

# Chapter I

## **INTRODUCTION**

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### INTRODUCTION

#### 1.0 INTRODUCTION

Throughout the World, We are going through a period of reflection on the teaching/learning process of the Science education, in order to maintain a healthy school environment. It is today's demand to teach science with a solid understanding of the most important scientific ideas by using new methods. Certain features of teaching science at the present time are fairly general. The biological Sciences usually treated as descriptive rather than experimentally and they are aligned to geography and geology rather than to physics and chemistry. The contribution of Science to the educative process is of two fold. On the one hand, it is informative, involving the acquisition, within the limits of the pupils' abilities, of the knowledge necessary for full participation in, and enjoyment of, life in the modern world. In the pre-technology education context, the teacher is the sender or the source, the educational material is the information or message, and the student is the receiver of the information. In terms of the delivery medium, the educator can deliver the message via the "Chalk-and-talk" method and overhead projector (OHP) transparencies. Basically, in lecture method, the teacher delivered the content to the entire class and the student listens to the lecture. Thus, the learning mode tends to be passive and the learners play little part in their learning process. It has been found that lecture method used for teaching sciences in schools has less effective. It is a method of one way process of imparting scientific knowledge. While on the other aspect of teaching, through various innovative methods students interact more and the teaching learning process become more effective than traditional teaching style. Hence I have decided to see the significance difference between traditional and innovative methods of teaching science in VII classes.

The information provided in this research will help one to better understand why this study was conducted. Because technology is prominent in education, there was focus between two different methods of delivering simple step directions: audio video

instructions (Multimedia) versus traditional lecture. Educators' today use both modes of instruction, but one will better result in the method of retaining information. The study is to determine the effectiveness of audio video instruction as opposed to the traditional lecture. Within a group of 70 students, students are going to be separated into two groups and each group of 35 students each group will going to be taught in totally different manner, one will attend normal chalk-n-talk other group will be taught through multimedia based methodology. It will be expected that the students who receive video instruction recalled more information than those who receives the traditional lecture instruction of the teacher in chalk-n-talk method. Because of the expected results, this study will suggest that the effectiveness of video instruction will be used as a method to support student learning.

In the current scenario of educational institutions, multimedia has dig up its own kind of space in some or the other way as a tool of educational technology. Multimedia has overcome the barriers of time and space and provides evidence to be accepted as an anytime and anywhere tool for educating multi-disciplinary masses. The process of knowledge acquisition becomes more efficient when the learners experience an event through a multimedia simulation. Multimedia technology empowers the educational process by means of increased interaction between teachers and the students. Apart from the fact that multimedia can provide educators and students with endless possibilities of quality teaching and learning, taking vital considerations of the pedagogical strengths and limitations of Multimedia, it can be used to its fullest potency, and reach the eminence of 'New Educational Technology tool'

### **1.1 What is Multimedia?**

In the field of education, we have long used media, sometimes referred to as "audio-visual aids", to help in our teaching. These have been many and varied, and have included things like movies, videos, slides, and audio tapes, overhead transparencies, along with various sorts of equipment such as cameras, recorders and television monitors. The term "multimedia" is a relatively new word that is used to describe a combination of different media, all being used to best describe or explain something.

Technically speaking, a movie projector or video tape player is a multimedia device in its own right; since it combines two or more media forms already - pictures plus sound. In recent times, however, the computer has dominated the scene, and we are now at the point where these remarkable machines can do just about anything that all the previous things were able to do. So if you have not had to go through the “learning curve” of old-fashioned and out-of-date technology, then you have a real advantage.

### **1.1.1 What is digital multimedia?**

When all of the things that we want to use are converted into a digital format, then we call it digital multimedia.

### **1.1.2 The raw bits**

These are the various bits and pieces that are combined together to make the final multimedia project. Let’s consider some of these.

**1.1.3 Text files:** These are normally word processor documents that are typed into a computer. They can also be produced by scanning text from a book or elsewhere and then putting them into a word processor file. Text files have file extensions like .doc, .txt, .rtf, etc.

**1.1.4 Drawing files:** Clip art and similar drawings are available from many sources, including the internet and various software libraries. Some programs come with a collection of freely available clip art. If you have a drawing program on your computer, you may also be able to create your own files. But be aware that some of these programs take quite a long time to learn. Picture files have extensions such as .wmf, .png, .dwg, and many others.

**1.1.5 Photograph and pictures:** Digital photographs are now very common and can be made easily on almost any digital camera. The tricky job is often getting these into a computer where they can be incorporated into a multimedia project. The best advice we can give is for you to follow the instructions that came with

cameras. Photographs can also be scanned into your computer in the same way as pictures. Digital imaging software can be used to alter your pictures. Sometimes this is supplied with either your camera or computer. Once again, it may take some time to become proficient in the use of this. Photograph files have extensions such as .jpg, .tif, and others.

**1.1.6 Sound recordings:** CDs are probably the most common form of digital recordings, but now it is also possible to make simple digital voice recordings on a number of devices, including the computer of course. The old-style cassette tape recorder is now replaced with a modern digital machine that records straight to a computer storage device such as a hard disc. The most common sound files have extensions like .wav or .wma.

**1.1.7 Videos:** Most video production work is now done digitally. The videotape is very rapidly becoming a thing of the past. In many countries now, even the broadcast television channels transmit digital signals to TV sets, and in the near future it is likely that the old non-digital sets (called analogue receivers) will become obsolete. And we are all now familiar with DVDs of course. For any who want to produce their own digital video recordings; the latest generation of camcorders enables you to do this. Popular video file formats have the extensions .wmv,.avi, .mpg and many more.

**1.1.8 Animations:** Animations are like cartoons. They are pictures or other objects that move. They could also be moving text. Animations can be very useful in multimedia programs, but they are difficult to create and the creation process is very time consuming. The file formats are usually the same as for videos.

## **1.1.9 Some examples of multimedia**

### **1.1.9.1 Desktop publishing**

This is really a misleading term, but it is one that is commonly used to describe a range of software that started to appear in the mid1990s. It is not actually “publishing” software since things are not published on the desktop, but it is a very useful and

powerful tool that enables the user to prepare materials ready to be published – either on a printing press or simply photocopied. So it is actually a graphic design and layout tool. But we can refer to it as multimedia, since it does enable more than one of the raw bits that we talked about earlier to be combined together. This Guide to the use of Multimedia, for example, has been prepared using the software called InDesign, one of the most widely used pieces of desktop publishing software. What desktop publishing enables you to do is combine text and images (including pictures, drawings, photographs, graphs, charts, tables, etc.) Using Multimedia in the Classroom together in the one document and then move them around the page so as to make them look attractive and easier for the reader to use. You can manipulate the text so as to:

- Make it fit into a given space.
- Change the font style.
- Change the size of the font and many other things as well.
- You can create the text inside the program itself or you can import it from some other program, such as a word processor. And you can also import (i.e. place into the document) graphic materials of many different types, and when they are there you can:
  - Change their shape and size
  - Move them about the page so as to give the desired effect
  - Put them under the text
  - Rotate them and lots more, depending on the program you are using. To become a good desktop publisher, you need to have a good knowledge of design and you need to know what works well in terms of layout. It is very easy to make a real mess of the layout unless you are careful.

#### **1.1.9.2 Some of the best known desktop publishing software programs are:**

- Adobe InDesign (probably the best)
- Adobe PageMaker (now replaced by InDesign, but still used quite extensively)
- Microsoft Publisher (lacks many of the features of InDesign, but still quite popular)

- Microsoft Word (really a word processor, but the most recent versions have many of the features of a full desk top publishing program)
- Open Office (a free alternative to Microsoft Office) has a program very similar to Word. It is called Open Office Text Document and has most of the features of Word.
- Scribe's is another open source program (i.e. it is available for free) that you can download from the internet.

#### **1.1.10 Presentation software**

Presentation software is also a form of multimedia. The most common one around is probably Microsoft PowerPoint. Again, the software enables pictures and text to be combined in the one place, but this time we have the added possibility of incorporating both sound and movies. Really effective presentations also depend on good layout and design. It is well worth while noting those you see that are impressive in this respect, and try to remember those features that make it good. Then try to incorporate them in your own presentation.

A free alternative to PowerPoint is the Open Office Presentation program. This program will also create presentations of a multimedia nature and will also open most presentations that have been created in PowerPoint. Is important to remember that presentation software is really intended for showing to an audience. They do work for individual viewing of course, but their main purpose is to present things to a group, usually as support for a spoken commentary. If you have a large amount of information that you want to convey, it is better to use another method, such as a PDF file.

#### **1.1.11 Portable document format files**

PDF files, as these are generally called, are produced from other documents that have been created in other program. Most desktop publishing programs, as well as word processors and presentation programs, enable you to export the finished file as a PDF document. The word "export" means that you can convert the file into PDF form. The main advantage of a PDF file is that it can be viewed on almost any computer, provided

that the software known as Acrobat Reader is installed on it. And Acrobat Reader is available for free. But PDF files have some other features as well:

- They can link to other multimedia elements such as sounds, videos, internet sites and other files. But to make these links you need to have a more advance version, known as Adobe Acrobat, installed. And this is not free.
- PDF files are quite difficult to edit or change once they have been created. For this reason they are often used in situations where you do not want the reader to be able to alter them.
- They can also be made in varying file sizes. If the file is to be distributed via the internet, for example, its size needs to be small, so that it can be downloaded easily by a viewer. The quality of the image will be not as good in this instance. But if you are wanting to produce a high quality printed book from your PDF file, then the size - and the clarity of the images and text - will need to be greater.

#### **1.1.12 Interactive multimedia**

Where the user of an interactive media project or program is able to interact with it, then we have what is called interactive multimedia. In education, this can be a very powerful learning tool when used in the right way. Here are just some of the possibilities for this sort of interaction.

- A link from the main program to another file which may be in another format. Note that in order to run this linked file, it may be necessary to have additional software on the computer.
- A link to a page that should be printed out. For example a test or assignment sheet. The sheet could be in Word or a similar word processor format that a user could fill in electronically. Or it could just be a printout that is completed by hand.
- A page in the program could offer choices to the user, asking them to select which option they would like to take.



- An extension of the above to enable a student to select an answer from a range of possibilities, and then having the computer respond with a comment if the wrong choice is made (or the right one).
- A link from the program to an internet site where more information can be found. Be careful with these, however, since internet sites can disappear without warning and the link may just go nowhere.

### 1.1.13 Pedagogical usages of multimedia

Adoption of multimedia in the classroom generally proceeds in four broad stages in the way the teachers and learners use of multimedia as a support to teaching and learning. These four stages give rise to the mapping that have been broadly classified as supporting work performance, enhancing traditional teaching, facilitating learning and creating innovative learning environments. More than three decades ago, computers and related information technology were introduced to educators for direct teaching and learning purposes. Multimedia started its journey primarily with productivity tools, proceeded to self-learning courseware and multimodal instruction, and finally progressed to web based learning management system.

**Supporting work performance** in the initial phase, teachers use productivity tools such as word processor, visual presentation software, spreadsheet, database, email etc., to support their daily work performance. During this stage, there is usually an emphasis on basic operations of electronic office software. This stage of using productivity tools for teaching and learning is linked with the emerging stage in multimedia development.

**Enhancing traditional teaching** from the productivity software comes the stage of learning how to use and develop computer assisted learning software in different disciplines. This stage involves the technique of integrating computer based learning in the traditional instructional process. Various instructional packages were selected, developed and used to enhance traditional classroom teaching.

**Facilitating learning** the next stage involves using various types of multimedia tools to facilitate student learning. The key point is that the teachers need to learn how to

choose the most appropriate tools for a particular task, and using these tools in combination to solve real life problems. This stage implies the ability to recognize situations where various multimedia and specialized software can be utilized for teaching and learning.

**Creating innovative learning environments** this stage involves specializing in the use of multimedia to create an innovative learning environment that transforms the learning situation. This is possible by incorporating emerging trends in pedagogy and learning principles in teaching and learning. For this purpose, specialized software including modeling and simulation, expert systems, semantic networking etc., are employed to support pedagogical innovation. It helps to develop, deliver and manage open and flexible learning program.

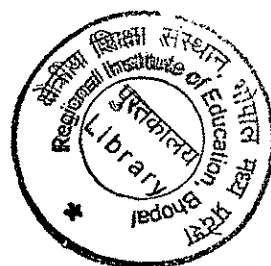
#### **1.1.14 Using multimedia in the classrooms**

Using multimedia materials in the class can be fun as well as educationally beneficial. One can use short segments to add visual impact to your lesson and bring a sense of reality into the classroom. Here are just a few ideas:

- Show students how the theories of science are actually being used in Samoa, eg look inside a power station, see renewable energy sources being used, see the different breeds of chickens that are found in the country.
- Print out student work sheets or assignment tasks for them to work on.
- Allow faster students to work by them, exploring the resources and researching materials for their study.

#### **1.1.15 Advantages of multimedia**

Potential advantages to multimedia are numerous. Claims ranging from reduced learning time to cost effectiveness abound. Few of these advantages have been evaluated using formal experimentation. In addition, the advantages can be minimized or eliminated by poor design of the multimedia interface. Since the literature



discussing advantages of multimedia is so extensive, only advantages with particular impact on the multimedia systems used in this study will be explored.

- One major advantage to interactive multimedia systems is the degree of learner control. Learner-controlled instruction allows the student to study material at a pace that suits his/her needs.
- Students are under less pressure to perform within certain time limits. Learners can choose a logical route through the instructional material that is meaningful to them.
- Multimedia instructional systems allow learners the opportunity to explore material of their choosing at a pace which is comfortable to them.
- Students are more interested in the material since they choose the pace and the sequence of the content. This increases the relevance of the material and creates a greater desire to learn, which in turn helps to increase knowledge retention.

Considerable research has shown that students learn more effectively when the instruction is consistent with their cognitive style (Gagne, 1985). Multimedia enables the learner to organize the information in a manner that reflects his learning style, thereby improving the retention and retrieval of knowledge (Norman, Genter, Steven, 1976). The way students review multimedia instructional material mirrors the way they think, learn, and remember. Students move between text and images and sound, stopping for a time to interpret, analysis, and explore. Multimedia adapts well to individual differences due to the high degree of learner control and the ability to map to many learning styles. Traditional learning relies heavily on reading text that may or may not be accompanied by illustrations. However, the reading comprehension of some students is naturally better than other students. Multimedia can provide dynamic illustrations (animations and video) that offer even more support for comprehension than the use of static pictures studied by Levie and Lentz (1982). In addition, students with varying levels of reading comprehension can use multiple senses to study information. Poor readers are more likely to perform at the same level as more better readers due to the reduced reliance on reading comprehension as the primary means of learning.

Multimedia can provide both good and poor readers with more context and support for comprehension than text alone. This helps learners develop better mental models which are key to learning.

#### **1.1.16 Educational multimedia programs and teaching:**

Multimedia programs are the essential components of all methods of teaching. They are necessary in methods like demonstration, observation, project, experimentation, dramatization and discussion etc. while in methods like lectures & problem solving they are felt optional.

So far as the conventional method like lecture & problem solving technique are concerned use of multimedia program should not be optional at primary level & secondary level because the verbal delivery of lectures by teachers often become like a constant hammering. The student fails to respond or conceive the sensory manipulative capacity of the children. Today children are compelled to coin vest maximum time for better understanding of different subjects. Matters which would have been easier & less time consuming had they been taught with the help of multimedia because of these children are bound to give up many extracurricular & recreational activities which are essential for the total growth of their body & brain.

Absence or no use of multimedia in conventional methods of teaching over the time also separates the children psychology from the subject matter of the school curriculum because without multimedia the pedagogy often become boring & as a burden for most of them.

Today institutions where use of multimedia program is an official culture of the study, the children are found excel over other in all curricular & extracurricular aspects. The demands of such schools among the parents are very high.

Intensive use of multimedia programs in school strictly speaking not a matter of cost as much as it is not a matter of keen efforts by the teacher community the school administration & after all the governing policy for this.

### **1.1.17 Importance of educational multimedia program:**

Rapid change in the sphere of society economy, policies, science & technology are the characteristics features of the modern world. This first change is most likely to catch a teacher in its sweep for which it is hardly possible to retain all up to date information minutely. Therefore, a teacher cannot be expected to become a fountain of all relevant knowledge in a given matter always.

The other factors which contain a teacher in becoming a perfect substitute of a treasure of information that can be effectively shared with all his pupils are continuous.

- Explosion of knowledge of idea and approaches in the fields and emergence of newer subjects and concept of teaching following researches on effective techniques
- Over crowded classroom which is a characteristic feature of Indian school.
- Vastness related to particular topic of global level
- Lack of scope and opportunity to include all new development in the text books which are considered to be primary institutional material in our country
- Develop self-confidence, creativity among the students at all level of elementary school. In order to overcome the problems, a teacher must be equipped with proper communication aids widely selective and carefully divided to cater the challenges of teaching in the modern era, multimedia programs can provide the best answer to such problems.

### **1.1.18 Role of educational multimedia in science education**

Children in today's technologically advanced society are growing up in an educational environment that is struggling to overcome the teachers centered classroom in which students achievement is based on the system of memorization and recitation of material contained in a single content area textbook. In order for students to succeed in today's competitive society they must be given the opportunity and the guidance to develop not only knowledge level, skill but they should graduate from high school with the ability to use that knowledge in real world situations.

There are many applications for multimedia technology in the science classroom teachers are discovering ways to spark students interests and motivate them to discover by incorporating a wide variety of software designed classroom presentation that are visually descriptive and relevant to the content material students are also becoming more involved in the learning process by exploring multimedia such as CD Rom based textbook, tutorials, and laboratory experiments as well as a diverse arena of internet based telecommunication and online experiments and research.

Science simulation allows students to observe & manipulate multiple aspects of complex micro worlds. Database software provides student with a tools for gathering information in different ways across all of these applications the technology itself possess a problem solving challenge as student learns to master the further features of the tools to accomplish their desired good. Further the computer tasks are often done in collaboration with peers, which in turns add new layer of complexity through the feedback & communication requirements, that working with other.

### **1.2 Need and Justification of the Study:**

Today's world is that of technology, and education keeping in view with the pace of it, has to inculcate technology into it to cater properly to the needs of today's students. In the same context, reviews of related literature has emphasized the fact that it is now unproductive to a large extent, outdated to use the chalk and talk method in the classroom, as it cannot promote constructing the knowledge by the student. Use of multimedia makes the students active learners in the classroom, and not passive entities, day dreaming, or waiting for the bell to ring. We know that learning can be effective the most when one is taught engaging the maximum number of senses possible. The famous quote, "I hear, I forget; I see I remember; I do and I learn" very much denotes the multimedia style of learning in favor of the student.

The reviews, illuminating as they were, were largely of a different state than M.P and even of other countries. The deep insight offered by them in the world of teaching-learning by multimedia will be utilized in the performing of this research. Looking at

the gaps, the previous researches have been done on college and higher secondary levels. Also, researches have been done in the field of arts, mathematics and other fields of humanities, but not on science for Std. VII students. Moreover, no research has been done earlier which takes in account the effect of multimedia on the science achievement of class VII and this makes the researcher curious as to verify the results in children as young as 11 to 12 years of age.

The researcher is hopeful that the results of the research will prove to be helpful for teachers teaching Std. VII science. In addition, the students will be benefited in their learning, if their teachers have the knowledge of multimedia and will prove to be a facilitator of bringing about a change in their learning style.

### **1.3 Statement of the Problem**

“Effectiveness of multimedia mediated teaching on science achievement of class VII students”

### **1.4 Objective of the Study**

To study the effectiveness of multimedia mediated teaching in science achievement of class VII students.

### **1.5 Hypothesis**

Students taught through multimedia mediated teaching will gain significantly higher score as compare to their counter parts in the control group.

### **1.6 Operational definition of variables:**

**Traditional approach of teaching-** methods and technique based on behaviorist pedagogy.

**Multimedia approach of teaching**-it is define as the use of various media techniques in constructivist pedagogy this will include ppts, animated films and activity based on multimedia in this research.

**Achievement in Science** -the marks scored by subjects in pretest and posttest.

### **1.7 Delimitation of the study:**

- This study is delimited to Bhopal District of Madhya Pradesh.
- The study is delimited to English medium school only.
- It is further delimited to students studying in VII<sup>th</sup> standard only.
- The study is delimited to the schools affiliated to Central Board of Secondary education (CBSE).
- This study is delimited to the science content only.
- This study is delimited to one school only.