CHAPTER 1: INTRODUCTION

Communication is ubiquitous. Without proper communication one cannot articulate thoughts, ideas, wishes or emotions to others. Communication skills are essential in every sphere of human life and it is crucial to all human social behavior. Human beings’ need for communication is as strong as his basic needs to eat, sleep or work. Communication is both an individual and a social need.

1.1 What is Communication?

The term ‘communication’ is derived from the Latin word ‘communicare’, which means ‘to make common’ or ‘to share’. Communication is defined as process of conveying messages to generate meaning. Communication is considered as a ‘process’ because it is an activity, an exchange of ideas, or a set of behaviors—not an unchanging product. (Pearson et al. 10). Interaction, interchange, transaction, dialogue, sharing, communion and commonness are the terms that can be related, when the word ‘communication’ is defined.

Model of communication propounded by Aristotle, had just three elements in it- who said, what, to whom, i.e., the source, the message and the receiver. The addition of the fourth element called the ‘medium’ was added later. The early theorists like Denis MacQuail saw human communication in linear terms as “the sending of meaningful messages from one person to another”. These messages could be oral, written or visual. Here, communication as a linear and one way process has been always flowing from the source of the communication
to a passive receiver. MacQuail had shown communication as a simple, mechanical process of message transmission.

The early theorists contributed to our understanding of communication by suggesting that messages were connected to the setting. An effective communicator required to master these different forms of discourse. Shannon and Weaver refined the message-centered approach by describing the processes that influenced the clarity of messages. He argued that the key to an effective communication was the clarity of communication exchanges. But, Noise, both external and internal, distorted a message and interfered with clarity.

Wilbur Schramm adapted Shannon Weaver’s model to human communication, but emphasized on the encoding and decoding aspects as it formed crucial part of communication. He defined communication as ‘the sharing of information, ideas or attitudes’. He not only endorsed Aristotle’s principle that communication requires at least three elements-source, message and destination, but also encoding and decoding of the message as the most important components. Schramm opined that communication was circular in nature, where both the sender and the receiver were involved in encoding and decoding, and were equal partners in the exchange (Kumar K 9-22).

The significance of communication lies in its ability to change the behavior of the receiver. It is an art of persuasion and motivation. It is the primary tool for effecting social change. According to Ordway Tead, “Communication is a composite of information given and received, of a learning experience in which certain attitudes, knowledge and skills
change, carrying with them alternatives of behavior, of listening effort by all involved, of a sympathetic fresh examination of issues by the communicator himself of a sensitive interaction of point of view leading to a higher level of shared understanding and common interest."

1.2 Communication in Digital Age

Until about 150 years ago, the only commonly, but by no means universally, available means to engage in the process of communication of meaning was, the text or static images either in two or three dimensions. These genres were well established with printed text having been in place for some 400 years. The form of writing had, however, been in continual evolution, becoming standardized only in the nineteenth century. Over the last 150 years, the number of genres available for both personal and mass communications has grown exponentially.

During 1980s, with the advent of computers and mobile phones, communication techniques have changed forever. The mode of production, distribution, presentation and accessibility of the message witnessed a revolutionary transformation. The new digital devices made their way into schools, homes, business, and industry. It made the communication process easier and helped to reach maximum people with an improved impact. In 1990s, Technological advancements such as World Wide Web, email, search engines and broadband not only gave a wide access to extensive content, but also improved the speed of communication process (Turban et. al 4-10). Internet helped to access the information from nook and corner of the world and also improved communication process in various ways. The Internet expanded quickly, and by 1996, it was a part of the mainstream communication. By1999 almost every country had internet connection. In the early 2000, cell
phones had become inevitable part of life. People were able to send text message and make a call to any part of the world and it had become a cultural phenomenon among them (“Digital Revolution”). The recent digital revolution has taken communication to another level. The arrival of smart phones has provided access to the internet at the figure tips. The widespread mobile networks have helped to carry internet to the remote places of the world. With internet getting popular, tablets and smart phones getting economical, people have become more techno savvy and it is being used in most of the fields in day today basis.

Modern tools of digital age -computers, mobile smart phones and social media network technologies have influenced a range of societal and cultural aspects of life as well as individual experiences. Increasing use of plethora of digital tools in communication has, indeed, turned the world into a village: ‘global village’.

1.3 Education: Meaning, Concepts and Types

Education may be defined as a “purposive, conscious or unconscious, psychological, sociological, scientific and philosophical process, which brings about the development of the individual to the fullest extent and also the maximum development of society, in such a way that both enjoy maximum happiness and prosperity”. Over all, Education promotes the development of individual according to his needs and demands of society, of which he is an integral part.

The word ‘educate’ stems from the Latin word ‘educare’ meaning ‘to lead out’. The word ‘Educare’ also means to train or mould. The term ‘Educatum’ denotes the act of teaching. It throws light on the principles and practice of teaching (Hayes 7). Different scholars have defined the word ‘education’ in different ways.
According to Prof. Drever, “Education is a process in which and by which knowledge, character and behaviour of the young are shaped and moulded”. G. H. Thompson explained education as “the influence of the environment of the individual with a view to produce a permanent change in his habits of behaviour, or thought and attitude”. Going beyond the process of learning, Mahatma Gandhi had given broader perspective to education. He said, “Education means an all-round drawing of the best in child and mind” (qtd. in Kumar S & Ahmed 3).

In general terms, education is a process by which an individual is encouraged and enabled to fully develop his or her innate potential and it may also serve the purpose of equipping the individual with what is necessary to be a productive member of society. Through teaching and learning, the individual tries to acquire and develop required knowledge, beliefs, and skills. Therefore, education is considered to be equivalent to instruction. It consists of the specific influences consciously designed in a school or in a college or in an institution to foster the development and growth of the child. The word ‘school’ includes the whole machinery of education from Kindergarten to the University. But, education, in true sense does not end with university degree. It is a process which begins at birth and continues throughout life.

Hence, the education is mainly categorized into three types - formal, informal and non-formal (Dhushi). Formal education is planned with a particular end in view. It is given in school, college and similar other institutions which are established with the purpose. In this way, it is direct schooling, instruction and tuition. Informal education is truly lifelong process whereby every individual acquires attitudes, values, skills and knowledge by the educative or
daily experience and resources in his or her environment consisting of family and neighbours, from work and play, from the market place, the library and the mass media. Informal education is incidental and spontaneous. There is no conscious effort involved in it. Non-formal education is one of the recent concepts creeping to the broad spectrum of mode of education. Any organised educational activity outside the established formal system – whether by operating separately or as an important feature of some broader activity – that is intended to serve identifiable learning objectives is called as non-formal education.

But, the word ‘education’ is often used to refer to formal education. The formal education can be broadly divided into four stages- preschool education, primary school education, secondary school education and higher education. Preschools provide education in the early years before children enter primary education. Primary (or elementary) education consists of the first 5–7 years of formal, structured education after pre-school. Generally primary education consists of six to eight years of schooling, starting at the age of five or six, although this varies between, and sometimes within, countries. In most contemporary educational systems of the world, secondary education comprises the formal education that occurs during adolescence. Next stage is higher education; and it is also called as tertiary education. Higher education is post-secondary education, which is non-compulsory educational level, which follows the completion of a school providing a secondary education, such as a high school or secondary school.

1.4 Communication in Classroom

In any level of education, teaching is about establishing effective and affective communication relationships with students in a classroom. Effective teachers are effective communicators. They are those who understand that communication and learning are inter
dependent - the knowledge and attitudes that can be calculated from the classroom teaching perceived from the classroom, selectively drawn from a complex assortment of verbal and nonverbal messages about the subject, the teacher, and themselves. Barnlund’s transactional model stresses the fact that communication is complex and individuals ultimately act on the meanings they construct. Some receivers may get their meanings from private cues and others may focus on the verbal message. All the elements help to shape understanding. The nonverbal style of the teacher (gestures, mannerisms), the verbal style (sentence structure, vocabulary), the physical environment (a warm and inviting room or a cold and unappealing setting), all influence the meanings constructed by students (Powell, Robert G & Dana 12).

In educational communication, teacher selects and arranges what the students are supposed to learn (the content), decides how best to help them learn (the instructional strategy), and determines how success in learning will be determined and how the students' progress will be communicated by and to them (evaluation/feedback) (Wrench, Viriginia & Joan 2). Teachers consciously and strategically make decisions about both what is communicated and how it is communicated in a classroom. Normally, in a traditional classroom setup, teachers use interpersonal communication techniques. Interpersonal communication is the process of using messages to generate meaning between at least two people in a situation that allows mutual opportunities for both speaking and listening. (Pearson et. al 20). Interpersonal communication occurs for a variety of reasons in a classroom- to solve problems, to resolve conflicts, to share information or to communicate an idea to the students.

Dyadic and small-group communications are two subsets of interpersonal communication. (Pearson et. al 20). Both type of communication techniques are used in an education system.
Dyadic communication is simply two-person communication. This can be seen in both inside and outside the classroom whereas teacher interacts with a student, or student interacts with a teacher on academic issues. Dyadic communication gives an opportunity to the teacher to pay personal attention to the students and solve their problem by understanding their individual requirement. Small-group communication is the process of using messages to generate meaning in a small group of people. In a normal classroom setting, a teacher sends message to a small group of students, using traditional pedagogical techniques like chalk and talk method.

But, introduction of computers have changed the method of communication in the modern day class rooms. Computer mediated communication is getting more and more popular now a days. Computer-mediated communication often referred to as CMC, is human interaction using networked computer environments. It includes human communication and information shared through communication networks (Pearson et. al 21). In other terms, computer mediated communication is the use of electronic messages to create meaning. CMC requires digital literacy, which is the ability to find, evaluate, and use information that is available via computer. The e-mail messages, discussion group threads, instant messages, text messages, and twitters serve as the ‘message’ while humans continue to serve as the sources or receivers of those messages. In the same way that media convergence has become an important avenue of study in mass communication, technological convergence has become a center of interest of educational scholars and practitioners. Information communication technology tools such as multimedia presentations, blogs, internet, social media networking sites etc. are changing the mode of interaction in classroom.
In the beginning, the use of the term ‘Information Technology (IT)’ was very popular in computer mediated communication technique. Later, in 1997 after Stevenson report, the term ‘Information and Communications Technology (ICT)’ was being used instead of information technology (Easingwood 45). Difference between two terms, reflects a subtle, yet distinct change in approach as to what the use of the new technologies in our classrooms really means. The former term suggested that there was a one-way flow of information with the receiver being a passive recipient of material displayed on the screen. The adding of the word 'communication' implies a more dynamic interaction between the user and the world of information contained beyond the computer screen. As a result of this, the computer has evolved from being a teaching machine to being a tool to support learning and ultimately into a means of instigating communication from a local to global scale. Through information flow and feedback the computer has rapidly enhanced the capability of people to communicate over small or vast distances instantly and easily.

The effectiveness of communication in classroom can depend on various factors influencing teachers and students. Teachers come to the classroom with a variety of communication skills. Some are good listeners, some are organized, and some are funny. They also have different attitude and have different levels of knowledge. Some seem to know a great deal about the subjects they teach, others seem to struggle. Some are techno savvy, and some are not. Teachers come from different social systems and cultures. Culture and social system influence perceptions, language use and rules for appropriate behavior. Taken together, these factors shape the way in which a message is structured, what is emphasized, and how it is coded in a class room communication. Messages are sent through a variety of channels. The senses—seeing, hearing, touching, smelling, and tasting—can be part of a communication exchange in a classroom. The reception of message is also influenced by the
student’s communication skills, attitudes, knowledge, social system and culture (Easingwood 47-54). The further apart the sender and receiver are on these variables, the more problematic the communication becomes. So, whatever the communication techniques or mode of communication teacher uses, the message should be conveyed to the students explicitly inside or outside the classroom, by reducing the ‘noise’ of any type, for successful educational communication.

1.5 Use of ICT in Education

Technology based education seems to provide a more conducive way than the ‘traditional’ schooling, to facilitate the informal, collective forms of learning. On the other hand, some people, therefore, reckon that digital technology is capable of superseding the educational opportunities that can be provided by schools and other formal institutions. For many teachers, technology has been about machines taking the place of teachers. It is hardly surprising, then, that they have sometimes been ambivalent about these devices and have not always seemed to welcome them into their classrooms. Now that notion is changing. Information communication technology (ICT) tools are being used in the field of education in several ways.

There are three major uses of ICT in the field of education. First, ICT is used to improve quality of teaching and learning — this includes the use of application software as a teaching and learning tool. Teachers can use ICT for presenting the information to their learners, for assessing and monitoring learners’ achievements and for their own professional development. Learners may use ICT for getting access to new information, augmenting existing knowledge, sharing what they have learned with others, working on school projects with peers and acquiring new knowledge and skills. The second use is to enhance the administrative
productivity — such administrative services as grading and keeping records in schools are vital for tracing a student’s learning history and monitoring each student’s performance. The automated administrative services using ICT are beneficial to all stakeholders in schools.

Third, ICT is used to build information literacy — the school curriculum includes ICT as a learning object for students. The ultimate goal of ICT education is to develop ICT skills for problem solving in real life. The main contents may include computer architecture and cyber ethics. ICT is an indispensable tool for people living in this society. Teachers who have ICT skills can effectively prepare teaching materials using computers and present complex ideas better than those who have fewer ICT skills. Students who have ICT skills can also be successful in their learning and achieve greater outcomes than others who have fewer ICT skills (Heo & Kang 191).

The new ICT tools are used to enhance the learning experience in the name of ‘e learning’. E-learning, is a term, generally used to refer out-of-classroom and in-classroom educational experiences via computer and network-enabled technology to transfer of skills and knowledge. E-learning applications and processes include Web-based learning, computer-based learning, virtual education opportunities and digital collaboration. Content is delivered via the Internet, intranet, extranet, audio or video tape, animation, satellite TV, and CD-ROM.

ICT is used in many of the educational institutions around the world, which can make a significant difference to- how learners learn, how quickly they master a skill, easily they can learn; and more importantly, how much they enjoy learning. ICT tools can help the students by providing web access to the lectures, notes and digital resources to support their study. It can create a personalized web environment, in which students can join discussion
forums with their class or group, and this new kind of access, gives them much greater flexibility of study, removing the traditional barriers of educational communication. The online learning is becoming the way to go, if students are encouraged to take more responsibility on their learning goals and if education is to be made available to all irrespective of location and status in the society on affordable scale (Lumande et. al 66-78).

ICT could do even more. The interactive computer could be used to give students an alternative to writing as a form of active participation in knowledge building. It can model real-world systems, transactions, and can therefore create an environment in which learners can explore, manipulate, and experiment. The features of the digital environment are fully controlled by the program, so that it can be designed to offer as much or as little freedom to the learner as is appropriate to their level of mastery (Luarillard 20).

1.6 What is Animation?

The word ‘animation’ is derived from the Latin word ‘anima’, meaning "life" or "soul." Thus, animation is the act of bringing something to life (Balakenship). According to Baek and Layne animation is “the process of generating a series of frames containing an object or objects so that each frame appears as an alteration of the previous frame in order to show motion”.

In a general sense, the term ‘animation’ can refer to any display element that changes its attributes over time. Taken this broadly, examples such as words that fly across the screen or objects that vibrate, blink or change their colour would be regarded as ‘animation’. But animation in a stricter sense can be interpreted as “a pictorial display that changes its
structure or other properties over time and which triggers the perception of continuous change” (Schotz & Lowe 304).

Gonzales proposed a broader definition of animation as “a series of varying images presented dynamically according to user action in the ways that help the user to perceive a continuous change over time and develop a more appropriate mental model of the task”. This definition broadens the concept of animation by adding the element of interactivity. It contained the idea that user interacts with the display, at least by hitting any key.

Betrancourt and Tversky’s definition was more apt for understanding the computer generated animation. He said, “Animation refers to any application, which generates series of frames so that each frame appears as an alternative for the previous one, and where the sequence of frames are determined either by the designer or the user” (qtd. in Betrancourt and Chassot 141). This definition is broader by design than either of preceding definitions. It doesn’t stipulate what animation supposed to convey, and it separates animation from issue of animation form the issue of interaction.

Now, in this modern technological era animation has been evolved into in different forms- 2D animation, 3D animation, stop motion animation, digital animation, and so on. But the history of animation dates back to history of human civilization. Around twenty five thousand years ago Cro-Magnon man made attractive drawings of the animals, he hunted, in the caves of Southern Europe. His art was not only beautiful but also included the theme of life. It had impressions of movement. This is the time when artists got the inspiration and idea of ‘movement’. Since then artists tried to get the movement of real life using varieties of media like sculptures, paintings, carvings ect. Artists continued to search for a medium that would
permit them to capture the elusive spark of life. In 1510 Leonada Da Vinci Drew a sequence of images directing movement. But only in 1800s, along with the improvements in motion picture, camera and the development of a roll film capable of surviving the harsh mechanisms for projecting its images, a new art form was born: ‘animation’ (Thomas & Johnston 14-15).

In 1831, Joseph Antoine Plateau used a machine called ‘phenakistoscope’ to create the illusion of movement. The device consisted of a spinning disc that held a series of drawings and windows that framed the user's perception of the drawings. Many other animating machines were invented since then, but it was not until 1906 when the first complete animated film was produced by J.Steward Blackton. It was called "Humorous Phases of a Funny Face". In 1914, Earl Hurd introduced the technique of cell animation. During this time the first hand drawn cartoon animation movie ‘Gurtie The Dinsosa’ was done. In 1923 arrival of Disney studios changed the landscape of cartoon animation. Walt Disney produced a huge cartoon world in less than ten years in 1928 ("The History of Animation"). The first commercial animated cartoon, "Snow White and the Seven Dwarfs", was then produced. Many artists contributed to this in their own way.

In early 1990s, legendary animator Walt Disney said, “Animation can explain whatever the mind of man can conceive” (qtd. in Thomas & Johnston 13). With the growth of computer technology and animation, his words have come true and animation has reached all areas of life in different form. It has proved that it can bring anything into reality whatever human mind can imagine. Historically, animation has its root in the entertainment world being used in the films and cartoon industries, as a way of explicitly visualizing a narrative with the aim of making it accessible and engaging, especially for young children.
But now it has been used in various fields like advertising, tourism, marketing, engineering, medical, education etc. Animation is emerging as a powerful tool of communication in these fields. With the help of animation, like any other field, facilities to communicate in an educational setting has also been increased. Drawing from the lessons used by the cartoonists, interaction designers have started to use animations to create agents that serve a variety of functions at the computer interface. In particular, they have been developing learning companions in computer-based tutoring environments and as visual agents in interactive narratives.

1.7 Visual Communication: From Pictures to Animation

In animation, message is communicated through series of images. The creation of realistic pictures as a means of communication was practiced from a long time. Famous early examples are the cave paintings that are estimated as being 20,000 years old. Although it is difficult to know exact function or the intentions behind these paintings, it seems reasonable to assume that pictures were used very early as a tool for the communication. For example, their purpose could have been passing information about any event or unknown object. Once established as a tool for communication, the further development of drawing and painting proceeded along a number of different ways.

One line of development had the general aim of producing highly realistic depictions. Painters such as Canaletto and Spitzweg, were famous for their skill in capturing subject matter with such a level of high accuracy and detail, which provided an illusion of looking upon reality though a window to the observers. Renaissance architect L. B. Alberti based his theory of painting explicitly on this metaphor. He considered a picture as a surrogate for a real window providing a view on an external reality. The skill of realistic depictions so
painstakingly developed by generations of artists was made redundant by the inventions of colour photography, which made it possible for everyone to create realistic pictures.

A second line of development in visual representations did not aim at pictorial realism but instead had a very different communicative purpose. Its goal was to emphasize selected aspects of the presented content that were important and in doing so, make visual communication more efficient. In this respect, the development of written languages shares some characteristics with this second line of pictorial development. Written language introduced segmentation techniques such as full-stops, paragraphs, headings and subheadings as well as signalling techniques such as different front types, type sizes and colours. Similarly, drawing and painting introduced various techniques such as simplifications, highlighting and colour coding in order to shape the observer's perceptual and cognitive processing. The use of pictures that were carefully selected and specially designed for the purposes of teaching and learning was given particular attention by Comenius, the 17th Century educator, who emphasized the role of envisioning in learning.

A third line of development of visual communication is far more recent. Charts and graphs, often referred to as ‘logical pictures’, were introduced by the British economist William Playfair in the second half of 18th Century. In this type of picture, direct perceptual similarity with a designated referent has essentially been abandoned in favour of capturing information about subject matter that cannot be directly perceived. Because of their power to represent more abstract type of content, they have been widely adopted by educators and the media.
Animation is widely considered to be a modern development that emerged as a result of technological advancement. Film technology, the first practical means of presenting ‘moving pictures’ to be widely adopted, was invented only just over 100 years ago. It was followed by video and most-recently by computer-based animation. However, a closer examination reveals that from a psychological point of view, animation is not as new as its modern technological incarnation would suggest. Today’s high-tech animations have various low-tech predecessors. Oriental shadow puppets that display moving silhouettes on a paper screen could be regarded as an early form of animation. If one accepts the form of 3D animation, the movements of marionettes on a stage could also be considered as a form of animation. In earlier times, artisans competed to make mechanical toys for entertaining their royal patrons as realistic as possible. Similarly, many of today’s computer-based animations try to portray their dynamic subject matter with a high degree of realism. Animations can also be used in the situations where visual realism is not the ultimate goal. This other line of development applies animation techniques for representational and directive purposes in order to make visual communication more effective by emphasizing on specific aspects of the depicted content (Schnottz & Lowe 306-309).

1.8 Animation: An Effective Tool of Communication in Education

Educational communication is defined as “the process in which a teacher establishes an effective and affective communicative relationship with the learner, so that the learner has the opportunity to achieve the optimum of success in the instructional environment”. (Wrench, Virginia and Joan 1). In this context, animation can be used both as an effective and affective tool of communication in modern day classroom.
For successful communication in the field of education, we should facilitate enjoyment in our classroom learning (Easingwood 49). Learning must be made as an ‘enjoyable process’. Teachers who should overcome from classroom anxiety by encouraging students to enjoy learning by exchanging fun ideas, telling interesting stories which relates to content, telling an appropriate, funny jokes, and generally attempting to make the classroom a delightful environment where learning will be fun. Use of animation instruction material aids to accomplish this idea.

According to Mayer cartoon animation is exceedingly successful in engaging its audience; even the most bizarre events are easily comprehended applying animation (30). In classroom it assists to increase learners ‘problem solving transfer performance’. It also helps to improve the students understanding of the presented explanation. He refers this result as ‘multimedia effect’.

A good animation can improve the quality of communication by focusing on specificity and accuracy of the message, paving way for swift integration of new information with prior knowledge of pupil. Thus, the students with a high level of prior knowledge are able to assess the ‘gaps’ between the internal and external information they have. There are several reasons to believe that animation could enhance the prior knowledge as well. According to Constructivist theories of comprehension, learning involves the integration of new information into existing knowledge structures (Hegarty & Kriz 10). The result of the integration process depends not only on how the new information is presented, but also on the quantity, specificity and accuracy of the existing knowledge.
In traditional classroom setup, instructor often uses ‘chalk and talk’ method for teaching. Usually, learner’s attention in the traditional classroom is directed by the explanation of the instructor and the text or static diagram written on the blackboard. When students see a static diagram in the classroom, they may have to mentally animate it to understand how the system works. Whereas, if they view the same course content in animated form they merely have to perceive it as it is. Mental animation depends on the prior knowledge of the mechanics as well as spatial ability (Hegarty & Kriz 15). So, the students will get an advantage from an animation compared to the static image or sequences of images in a classroom.

Narayanan and Hegarty argue that animation could be more effective for low-knowledge students (270). When static diagrams or images are presented in the class room, inference of motion from static diagrams depends on the knowledge as well as spatial visualization abilities. Animations may be relatively more effective for those with low prior knowledge, because it shows the motion in a mechanical system explicitly, and do not rely on the learner’s ability to infer motion from static diagrams. When instructor communicates in the classroom two channels are used to process the information—visual and auditory channel. Visual or pictorial channel helps to process pictures and auditory or verbal channels are used to process words (Mayer 33). Each channel has limited capacity for processing the information. If the visual or auditory channels are overburdened with information, it can act as ‘noise’, and it may finally disrupt the communication process which will have detrimental effect on learning. A student can effectively learn only if he engages in appropriate cognitive processing such as selecting the relevant information, organizing the selected information, and integrating the selected information with prior knowledge and other representations. Animation can achieve this.
Interactive animation content can give hyperlinked access to the multiple forms of graphic, textual, and multimedia information and help to convey the message in an effective way. While teaching using animation in class room, teacher is less a lecturer, more a coach. Working with computers allows instructors to observe and to facilitate. There is more dialogue and mutual conversation than in a teacher-controlled instruction (Harada 43).

The success of animation in education largely depends on the design of the animated instructional material. The animation which has the ability to communicate the message effectively, and engage the students in learning, will be successful in educational environment. In order to get better result in the class room, the process of communication in educational environment should be improved. Animation as a distinctive technological tool can be used to enhance the overall process of communication in pedagogy. Its effectiveness is mainly determined by how the issues related to the basic elements of communication are addressed while preparing and presenting animation instructional material. According to the ‘bottom-up’ model of animation comprehension, the comprehension is primarily a process of encoding the information in the external display, so that improving the display necessarily improves the understanding (Hegarty & Kriz 4). But learner’s abilities, skills, prior knowledge, and environmental factors may also influence the students’ understanding of the subject even while learning from animation.

1.8 Primary Education in Karnataka

Karnataka, established as a state in 1973, is situated in the southern part of India. The state of Karnataka is divided into 28 districts, which are further divided into subdivisions, and the subdivisions are divided into blocks. Karnataka with Bengaluru as its capital has emerged as the leader in the sectors of IT, biotechnology and education in the country. 80.6% of the
Karnataka population is literates, of which 86.6% are male and 74.1% female (“Surveys of ICT” 22).

In Primary education, there are three kinds of schools in the state, viz., government-run, private aided (financial aid is provided by the government), and private unaided (where no financial aid is provided). These schools are affiliated either to Karnataka State Board or Council for the Indian School Certificate Examinations (CISCE). We also come across schools affiliated to the Central Board of Secondary Education (CBSE). Kannada and English are the primary languages which are used as the medium of instruction at the schools in Karnataka. The CBSE and ICSE schools however, generally depend on English as their medium of instruction. The primary language of instruction in the government schools are, Kannada. As of March 2006, Karnataka had 54,529 primary schools with 8.495 million students and 9,498 secondary schools with 92,287 teachers and 1.384 million students. (“Surveys of ICT” 21-23).

1.9 Use of Animation in Primary Education of Karnataka

Karnataka has been in the forefront in using ICT in education. The schools in Karnataka have been using animation instructional content in primary education from a long time. The state announced its IT policy in the year 1997 known as “Mahiti, The Millenium Information Technology Policy of Karnataka”. In the area of education, this policy had planned to take ICT to all the schools and to set up training centers in schools. These centers were supported by the private sector to impart teacher training, computer education as well as foster general education with the help of ICT tools (“Surveys of ICT” 25). This computer-based education was introduced in Karnataka, starting with 1,000 government Secondary Schools under the *Mahiti Sindhu* Project in the year 2000 by the Government of Karnataka.
In 2001, the Azim Premji Foundation, a nonprofit organization, had set up Computer-Assisted Learning Centers (CALCs) in 35 rural government primary schools to enhance the quality of learning of the children, through computer-based lessons developed for the Karnataka state curriculum for grades I to VII. Today, in association with the Azim Premji Foundation, the Education Department is creating CALCs in government primary schools across the state. A total of approximately 600,000 students have been benefited in 3,000 primary schools by the program, along with a total of 15,000 being teachers trained.

The Foundation has developed a range of multilingual animation instructional CDs to assist the primary school children in grasping their curricular subjects. The department of education has been instructed to use this in various government schools of Karnataka. The subjects like Mathematics, Science, Geography, Kannada, Hindi, and English, from 1st to 7th standard are covered in this animation content and it has been prepared under the supervision of educational experts by Azim Premji Foundation. These instructional materials are in the form of 2D cartoon animation and child-centered interactive games ("Surveys of ICT" 30). However, private unaided schools of Karnataka are not using this animation instructional material. Most of these schools are depending on the animation course content available in the outside market. Among these multi-media based interactive content supplied by Pearson educational services, in the name of ‘Digi Class’, is very popular.