire, purchasing power and willingness to spend.
  
2. Demand is at
  - a) a given place and price.
  - b) a price and within a time-frame.
  - c) a place and within a time-frame.
  
3. Generally
  - a) demand decreases with an increase in price.
  - b) demand increases with an increase in price.
  - c) demand is not influenced with an increase in price.
  
4. Generally with an increase in income
  - a) demand does not change.
  - b) demand changes.
  - c) demand is not influenced as there is no relationship between the two.
  
5. With an increase in income
  - a) inferior commodities are bought less.
  - b) inferior commodities are bought more.
  
6. Related demand means
  - a) combined decrease in demand of two commodities.
  - b) combined increase in demand of two commodities.
  - c) the effect on the price of a commodity due to the change in price of another commodity.

7. Following is the example of complementary commodities
- a) shoes and socks
  - b) petrol and car
8. Following is the example of substitute commodities
- a) ballpen and refill
  - b) tea and coffee
9. The demand of a commodity is influenced because of
- a) price and fashion.
  - b) price, fashion and the price of related commodity.
  - c) price, fashion and the behaviour of the shopkeeper.
10. The Law of Demand means
- a) demand increases with an increase in price.
  - b) demand decreases with an increase in price and demand increases
  - c) with decrease in price.
  - d) demand decreases with an increase in price.
11. The Law of Diminishing Marginal Utility means
- a) the decrease in the utility of a commodity.
  - b) non-availability of a commodity.
  - c) the decrease in the utility of each additional unit bought of a commodity.
12. Real income
- a) is related with money income.
  - b) is not related with money income.
13. Market demand means
- a) the total sum of demand by all the buyers.
  - b) non-availability of a commodity in the market.
  - c) the demand of a commodity by a buyer.
14. In summer, with decrease in the price of woolen clothes
- a) the demand for such clothes increases.
  - b) the demand for such clothes does not increase.
15. The example of potato and bread given by Robert Giffin is that of
- a) related commodities.
  - b) inferior and superior commodities.
  - c) complementary commodities.

16. If the price of tea increases then
- a) the demand of coffee will decrease.
  - b) there will not be any effect on the demand of tea and coffee.
  - c) the demand for tea will decrease.
17. Real income means that with the same amount of money
- a) more quantity of a commodity can bought.
  - b) lesser quantity of a commodity can be bought.
  - c) same quantity of a commodity can bought.

# APPENDIX VII

## Attitude Post-Test

Your impressions about the presenter and the programme:

Circle (O) your answer:

1. Is the presenter a teacher?

certainly yes	probably yes	can't decide	probably not	certainly not

2. Presenter's knowledge of Economics

no knowledge	very little knowledge	can't decide	moderate knowledge	expert

3. Presenter's style was

very impersonal	impersonal	can't decide	personal	very personal

4. Presenter's style was

quite relaxed	somewhat relaxed	can't decide	slightly tense	very tense

5. Presenter made the subject matter

very easy	easy	can't decide	somewhat difficult	very difficult

6. Presentation of the subject matter was

--	--	--	--	--

very boring      boring      can't decide      interesting      very interesting

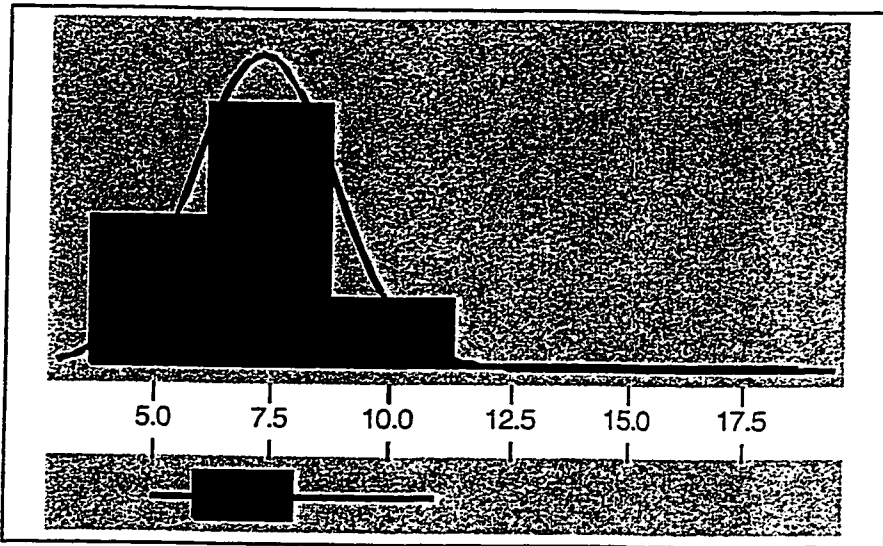
7. The topic chosen for the video programme was to my liking

--	--	--	--	--

very much      to some extent      can't decide      not much      not at all

# APPENDIX VIII

## Descriptive Statistics



Group: 0

### Anderson-Darling Normality Test

A-Squared: 0.9101  
p-value: 0.0177

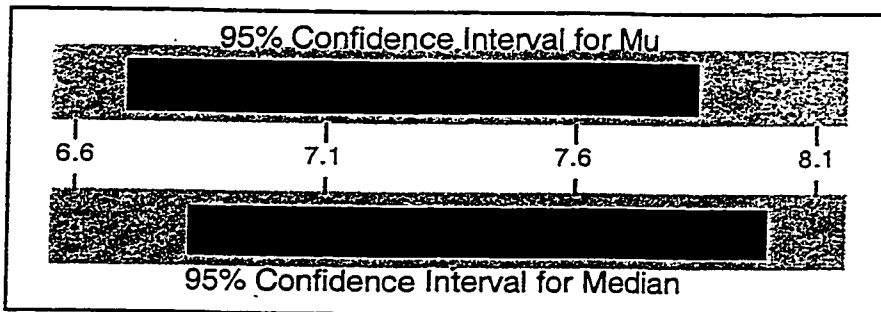
Mean 7.2759  
Std Dev 1.5094  
Variance 2.2783  
Skewness 0.6878  
Kurtosis 0.3283  
n of data 29.0000

Minimum 5.0000  
1st Quartile 6.0000  
Median 7.0000  
3rd Quartile 8.0000  
Maximum 11.0000

95% Confidence Interval for Mu  
6.7017 7.8500

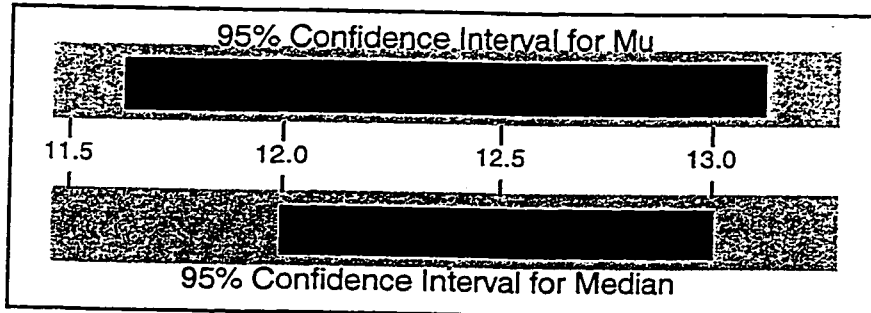
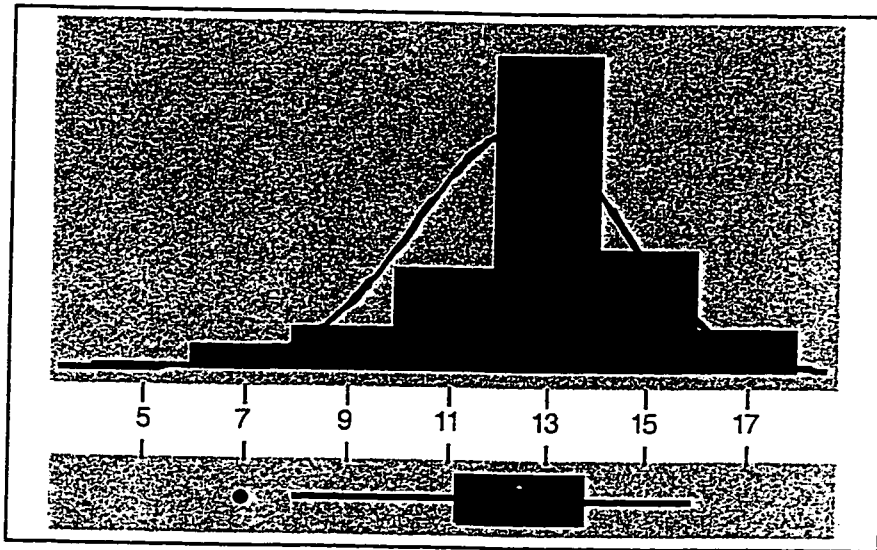
95% Confidence Interval for Sigma  
1.1978 2.0414

95% Confidence Interval for Median  
6.8342 8.0000



# APPENDIX IX

## Descriptive Statistics



Group: 1

### Anderson-Darling Normality Test

A-Squared: 0.7168  
 p-value: 0.0554

Mean 12.3750  
 Std Dev 2.0596  
 Variance 4.2419  
 Skewness -0.4923  
 Kurtosis 0.2769  
 n of data 32.0000

Minimum 7.0000  
 1st Quartile 11.2500  
 Median 12.0000  
 3rd Quartile 13.7500  
 Maximum 16.0000

### 95% Confidence Interval for Mu

11.6324 13.1176

### 95% Confidence Interval for Sigma

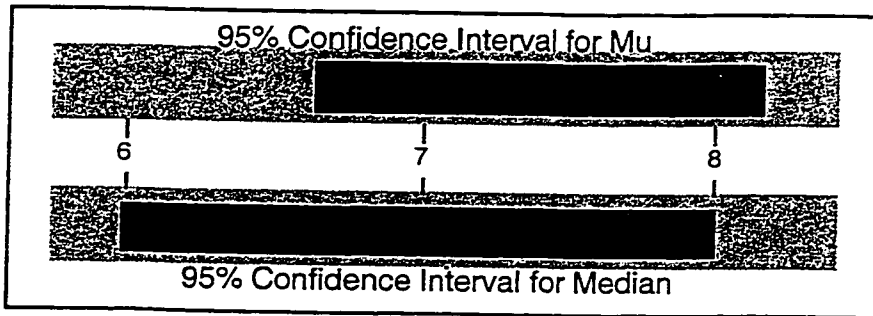
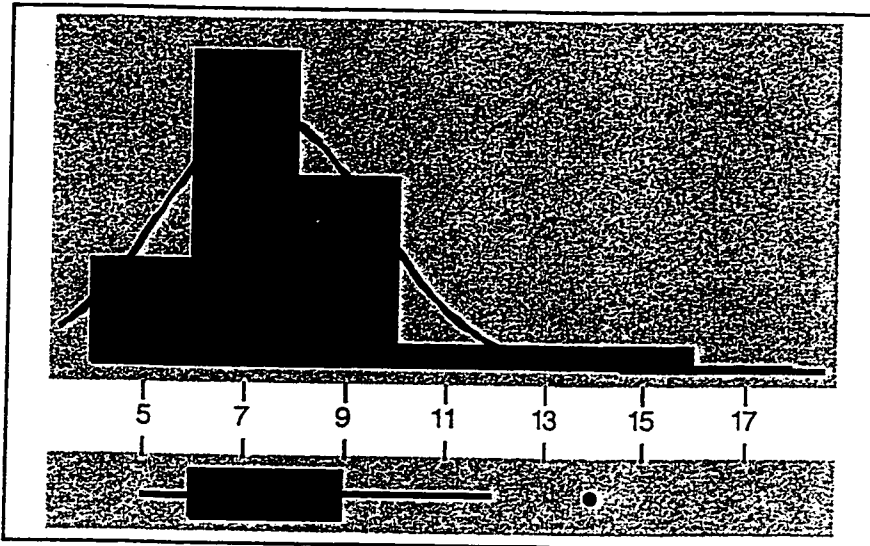
1.6512 2.7382

### 95% Confidence Interval for Median

12.0000 13.0000

# APPENDIX X

## Descriptive Statistics



Group: 2

### Anderson-Darling Normality Test

A-Squared: 1.2226  
p-value: 0.0029

Mean 7.4062  
Std Dev 2.0924  
Variance 4.3780  
Skewness 1.1512  
Kurtosis 1.2804  
n of data 32.0000

Minimum 5.0000  
1st Quartile 6.0000  
Median 7.0000  
3rd Quartile 9.0000  
Maximum 14.0000

95% Confidence Interval for Mu  
6.6519 8.1606

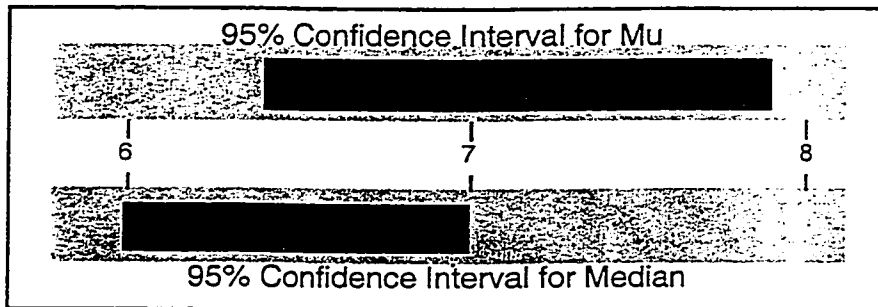
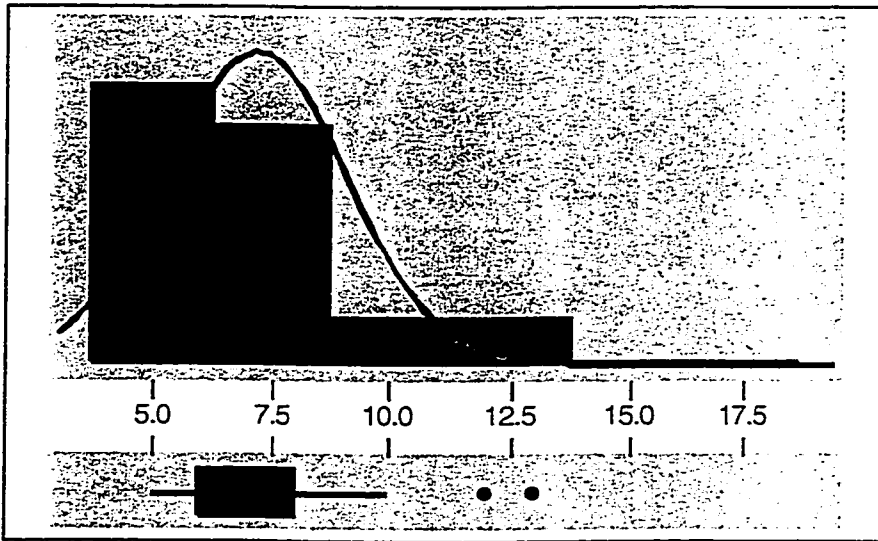
95% Confidence Interval for Sigma  
1.6775 2.7818

95% Confidence Interval for Median  
6.0000 8.0016



# APPENDIX XI

## Descriptive Statistics



Group: 3

Anderson-Darling Normality Test

A-Squared: 1.8946  
p-value: 0.0001

Mean 7.1429  
Std Dev 1.9190  
Variance 3.6825  
Skewness 1.5329  
Kurtosis 1.9893  
n of data 28.0000

Minimum 5.0000  
1st Quartile 6.0000  
Median 7.0000  
3rd Quartile 8.0000  
Maximum 13.0000

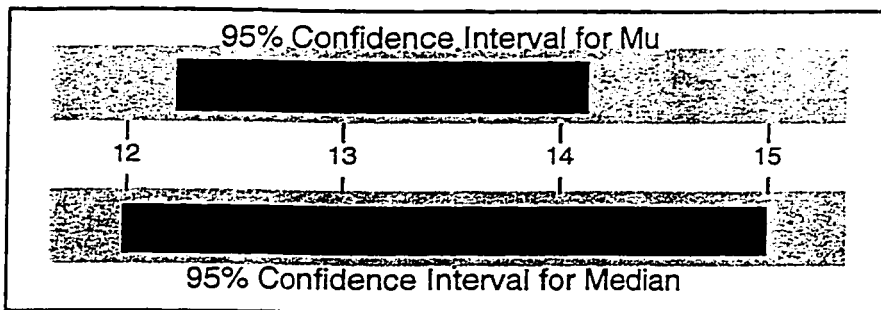
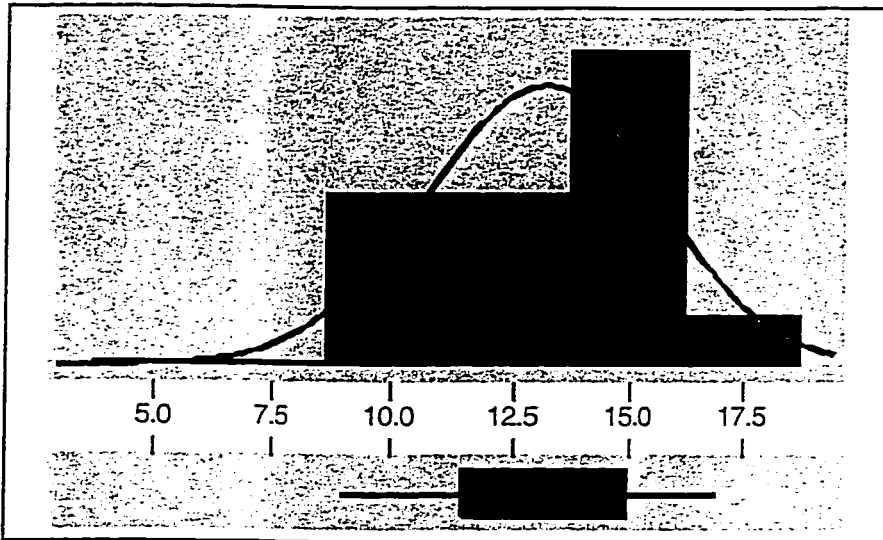
95% Confidence Interval for Mu  
6.3987 7.8870

95% Confidence Interval for Sigma  
1.5172 2.6120

95% Confidence Interval for Median  
6.0000 7.0000

# APPENDIX XII

## Descriptive Statistics



Group: 4

### Anderson-Darling Normality Test

A-Squared: 0.6691  
p-value: 0.0723

Mean: 13.1724  
Std Dev: 2.4795  
Variance: 6.1478  
Skewness: -0.3533  
Kurtosis: -1.0640  
n of data: 29.0000

Minimum: 9.0000  
1st Quartile: 11.5000  
Median: 14.0000  
3rd Quartile: 15.0000  
Maximum: 17.0000

95% Confidence Interval for Mu  
12.2293      14.1156

95% Confidence Interval for Sigma  
1.9677      3.3534

95% Confidence Interval for Median  
12.0000      15.0000