Chapter – 1

Introduction of the Problem

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1.0 Introduction :-

Today in every field technological revolution takes place. Scientific inventions modernized every field like medical, agriculture, management and education. Education field is also inspired by modernization. There are many teaching methods invented in educational field like demonstration method, programmed learning method, experimental method, conceptual education, multimedia method, etc. Every method is useful though there are some limitations in each method. Specially while teaching micro physics or chemistry, concepts of atom, it’s particles like electron, proton neutron, atomic and molecular orbitals are unable to explain through charts, drawings or models. The pictures are two dimensional, so physical structure of atom, molecule and its orbitals could not been explained properly. By virtual reality this limitation can be removed almost, so students can understand these concepts easily.

“Virtual reality (VR) has typically been portrayed as a medium, like telephone or television. This new medium is typically defined in terms of a particular collection of technological hardware, including computers, head-mounted displays, headphones, and motion-sensing gloves. The focus of virtual reality is thus technological, rather than experiential; the locus of virtual reality is a collection of machines.”

Educating children now and in the future to live in an information society is critical. There is also a need to provide life-long education for all citizens and to support a flexible workplace. VR (virtual reality) technology has been widely proposed as a major technological advance that has potential to support for such education. There are several ways in which VR technology is expected to assist learning. Most importantly it allows students to visualize abstract concepts, to observe events at atomic or planetary scales, and to visit environments and interact with events that distance, time, or safety factor make unavailable. The types of activities
supported by this technology promote current educational thinking that students are better able to master, retain, and generalize new knowledge when they are actively involved in constructing that knowledge in a hand on learning environment.

There is evidence that, in suitable application areas, VR can offer an effective medium for enhancing certain skills. For example, effectively coordinating sensory motor skills; gaining situation awareness through use of simulations; and training in design skills. The commercial success of virtual environments in pilot training has led to speculations about the application (Krueger, 1991) of virtual environments to other areas of education, such as in virtual science laboratories. This kind of approach could give students access to virtual experiments involving the use of otherwise prohibitively expensive equipment. However, research concerning virtual environments to date has focused on skill acquisition, i.e. the development of coordinated sensory motor skills and situation awareness. Empirical evidence on the effectiveness of virtual environments for promoting learning of rich subject matters is limited.

Designers and evaluators of immersive VR systems have many ideas concerning how VR can facilitate learning, but there is little information concerning which of the VR’s features best enhance understanding or how to customize those affordances for different learning environments. Other factors such as the concepts or skills to be learned, individual characteristics, the learning experience, and the interaction experience all play a role in shaping the learning process and learning outcome.

For the first time, virtual reality has been used in a non-research, public-school environment. During the summer of 1998, summer program students at the Coles Elementary School and the Phoenix High School in Chicago used virtual reality to
supplement their traditional learning. This innovative pilot program was born through a partnership between SUNRISE Virtual Reality, a Chicago-based virtual reality company, and Dr. Eleanor Byrd, director of the New Functional Learning Institute, also based in Chicago. The objective of the pilot program was to discern the optimal ways virtual reality could be integrated into an educational curriculum, and to see how students and teachers alike reacted to the new technology.

1.1 Statement of problem :-

Construction and tryout of virtual reality based learning material in chemistry subject of standard XI

1.2 Definitions of keywords :-

Virtual Reality

“Theoretically, these inadequacies are manifest in three ways. First, a technology-based view suggests that the most salient feature in recognizing a “VR system” is the presence or absence of the requisite hardware.”

“Virtual Reality is electronic simulations of environments experienced via head mounted eye goggles and wired clothing enabling the end user to interact in realistic three-dimensional situations.”

“Virtual Reality is an alternate world filled with computer-generated images that respond to human movements. These simulated environments are usually visited with the aid of an expensive data suit which features stereophonic video goggles and fiber-optic data gloves.”

“The terms virtual worlds, virtual cockpits, and virtual workstations were used to describe specific projects…. In 1989, Jaron Lanier, CEO of VPL, coined the term virtual reality to bring all of the virtual projects under a single rubric. The term
therefore typically refers to three-dimensional realities implemented with stereo viewing goggles and reality gloves.”

“VR technology is an integrated technology of computer hardware and software that requires the user to be fully immersed into the computer-generated, real-time, and 3D virtual environment as an inside participant to look, listen, manipulate, interact, feel, speak, and even smell if it is possible”

“Virtual Reality, VR, is a newly emerging computer interface characterized by high degrees of immersion, believability, and interaction, with the goal of making the user believe, as much as possible, that she/he is actually within the computer generated environment, as opposed to being an external observer looking in.”

**Operational Definition :-**

“In present research researcher will shoot the video lectures with chroma key technology and provide a virtual class room environment by using different software. The researcher will also construct 3d mouse interactive molecules so the students can rotate move molecules using mouse and feel virtual reality.”

**1.3 Variables of study :-**

A variable is something that can be changed, such as a characteristic or value. Variables are used in psychology experiments to determine if changes to one thing result in changes to another. An important step in designing all quantitative research projects is defining or identifying the variables that will be manipulated, measured, described, or controlled.

In this study the following types of variables are selected.
1. Independent variable :-

The independent variable is the variable that is controlled and manipulated by the experimenter. It is like the knob on a dial that the researcher turns. The independent variable is manipulated in order to determine if it has an effect on the dependent variable. In an experiment, the independent variable is varied or manipulated by the experimenter so that the effect on the dependent variable can be measured. A single condition or treatment of an independent variable is called a level.
In this study three types of independent variable will have been taken.

1. **Group of students (Methods of teaching) :-**

   In this variable the students of sample will be distributed in three groups by random sampling method. Each of the group will have been treated with a different teaching method. The details of groups will have been taught by different teaching methods are as under.

   **A. Group 1 :-**

   Students of group 1 will be called experimental group 1. The students of this group will have been taught by virtual reality based multimedia package that will have been created by the researcher. This group will be given software as well as proper instruction and software will be demonstrated by the researcher while teaching.

   **B. Group 2 :-**

   Students of group 2 will be second experimental group so will called experimental group 2. The students of this group will be provided virtual reality based multimedia package software only. They will not have been experiencing teaching by the researcher. They will have to learn themselves using this software. Only the instructions about “how to use software” will provide to the students. Then students will be allowed to learn themselves with in a period of time given by researcher.

   **C. Group 3 :-**

   Students of group 3 will be controlled group of the study. The students of this group will be taught with traditional lecture method. In this method the researcher will teach chemistry with the help of chemistry book, black board
and chalk only. The researcher will explain each topics of selected unit by delivering lecture.

2. Gender of students :-

   A. Girls
   B. Boys

   The researcher will have to check effect of gender on the educational achievement in chemistry subject. So he will stratify the sample in two strata according to their gender.

3. Levels of educational achievements :-

   The researcher is also aiming to check the effect of their achievement level on the educational achievement in chemistry subject. So sample will be stratified into two strata according to their levels of achievement in pretest.

   A. Higher Level
   B. Lower Level

2. Dependent variable : Achievement of students :-

   In this study the researcher has to check the effect of learning material on achievement of students in chemistry subject. So achievement of students in chemistry subject according to posttest will be dependent variable of present study.

1.4 Objectives :-

   To make the research fluent and hurdle free the researcher created following objectives.

   1. To study the effect of virtual reality based learning material on the achievement of students in chemistry.
2. To study the effect of virtual reality based learning material on the achievement of students in chemistry in context to their group.

3. To study the effect of virtual reality based learning material on the achievement of students in chemistry in context to their gender.

4. To study the effect of virtual reality based learning material on the achievement of students in chemistry in context to their level of achievement.

5. To study the main effect and interaction effect of group, gender and level of achievement on the educational achievement of students in chemistry subject.

1.5 **Hypothesis :-**

Research hypothesis are assumptions of results or temporary solution of the problem. In research it is necessary to stipulate hypothesis. It will give researcher a clear path how to reach the conclusions. To obtain results of research pure and biasfree the researcher has constructed null hypothesis. These null hypothesis of present study are as follows.

- $\text{H}_0^1$ There will not be any significant difference between the mean score in posttest of students of experimental group 1 and experimental group 2.

- $\text{H}_0^2$ There will not be any significant difference between the mean score in posttest of students of experimental group 1 and controlled group.

- $\text{H}_0^3$ There will not be any significant difference between the mean score in posttest of students of experimental group 2 and controlled group.
HO₄ There will not be any significant difference between the mean score in posttest of boys of experimental group 1 and experimental group 2.

HO₅ There will not be any significant difference between the mean score in posttest of boys of experimental group 1 and controlled group.

HO₆ There will not be any significant difference between the mean score in posttest of boys of experimental group 2 and controlled group.

HO₇ There will not be any significant difference between the mean score in posttest of girls of experimental group 1 and experimental group 2.

HO₈ There will not be any significant difference between the mean score in posttest of girls of experimental group 1 and controlled group.

HO₉ There will not be any significant difference between the mean score in posttest of girls of experimental group 2 and controlled group.

HO₁₀ There will not be any significant difference between the mean score in posttest of students having higher achievement in pretest of experimental group 1 and experimental group 2.

HO₁₁ There will not be any significant difference between the mean score in posttest of students having higher achievement in pretest of experimental group 1 and controlled group.

HO₁₂ There will not be any significant difference between the mean score in posttest of students having higher achievement in pretest of experimental group 2 and controlled group.
There will not be any significant difference between the mean score in posttest of students having lower achievement in pretest of experimental group 1 and experimental group 2. 

There will not be any significant difference between the mean score in posttest of students having lower achievement in pretest of experimental group 1 and controlled group. 

There will not be any significant difference between the mean score in posttest of students having lower achievement in pretest of experimental group 2 and controlled group. 

Main effect, two way interaction effect and three way interaction effect of variables on mean score of posttest of students will not significant.

1.6 Importance of the study :-

There are specific aims behind every research work. To achieve the aims perfectly the researcher has to conduct his research work carefully and precisely. This study has unique importance for students, teachers and researchers of future. This research will open a new direction for researchers of future. Still now the concept of virtual reality is used for developing 3D games the most. In education this technology is used to develop learning materials in higher education like medical and engineering, provide training to doctors, pilots, soldiers, etc. But at higher secondary level there is a lack in this type of software. There many reasons which resist professionals to create such type of virtual reality based learning material. To create such type of complete learning material someone should have a complete knowledge about visual graphics, 3d animation and programming. One
more thing is its less commercial return value. So IT professionals are not interested to create this type of learning material. Of course this type of learning materials are available in market but at high price. TATA edges and EDUCOMP are the companies who provide this type of learning material in form of “Smart Class”. But it is costing in lacs to equip a single classroom by this technology.

The researcher has created this virtual reality based learning material without taking help of anybody. The researcher does not possess any professional degree in this field. He has learned everything using internet. So it is a proof that anyone can create such type of software without help of any body. So a teacher can create his personal learning material using its own idea. This will be cheap and will make teacher to deliver its own idea to the students in the best way.

To create this type of learning material the creator should possess IT knowledge as well as content knowledge. The researcher is M.Sc. in chemistry subject. So he has enough content knowledge which is necessary to create the most effective material. Generally having knowledge in both IT as well as subject is rarely happen. So the locally it is difficult to create such type of effective learning material. In this way this research is the most important for students as well as teacher inspires teachers to develop such type of high quality learning material.

1.7 Limitations of the study :-

Delimitations are the definitions researcher set as the boundaries of his study, so delimitations are in researcher’s control. Delimitations are set so that researcher’s goals do not become impossibly large to complete.

Every research has delimitations. These will aware readers or researchers of future, how this research will be useful in their research. The delimitations will show
on which area the conclusions of the research could be applied or which task of research has not been comprised in present study.

Examples of delimitations include objectives, research questions, variables, theoretical objectives that researcher has adopted, and populations chosen as targets to study. When researcher is stating his delimitations, clearly inform readers why he chose this course of study. The answer might simply be that he was curious about the topic and/or wanted to improve standards of a professional field by revealing certain findings. In any case, he should clearly list the other options available and the reasons why he did not choose these options immediately after he has listed his delimitations. He might have avoided these options for reasons of practicality, interest, or relativity to the study at hand.

The delimitations of this study are mentioned below.

1. The present study will be conducted on the students of standard 11 from science stream in a single experimental school only.

2. The researcher will construct virtual reality based multimedia package by his own without help of professionals. So package may have a lower quality in compare to IT professionals.

3. The researcher will construct learning material for the students of Gujarati medium, so Gujarati language will be used to create this package.

4. The researcher has no idea how long time he has to spend to create this package, so selected units will be taken to create this package. The researcher assumes a single unit to be completed for the construction of virtual reality based learning material.
1.8 Planning of the next chapters :-

The design of study will give a better idea to reader about research designs, method of research, method of analysis, etc.

So a short review of upcoming chapters is given below.

Chapter – 2
Virtual Reality in Education

In this chapter concept of virtual reality in education is mentioned. Researcher has discussed benefits and applications of virtual reality in education. Different hardware necessary to feel virtual reality is also discussed. The fields in which virtual reality based audio visuals are used to provide trainings are briefly discussed in this chapter.

Chapter – 3
Study of Past Research

In this chapter reviews of research conducted in past have been mentioned. The researcher had studied different researches related to his own research and mention the main idea of researches in this chapter. He also compared and differentiated his own research with these researches.

Chapter – 4
Development of Learning Package

The researcher has developed a virtual reality based learning material to check its effect on educational achievement of students in chemistry subjects. The researcher has demonstrated whole process of development of virtual reality based learning material in this chapter.

Chapter – 5
Design of Research
This chapter presents design of research included steps and planning of experiment, method of research, method of experiment, method of sampling, method of data collection and data analysis.

Chapter – 6

Statistical of Analysis and Interpretation of Data

This chapter described whole process of analysis of the data and interpretation. The data obtained by the tools was analyzed according to the hypothesis.

Chapter – 7

Conclusions and Suggestions

This chapter included conclusions of the study based on interpretation of obtained data, as well as chapter focus the future research can be carried out based on present research.
References


