CHAPTER 1

MULTIMEDIA

INTRODUCTION
CHAPTER-I
INTRODUCTION

"Multimedia has come a long way from its humble roots to today's cutting-edge modern animation and interactivity."

1.1 PERMEABLE

The world has passed through a few revolutions, namely Agricultural Revolution, Automobile Revolution and Industrial Revolution. It is currently in the age of Information Revolution. The age of revolution is dominated by a single most important technology known as Information Technology (IT). IT deals with data collection, data processing to generate information and information transmission. Multimedia is a communication service of the 21st century. It will be the power of Knowledge Age that is believed to come after Information Age. Multimedia approach has unique importance in the educational system and social transaction. It has revolutionized the lives of people in the world. It has played an important role in innovation and improvement in teaching methods, individualization of instruction and an effective learning system for a fairy large number of students. During the last four decades, great changes have taken place as a result of the rapid scientific and technological developments. Education has to play an important role so that we can accept the change in a smooth way. It can do so by bringing improvements in the existing curricular, textbooks, methods of teaching and evaluation.

To achieve the aims of education in modern world, it makes sense to take an innovative approach to teaching that can prove better in the long run than letting it just filter in for the highly-motivated teachers. Multimedia has become, within a very short time, one of the basic building blocks of modern society. The incorporation of Multimedia and Communication Technologies in education has profound influence in teaching. The student accesses knowledge and information through Internet, TV, satellite and cable network and digital media to synchronies learning mediated through these multiple delivery mechanisms.
Education is a life long process but the new and emerging technologies challenge the traditional process teaching and learning. The multimedia programme allows students to work at their own pace and supports connections and comparisons that a traditional text does not. An environment in which the student is “empowered to control their own learning” is said to foster “deep learning” which is self motivated and self-directed. Multimedia environments allow users to explore and undertake a range of tasks that closely mirror those of the real world. In this way, you do not have to be constrained by verbal descriptions of visual activities. When students are able to convert learning into a world in which the learning process naturally unfolds, higher levels of cognition are attained. Because attention tends to lapse some ten to eighteen minutes into a typical classroom lecture, teachers need to find ways to engage students into the classroom lecture, video and web-resources reengage students. Brief digital sound and video clips add an element of surprise to the lecture causing students to pay closer attention.

Educational systems around the world are under increasing pressure to use the new Information and Communication Technologies to teach students the knowledge and skills they need in this century. “Through computers the use of multimedia has created novel models of learning and greatly contributed to the restructuring of instructional environments in schools.

One of the most rapidly changing and exciting areas of education in the world today is development of multimedia learning packages that run on personal computers. These new technologies offer students and teachers access to materials as never before. Multimedia deliver large amounts of information in ways that make it manageable, approachable and useful. Multimedia makes it possible to access illustrations and photographs, sound and video, as well as large amounts of text. Multimedia programmes present learning information to teachers, students and scholars in newly engaging and meaningful ways. The integration of multimedia programmes into classrooms and libraries promises not only to change the kinds of information that is available for learning, but the ways that learning takes place. One of the advantages of using multimedia is to convey information quickly and effectively to all students and keep them interested in learning.
1.2 MULTIMEDIA AS AN EDUCATIONAL TOOL:-

Multimedia is fast emerging as an important tool of information technology and as a basic tool of tomorrow’s life. Future world of information and communication shall be converged to multimedia application and shall provide comfort, competition, mobility, efficiency and flexibility. As per Fred T. Hofstetter “Multimedia is the use of a computer to present and combine text, graphics, audio and video with links and tool that let the user navigate, interact, create and communicate”. Multimedia shall enable people to communicate and access at anytime and anywhere at reasonable costs with acceptable quality and manageability.

The multimedia approach in teaching-learning scenario means a strategy, which incorporates more than one technique/media of instructional unit. But is not just a collection of a few media or techniques; rather it is planned combinational objectives because different potentialities for realizing varied objectives. The Multimedia Approach aims at the maximum utilization of effectiveness of different techniques and media in proper combination to acquire the desired end with interactive multimedia programs the learning process becomes active. The use of multimedia technology has offered an alternative way of delivering instruction.

1.3 IMPORTANCE OF ENVIRONMENTAL AWARENESS AMONG THE ELEMENTARY STUDENTS:

Environmental degradation has emerged as a serious issue in the world today. Human factor is the largest contributor to the environmental degradation. There is dire need to pay serious attention towards protecting life on earth.

The goal of Environmental Science is to make the students aware of the formidable consequences of the environmental degradation, if not retorted and reformative measures undertaken would results in extinction of life. The environmental science has a very important role in making available to the man and the social communities, knowledge of the whole environment and the problems related to it. By means of environmental education only the man gets the knowledge of these factors which influence
the environment. Man is an important part of environment. Therefore, by means of environmental education only the information about the problems related with the environment and appropriate suggestions for the removal of those problems can be given. Thus, environmental science has an important role in bringing environmental awareness among the people.

Environmental education is significant in providing environmental knowledge and awareness and in developing fundamental understanding of the environmental. Environment, the factors responsible for the environmental problems and the role of man are all incorporated in the environmental education so that sufficient knowledge of every aspect of environment could be made available.

For bringing about change in the attitude of students', knowledge of environmental education is important. As a result of the change in attitude, awareness of the social groups with the values, determined feelings is possible only through environmental education which is necessary not only for the environment but for students’, also. By getting inspiration from these attitudes, students’ can provide his positive contribution in the conservation and improvement of the environment. Similarly, in the context of change in attitude environmental education has a special significance.

Environmental science is helpful in attributing the ability to evaluate social communities and individual environmental programmes which are concerned with ecological, economic, aesthetic and educational factors. By means of environmental education only the man gets the knowledge about the various factors responsible for influencing the environment and their effects.

Along with the social groups, environmental science is necessary individually also for making available the essential skills for solution of the environmental problems. Whereas on one hand the modern age is regarded as the age of development, on the other hand it is accepted as the harbinger of devastation. During the completion of developmental tasks suddenly some tasks are carried out which damage the environment. Thus environmental
science is extremely important for creating necessary skills for balancing environment.

Environmental science is helpful in developing a feeling of responsibility in the students. By the creation of these responsibilities the students not only get the knowledge about the environment, but also about various problems related to it, their causal factors, effects and their solutions. On the basis of this environmental knowledge, by maintaining a balance in environment the students gives his positive contribution in removing problems concerned with the environment. Thus environmental education develops an attitude in students to actively participate in the improvement of the environment. In conclusion environmental science provides the elementary students’ knowledge about the environment among elementary students and the problems concerned with the environment and the necessary skills, attitudes, inspirations and the feelings to improve environment.

Environmental science is not a separate branch of science or field of science. It should be carried out according to the principles of life-long integral education. It prepares the individual and communities for life, through an understanding of the major problem of the interaction of the biological, physical, social, economic and cultural aspects of the individual and communities. It provides skills and attitudes needed to pay a productive role in improving life and values in order to enable people to enjoy good health and high quality of life. The goal of environmental science is to provide the child knowledge of the physical and social environment comprehensively and develop his consciousness about them. Thus in environmental study a child can make progress in life by solving problems of his natural and social environment. In Environmental science, the students are provided such learning experiences through which they may develop expected attitudes by obtaining knowledge of the environment, understanding, skill and awareness; establish a relation between natural and manmade circumstances.
1.3.1 GOALS OF TEACHING ENVIRONMENTAL SCIENCE AT ELEMENTARY LEVEL:-

The main goal of teaching environmental science is to educate students about the environmental challenges and also to provide them adequate environmental attitudes.

- To educate the students about the environmental problems.
- To provide them adequate environmental attitudes.
- To help in understanding the biotic and abiotic environment.
- To help in finding the causes of environmental pollution and to suggest remedial measures.
- To appreciate the gifts of nature.
- To help in understanding the use and misuse of natural resources.
- To develop the positive attitudes, values and practices such as respect and care for all life on earth, protection and conservation of natural resources etc.
- Promoting a conservation ethic and adoption of environment friendly practices and habits.
- Valuing the importance of protecting and conserving natural resources for the needs and rights of future generations.

The effective way of solving environmental issues is that of developing environmental awareness among the students who are consciousness about the environment. This can be achieved by informing students about the environmental topics and providing them with positive attitudes about the environment.

1.4. CONCEPT OF MULTIMEDIA:

In the simplest form of definition, Multimedia can be described as: Two or more media combined to provide information about a subject or concept. Multimedia refers to the use of various media to communicate messages. It is often said, with voice you can communicate with about 70% efficiency, but with voice and video with 90% efficiency. Simultaneous delivery by multiple media for communicating messages and content increases the delivery efficiency, the message impact and multisensory
experience. Multimedia increases receiver’s knowledge and understanding of the received messages. Computer Technology Research of 1993 says: “People retain only 20% of what they see and 30% of what they hear. But they remember 50% of what they see and hear and 80% of what they see, hear and do simultaneously.”

**Multimedia is actually combination of two words:**

\[
\text{Multimedia} = \text{Multi} + \text{media}
\]

The term “Multi” means: Many

The term “medium” means:

- Medium for presentation
- Medium for perception
- Medium for storage
- Medium for information exchange
- Medium for representation
- Medium for transmission

![Fig. 1.1 Concept of Multimedia](image)

### 1.4.1 Definitions of Multimedia:

“Definitions of multimedia available on the web and books are:-

- Presenting data in more than one medium, such as combining text, graphics and sound. ([www.m2ketch.com/hardware_glossry.html](http://www.m2ketch.com/hardware_glossry.html))
- The combination of audio, video, animation and graphics. Multimedia software presents information in all these contexts. Multimedia computers are required to run these types of programmes. ([www.mywapole.com.au/Business/smallBusinessIT/Glossary](http://www.mywapole.com.au/Business/smallBusinessIT/Glossary))
- “Multimedia is characterized by the presence of text, pictures, sound, animation and video; some or all of which are organized into some coherent program” ([Phillips, 1997](#))
A form of communication combining text with graphics, page layout, video, audio, animation and so forth. (www.dakno.com/glossary.php)

A term used to describe a range of products that have some audio and/or visual basic; for example, encyclopedias are labeled as being “multimedia”. (www.youngmers.com/dictionary/3/)

A combination of multiple media types, including text, graphics, animation, audio and video is called Multimedia. (www.actewagl.com.au/education/glossary/default.aspx)

This is software that combines graphics, audio and video to make us a media presentation. (www.its.strath.ac.uk/helpdesk/glossary)

The use of several media, such as movies, slides, music and lighting in combination normally for the purpose of education or entertainment. (www.publicspeakingcourse.com/glossaryk-o.htm)

Generic description of the generation and transfer of voice/data/video traffic between users. Applications to exploit multimedia to the full are text, graphics, audio, video and animation. (www.nettedautomation.com/glossary_menu/glossary_m.html)

Writing and filmmaking encompassing more than one medium at a time, script-wise, usually refers to CD-ROM games or Internet based programming. (www.screenwriting.info/glossary.php)

Computer-controlled presentations combining three or more of the following elements: text, graphics, animation, full-motion images, still video images and sound. (www.srec.iisc.ernet.in/Computinfacilities/systems/cluster/vac7.0/html/glossary/czgm.htm)

Software programmes that combine text and graphics with sound, video, animation. A multimedia PC contains the hardware to support these capacities. (www.gbdpro.com/glossary3.html)

“Multimedia is the combination of a variety of communication channels into a co-ordinated communicative experience for which an integrated cross-channel language of interpretation does not exist”. (Elsom-Cook, 2001)

This originally indicated a capability to work with and integrate various types of things including audio, still graphics and especially video. (Ambron and Hooper, 1988)
• Systems that support the interactive use of text, audio, still images, video and graphics. Each of these elements must be converted in some way from analog form to digital form before they can be used in a computer application. (tr.wou.edu/ntac/documents/fact_sheets/glossary.htm)

• “Multimedia can be defined as an integration of multiple media elements(audio, video, graphics, text, animation etc.) into one synergetic and symbiotic whole that results in more benefits for the end user than any one of the media elements can provide individually”. (Reddi, 2003)

• Multimedia is the integration of multiple forms of media. This includes text, graphics, audio, video etc. For example, a presentation involving audio and video clips would be considered a multimedia presentation. (srdc.msstate.edu/ecommerce/curricula/farm/-mgmt/glossary.htm)

From the general definitions, it is clearly evident that multimedia encompasses a wide spectrum of application and technology. Any one or more of the following media and / or a combination of Audio, Text, Graphics, Animation and Video is generally employed in all Multimedia Projects in the field of education.

1.4.2 Elements of Multimedia

Multimedia refers to the integration of multiple media such as voice, video, data, text, animation and graphics etc. Basic three communication media or services are Voice, Video and Data. The elements of multimedia can graphically be seen as in Fig. 1.2

![Elements of Multimedia](image)

Fig. 1.2 Elements of Multimedia
TEXT
Text is the basic element of multimedia. It involves the use of text types, sizes, colours and background color, in a multimedia application, other media of screen can be linked through the use of text. This is what you call Hypertext. To produce an effective multimedia program there are three things that need to be considered. They are:

- Position of the text on the screen.
- Length of the message
- Legibility of the text.

GRAPHICS
Graphics make the multimedia application attractive. They help to illustrate ideas through still pictures. There are two types of graphics used: bitmaps (paint graphics) and vector (draw graphics). All formats of graphic can be presented in a multimedia. An image represents a still picture in digital form by using bits to specify the colour of each of many pixels. An image is the spatial representation of an object, a two dimensional or three dimensional scenes or another image. It can be real or virtual. An image is a still picture used for adding visual effect to multimedia.

AUDIO
A multimedia application may require the use of speech, music and sound effects. These are called audio or the sound element. There are two basic types of audio or sound: analog and digital audio. Sound is put in the form of

- Natural Sounds
- Music
- Dialogues
- Narrations

VIDEO
Video provides a powerful impact in a multimedia program. It is made up of series of frames of slightly varied images “which”, when shown in rapid succession gives the impression of the movement. To give smooth motion,
PC needs to display over 25 frames per second. Each frame is a separate image so even a short video clip takes up huge amount of space on disc.

**ANIMATION**

Animation is a process of making a static image look like it is moving. In multimedia, digital animation is used. Digital animation can be categorized into two broad area: 2D (2 Dimension) and 3D (3 Dimension) animations.

![Animation](image)

**Fig. 1.3 Types of Animation**

**1.4.3 TYPES OF MULTIMEDIA**

The multimedia programmes are mainly of two types -

(A) **Linear** - Early multimedia was linear in nature. In linear multimedia, the end user receives a programmes, which plays a sequence of sound, video and images without any control over the presentations content.

(B) **Non-Linear** - In contrast to linear, if the programme lets the user control the sequence by selecting different options, it is called Interactive Multimedia (IMM) or Non-linear multimedia.

![Multimedia Diagram](image)

**Fig. 1.4 Types of Multimedia**
PRINT AND NON-PRINT MEDIA

Print media is the chief instrument for education throughout the world. The print media is used in various forms such as books, newspapers, magazines, journals, pamphlets, atlases, dictionaries, encyclopedias etc. It is considered as an important aid to teaching as well as to learning. Most of the teachers and educators depend on the printed text for teaching and learning. Thousands of books are being printed everyday throughout the world in different languages and for different purposes. Print media is the reliable and economical source of information and knowledge. Even in the present age of computer and satellite communication, the print-based material is the most powerful and pervasive educational technology. Even all the distance educational institutions use print-based material for instructional purposes. Non-Print media enlightens the students by providing useful knowledge in almost all the fields of life. Examples of Non-print media are:- Radio, Television, Computer, Video-disc, Video-text, Tele-conferencing etc.

1.5 HISTORY OF MULTIMEDIA

To understand the history of multimedia, we need to peep into the history and development of various technological aspects which paved way for the development of multimedia. About 50 years ago, photographic images in slide form were projected on a screen or wall while audio attempted to synchronize with the sequence or played as “background” music.

In 1967, pop artist Andy Warhol organized “multimedia” events called the Exploding Plastic Inevitable, where he showed films combined with live performances that were illuminated with flashing, colored lights to create a multisensory atmosphere. The technology necessary for joining individual media did not exist at that time. Computers were not accessible to the general public and those that did exist were large, complex, costly, and primarily geared toward scientists and researchers.

Today, the term multimedia is associated almost exclusively with the computer, and the components that make up a multimedia program are digital. Various media are brought together to perform in unison on the computer as a single entity, and they are programmed or scripted using
authoring software or programming languages. Diverse forms of communication are combined with multimedia to allow for a myriad of outcomes.

**The Evolution of Multimedia**

Evolution of multimedia can be woven around five themes developed over a timeline, Visionaries, Text, Processing and Software, Audio and Telecommunication, Computers, Video and Animation.

**Visionaries** - Innovation of the outstanding thinkers had a direct impact on the explosion of the technological age. So the ingenious idea of the programmable computer can be traced back to the innovations of visionaries.

**Text, Processing and Software** - Inventions and innovations that spawned the development of software enabling computers to move from mathematical processing of technology, which creates and deliver multimedia.

**Computers** - From academic and corporate worlds, we can trace computer development from gigantic, noisy, bulky dinosaur computers to the role of sleek, handy and efficient desktop personal computer and laptop of today.

**Audio and Tele-Communication** - From the telegraph signal to cellular telephones and the development from analog signal to digital transmission of voice.

**Video and Animation** - From manually manipulated negative film and hand drawn sketches, video and animation developed to sophisticate digital creation and rendering of motion.

So the history of Multimedia can be best understood by understanding the development in these five fields.
Table 1.1
History of Multimedia

<table>
<thead>
<tr>
<th>Times &amp; Vision</th>
<th>Text, Processing &amp; Software</th>
<th>Computers</th>
<th>Audio &amp; Telecommunication</th>
<th>Video &amp; Animation</th>
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<tbody>
<tr>
<td>Intel 4004 chip developed by Hoff, Computers can now be owned by individuals.</td>
<td>Printing Press Gutenberg and Caxton, movable type printing</td>
<td>Franklin discovers electricity</td>
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<td>1780 FRANKLIN</td>
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<tr>
<td>1822 BABBAGE</td>
<td>Charles Babbage designs the Difference Engine</td>
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<tr>
<td>1833 LADY BYRON</td>
<td>Babbage design Analytical Machine, often considered to be the first general-purpose computer. Lady Byron writes programs for the machine</td>
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<td>1837 MORSE</td>
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<td>Telegraph receiver and transmitter</td>
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<td>1839</td>
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<td>Daguerreotype: photographs produced using a paper negative</td>
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<td>1854 BOOLE</td>
<td>George Boole:</td>
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<td>1867</td>
<td>Remington Manual Typewriter</td>
<td>Develops binary mathematical language of 1's and 0's (Boolean Algebra)</td>
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<td>1876</td>
<td>Bell</td>
<td>Telephone</td>
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<td>1879</td>
<td>Edison</td>
<td>Granted a phonograph patent</td>
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<tr>
<td>1886</td>
<td>Burroughs</td>
<td>First commercially successful adding machine</td>
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<tr>
<td>1888</td>
<td></td>
<td>Mood Music for Film: Musical scores sent along for organ accompaniment Gramophone: disks manually rotated @ 70 rpm</td>
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<tr>
<td>1890</td>
<td>Hollerith</td>
<td>Tabulating Machine for the U.S. Gov. Census using punch cards. The tabulating machine later became IBM</td>
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<td>1920</td>
<td></td>
<td>Commercial radio: KDKA</td>
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<tr>
<td>1925</td>
<td>Electronically recorded sound discs AT &amp; T’s Bell labs allow recording of whole symphonies</td>
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<tr>
<td>1928</td>
<td>DISNEY “Steamboat Willie” first cartoon with a fully synchronized soundtrack</td>
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<td>Year</td>
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<td>1931</td>
<td>ZUSE</td>
<td>Conrad Zuse First calculator.</td>
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<tr>
<td>1932</td>
<td></td>
<td>Magnetic tape BASF introduces magnetic tape recording</td>
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<tr>
<td>1933</td>
<td></td>
<td>Dudley Vocoder - voice code</td>
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<tr>
<td>1936</td>
<td>TURING</td>
<td>&quot;Turing's Machine&quot; defined as capable of computing any calculated function</td>
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<tr>
<td>1937</td>
<td></td>
<td>&quot;Snow White and the Seven Dwarfs&quot; the first full-length animation is released.</td>
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<tr>
<td>1939</td>
<td>ATANASOFF</td>
<td>John Atanasoff and Clifford Berry design a prototype of the ABC computer (the first automated digital computer).</td>
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<tr>
<td>1940</td>
<td></td>
<td>First colour T.V. broadcast</td>
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<tr>
<td>1941</td>
<td></td>
<td>&quot;Colossus&quot; built for the British military from Alan Turing's system.</td>
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<tr>
<td>1943</td>
<td></td>
<td>Zuse - Z3: First machine to work</td>
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</table>
on a binary system rather than decimal system.

<table>
<thead>
<tr>
<th>Year</th>
<th>Inventor/Description</th>
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<tbody>
<tr>
<td>1945</td>
<td>BUSH</td>
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<td>“As we may think” in the Atlantic Monthly</td>
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<td>Momex</td>
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<tr>
<td>1946</td>
<td>MAUCHLY</td>
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<tr>
<td></td>
<td>ENIAC Electronic Numerator Integrator and Calculator the first successful high speed digital computer. However, it used the same concepts that Atanasoff and Berry used to build the ABC computer.</td>
</tr>
<tr>
<td>1948</td>
<td>Shockley, Bardeen and Brattain develop the transistor. More reliable and cheaper to run than vacuum tubes.</td>
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<tr>
<td></td>
<td>Open reel tape recorder by Magnecord</td>
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<tr>
<td>1951</td>
<td>UNIAC Computer used magnetic tape for buffer memory.</td>
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<tr>
<td>1952</td>
<td>IBM 701: First electronic stored computer that used vacuum tubes, RAM, punch cards and was the size of</td>
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<td>Year</td>
<td>Event</td>
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<tr>
<td>1953</td>
<td>Electric typewriter</td>
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<td>1954</td>
<td>Transistor radio</td>
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<td>1956</td>
<td>First Transatlantic telephone cable</td>
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<td>1957</td>
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<tr>
<td>1958</td>
<td>CRAY: Builds the CDC 1604 for Control Data Corporation. The first fully transistorized supercomputer. Texas Instruments develops the first Integrated Circuit. Solves the problems of speed, size and wiring.</td>
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<tr>
<td>1959</td>
<td>Second generation computer introduced by IBM. Used transistors instead of vacuum tubes.</td>
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<td>Year</td>
<td>Event</td>
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<tr>
<td>1960</td>
<td>Removable disks. Paul Baran sees a communications network different than the traditional point to point links. He envisioned a &quot;fishnet network&quot;</td>
</tr>
<tr>
<td>1963</td>
<td>CAD (Computer Aided Design) Sketchpad uses the first light pen. Phillips first compact audio cassette. First home video tape recording</td>
</tr>
<tr>
<td>1964</td>
<td>&quot;Understanding Media&quot; postulates the global village. Third generation of computers included the photo printing of conductive circuit boards to eliminate wiring.</td>
</tr>
<tr>
<td>1965</td>
<td>McLuhan Xanadu hypertext project</td>
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<tr>
<td>1969</td>
<td>VanDAM Development of hypertext editing system Dolby labs produces Dolby noise reduction for pre-recorded tapes</td>
</tr>
<tr>
<td>1970</td>
<td>Fourth generation computer by IBM uses chips to reduce size and cost.</td>
</tr>
<tr>
<td>1971</td>
<td>Intel 4004 chip</td>
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<td>Year</td>
<td>Event</td>
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<tr>
<td>1972</td>
<td>Computers can now be owned by individuals.</td>
</tr>
<tr>
<td>1973</td>
<td>Metcalf outlines ideas for Ethernet</td>
</tr>
<tr>
<td>1974</td>
<td>Intel 8080 microprocessor which was to be used in many PC's.</td>
</tr>
<tr>
<td>1975 Gates</td>
<td>Microsoft is founded by Bill Gates.</td>
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<tr>
<td>1976</td>
<td></td>
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<tr>
<td>1977 Jobs &amp; Wozniak</td>
<td>Apple was founded by Steven Jobs and Steve Wozniak</td>
</tr>
<tr>
<td>1979</td>
<td>VisiCalc: the first spreadsheet WordStar: word processing package is</td>
</tr>
</tbody>
</table>

21
<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>1980</td>
<td>Word Processing Machine</td>
<td>Single purpose machine with limited storage on magnetic material.</td>
</tr>
<tr>
<td>1981</td>
<td>The MS-DOS, or Microsoft Disk Operating System</td>
<td>Adam Osborne completed the first portable computer</td>
</tr>
<tr>
<td>1982</td>
<td>Lotus 1-2-3, software</td>
<td>First digital audio 5th compact disc.</td>
</tr>
</tbody>
</table>

Bartle and Roy Trubshaw at University of Essex. Beginning of on-line services with CompuServe and The Source.

SONY introduces the consumer camcorder.

Apollo Computer unveiled the first workstation.

Computer-generated graphics in movies step forward with Disney’s “Toon”.

22
<table>
<thead>
<tr>
<th>Year</th>
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<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>1983</td>
<td>First PC clone Musical instrument Digital Interface (MIDI) introduced</td>
<td>Internet is born TCP/IP protocol</td>
</tr>
<tr>
<td>1984</td>
<td>Apple Computers introduced with the first mouse driven GUI (Graphical User Interface)</td>
<td>3 ½-inch &quot;microfloppy&quot; diskette DNS: domain name server introduced voicemail developed</td>
</tr>
<tr>
<td>1985</td>
<td>Desktop publishing Aldus PageMaker for the Macintosh</td>
<td>NSFNET: linking five university supercomputer centres (550 mg) CD-ROMs evolve from CDs on which music is recorded.</td>
</tr>
<tr>
<td>1986</td>
<td>Optical transistor patented, a component central to digital optical computing.</td>
<td>SONY Betamax removed from consumer shelves</td>
</tr>
<tr>
<td>1987</td>
<td>HyperCard Apple (1987) actually</td>
<td>First digital audio tape players</td>
</tr>
<tr>
<td>Year</td>
<td>Event/Innovation</td>
<td>Details</td>
</tr>
<tr>
<td>------</td>
<td>------------------</td>
<td>---------</td>
</tr>
<tr>
<td>1988</td>
<td>Robert Morris’ worm flooded the ARPANET.</td>
<td>3D Graphics: 3D graphical supercomputers Pixar’s “Tin Toy”: the first computer-animated film to win an Academy Award.</td>
</tr>
</tbody>
</table>
| 1989 | Handwriting recognition is introduced by grid with a touch sensitive pad on a laptop computer. | Battery powered fully functional notebook computer. Corporation for Research and Education Networking (CREN) is formed by merging CSNET into BITNET. Maxis released SimCity, sophisticated video game launching a new genre ‘simulation’.
<table>
<thead>
<tr>
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<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990</td>
<td>IBM, Tandy AT &amp; T, and others announce the software specifications for multimedia platforms.</td>
<td>IBM, Tandy AT &amp; T, and others announce the software specifications for multimedia platforms.</td>
</tr>
<tr>
<td>1991</td>
<td>GOPHER, PGP encryption released by Phillip Zimmermann</td>
<td>National Science Foundation lifts ban on commerce on the internet.</td>
</tr>
<tr>
<td>1992 Berners-Lee</td>
<td>Mosaic developed by M. Andreessen</td>
<td>World Wide Web</td>
</tr>
<tr>
<td>1993</td>
<td></td>
<td>Internet 1994</td>
</tr>
<tr>
<td>1994</td>
<td></td>
<td>Internet goes interactive; shopping, banking, live concerts, radio broadcasting, spamming</td>
</tr>
<tr>
<td>1995</td>
<td></td>
<td>Private ISP becomes big business; Netscape goes public</td>
</tr>
</tbody>
</table>
History of Multimedia helps in understanding the concept and ingredients of multimedia.

Clark (1977) further focuses on the concept of multimedia and the glittering world created by it “Before you become too entranced with gorgeous gadgets and mesmerizing video displays, let me remind you that information is not knowledge, knowledge is not wisdom and wisdom is not foresight. Each grows out of the other and we need all.” Clark (1997) impresses upon the fact that multimedia attracts everyone, but needs to be used judiciously.

So Multimedia by itself can be fruitful. “It is the competence of the teacher on which depends the success and failure of the Multimedia in the field of Education”, Clark. Today, Multimedia is made possible and affordable because of increase in storage and speed and decrease in size and cost; this yields an increase in performance and availability. Electronic Communications can be broadly classified in two categories:

- Analog
- Digital

In the analog form of electronic communication, information is represented as a continuous electromagnetic wave form. Digital communication represents information in binary form through a series of discrete pulses. A digital signal is made up of on and off pulse of electricity. Digital media record audio as binary computer code. Computers process, store and communicate information in binary form, i.e., in the combination of 1’s and 0’s which has specific meaning in computer language. A binary digit (bit) is an individual 1 or 0. Multiple bit streams are used in a computer network. With the development of excellent graphics and emergence of stereo sound multimedia, the computers have become excellent device for effective, what computers can do for us by giving those new ways to present information, and act as powerful source of information and communication.

1.6 IMPORTANCE OF MULTIMEDIA IN THE CLASS ROOM

Multi-Media have unique importance in the educational system and social transactions. It has revolutionized the lives of people in the world. It
has played an important role in innovation and improvement in teaching methods, individualization of instruction and an effective learning system for a fairly large number of students.

- Multi-media package in teaching and learning is psychologically sound. Variety and newness of the media motivate students for learning both at the preparation and participation stages and promote learning. Students profit from recreational activities like pictures, charts, posters, models, stories and plays.
- Multi-media package in teaching and learning is essential for the effective realization of learning objectives and provides learning environment in which students take active part in the learning process.
- Multi-media approach in teaching and learning helps in achieving student’s involvement and participation and therefore facilitate learning.
- Multi-media in teaching and learning is learner-centered in the sense that it can accommodate learner’s needs and interests. The variety and flexibility of multi-media offer the opportunity to adopt any media combination for use in individualized instruction.

The pedagogical strength of multimedia is that it uses the natural information processing abilities that we already possess as humans. Our eyes and ears, in conjunction with our brain, form a formidable system for transforming meaningless sense data into information. The old saying that "a picture is worth a thousand words" often understand the case especially with regard to moving images, as our eyes are highly adapted by evolution to detecting and interpreting movement.

1.7 STATEMENT OF THE PROBLEM

DEVELOPMENT AND VALIDATION OF MULTIMEDIA PACKAGE IN ENVIRONMENTAL SCIENCE AND ITS EFFECT ON COGNITIVE AND AFFECTIVE OUTCOMES OF ELEMENTARY STUDENTS

1.7.1 OPERATIONAL DEFINITION OF THE KEY TERMS

The terms used in the statement of the study are defined as under:

1. Multimedia Package:

Multimedia combines five basic types of media into learning environment: text, video, sound, graphics and animation, thus providing
powerful new tools for education. Multimedia package by definition has the
capacity to deliver large amounts of materials in multiple forms meant for
teaching and to deliver them in an integrated environment that gives students
the reading, listening and viewing experience through amalgamation of text,
audio, video, graphics and animation.

2. **Environmental Science:**
The branch of Science that deals with all elements, factors and
conditions that have impact on growth and development of an organism.

3. **Validation:**
It refers to check the quality of instructional material. The programmer
for improving the quality of instructional material should do empirical
validation of the instructional material.

4. **Elementary Students:**
In India elementary schools provide education from Class 01 to
Class 07. The children in these classes are generally aged between 5 to 12
years. It is the next stage after kindergarten (Pre-Nursery, Nursery, Prep or
Lower Kindergarten and Upper Kindergarten). Students studying in class VI
between the age group of 10-11 years are taken for study in this research.

5. **Cognitive Domain:**
Relating to knowing, understanding and reasoning; logical thought
processes. It is also relating to the process of acquiring knowledge by the use
of reasoning, intuition or perception.

6. **Affective Domain:**
It describes the way people react emotionally and their ability to feel
another living thing’s pain or joy. Affective objectives typically target the
awareness and growth in attitudes, emotion and feelings.

7. **Achievement:**
Achievement is a measure of knowledge gained by plan programme as
indicated in the test score.

8. **Development:**
Development means to construct.
1.8 OBJECTIVES OF THE STUDY

1. To develop the Multimedia package in Environmental science for elementary students.
2. To validate the Multimedia package in Environmental science for elementary students.
3. To develop Achievement Test on Environmental science for the elementary students.
4. To develop opinionnaire to seek the opinion of teachers about the effectiveness of multimedia package as a teaching-learning strategy for elementary students.
5. To develop Attitude Scale on Environmental science for elementary students.
6. To compare the mean achievement scores of two groups of elementary students taught Environmental Science with and without the use of Multimedia Package before the experimental treatment.
7. To compare the mean achievement scores of two groups of elementary students taught Environmental Science with and without the use of Multimedia Package after the experimental treatment.
8. To compare the mean gain achievement scores of two groups of elementary students taught Environmental Science with and without the use of Multimedia Package after the experimental treatment.
9. To compare the mean attitude scores of two groups of elementary students taught Environmental Science with and without the use of Multimedia Package before the experimental treatment.
10. To compare the mean attitude scores of two groups of elementary students taught Environmental Science with and without the use of Multimedia Package after the experimental treatment.
11. To compare the mean gain attitude scores of two groups of elementary students taught Environmental Science with and without the use of Multimedia Package after the experimental treatment.
1.9 HYPOTHESES
The following corresponding hypotheses have been framed:
• $H_1$ At the end of experimental treatment, the group of elementary students taught Environmental science through multimedia package scored significantly higher on the achievement test than the group of elementary students taught through the traditional method.
• $H_2$ At the end of experimental treatment, the group of elementary students taught Environmental science through multimedia package showed significantly higher mean gain score on the achievement test than the group of elementary students taught through the traditional method.
• $H_3$ At the end of experimental treatment, the group of elementary students taught Environmental science through multimedia package scored significantly higher on the attitude scale than the group of elementary students taught through the traditional method.
• $H_4$ At the end of experimental treatment, the group of elementary students taught Environmental science through multimedia package showed significantly higher mean gain score on the attitude scale than the group of elementary students taught through the traditional method.

1.10 DELIMITATIONS OF THE STUDY
The present study was delimited to:
• Students of Gurukul Senior Sec. School, Matindu, Distt. Sonepat only.
• Multimedia Package was tried out on one hundred students of Elementary class (Sixth grade).
• Multimedia Package was based on five topics of environmental science mentioned below:
  1. Understanding Our Environment
  2. Living and Non-living things
  3. Natural Resources
  4. Water
  5. Pollution
* 30 days of the academic session.
1.11 NEED FOR THE STUDY

We are facing many environmental problems such as air pollution, water pollution, noise pollution, soil pollution and global warming but learning about them is not sufficient to overcome these problems. By using classroom activities we can develop a positive approach and focus on what individuals can do to help in saving the earth. Teachers can provide Computer assisted Instructional material to the students on environment to make them aware about the environmental pollution and how to control it. All teachers have personal responsibility to contribute to the students’ awareness on environmental issues and to foster in their students the development of skills that promote sustainable development.

Education on environment helps the students of elementary classes to understand the physical and cultural characteristics of the world. Multimedia Package on environment provides the values, knowledge, concepts and skills to better understand ourselves, our relationship to the earth and our interdependence with other people of the world. Teachers can promote the study of environmental issues through one or more teaching strategies, personal experiences, textbooks and printed media but Multimedia Instructional material if used for the purpose is likely to be more interesting and effective as compared to the others.

Environmentalism is very important political and social movement with goal to protect environment by emphasizing importance of nature’s role in protection of the environment in combination with various actions and policies oriented to nature preservation. Environmentalism is movement connected with environmental scientists and many of their goals. Some of these goals include:

- To reduce world consumption of fossil fuels.
- To reduce and clean up all sorts of pollution (air, sea, river...) with future goal of zero pollution.
- Emphasis on clean, alternative energy sources that have low carbon emissions.
• Sustainable use of water, land and other scarce resources
• Preservation of existing endangered species
• Protection of biodiversity

Keeping in view the utility of Multimedia Package as instructional mode and the increasing necessity for such material in schools, the investigator decided to develop Multimedia Package on Environmental Science for Elementary class students. Multimedia Package on environmental science will certainly motivate the students to attain cent percent mastery of content and further enable them to apply this knowledge in real life situations. In addition to it, the developed Instructional Material on environment helps the students of Elementary class to understand the physical and cultural characteristics of the world. Multimedia Package on environmental science provides the values, knowledge, concepts and skills to better understand ourselves. It concentrates on giving information, developing the understanding and application of the concepts, reasoning and thinking power of the students and also enhances the creativity in developing better understanding about the environmental science. Multimedia brings a new dimension to reading and writing and need for the students to develop basic skills in information. Employing multimedia tools into the learning environment is rewarding, but complex and challenging task. All of the multimedia formats available: text, sound, video, animation and graphics, already exist in one form or another in most libraries. Students can explore an almost infinite variety of information.