

EFFECTIVENESS OF VIRTUAL REALITY IN TEACHING SCIENCE AMONG XSTD STUDENTS

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ABSTRACT

This study examines the effectiveness of Virtual Reality in teaching science among X std Students. In science, the investigator selected 'structure of Heart' and 'Pollination'. The sample of the study consists of 30 students, from a matriculation school in Chengalpattu district. In that 15 students comes under Experimental group and 15 students will come under Control group. The experimental group students and Control group students were given Pre-test. The experimental group students were taught 'Structure of Heart' and 'Pollination' in science using Virtual reality and the Control group students were taught 'Structure of Heart' and 'Pollination' in science using traditional method. After teaching Experimental group through virtual reality and Control group through traditional teaching, they were given post test. The students in the experimental groups scored more in their post test than the control group students.

Key words: Virtual Reality, Experimental group, Control group.

INTRODUCTION

Virtual reality (VR) is an immersive technology that creates a computer-generated environment which simulates a realistic sensory experience for the user. By wearing a VR headset, users are transported to a three-dimensional virtual world that they can interact with and explore. This technology aims to provide a sense of presence and immersion, enabling users to feel as if they are physically present within the virtual environment. Virtual reality has found applications in various fields, including entertainment, gaming, education, healthcare, architecture, and training simulations. It has the potential to revolutionize how we experience media, interact with digital content, and collaborate remotely. With ongoing advancements and innovations, Virtual Reality continues to evolve, providing increasingly realistic and immersive experiences in the field of education.

LITERATURE REVIEW

Antonio et al (2022) studied upon the Effect of a Full Immersive Virtual Reality Intervention on Selective Attention in Children. An Experimental study was implemented in the study. children aged 8-10 years old. Forty-eight girls of elementary school from the city of Komotini, in Greece, participated in this study. The sample was randomly divided into three individual groups of 16 children each, one Control Group (CG) and two experimental groups. The CG did not receive any structured SA training program, while the two experimental groups attended a program focused on improving SA for 6 weeks, twice a week for 24 min, each time. The participants of FIVE group attended a full immersive program in Playstation4 VR and the participants of TT group attended a typical training to the gym. The result of the study illustrated that the post-test SA scores and the one-month retention test SA scores were remarkably greater than pre-test SA scores for both experimental groups and not for the CG. The conclusion of the study is VR are effective tools for improving SA such as typical training.

Matome et al (2022) examined the Student Perceptions of Virtual Reality in Higher Education. a mixed-method research method, online surveys were used in this research. simple random sampling strategy was used to select the sample. University students in South Africa was selected as sample.

The result of the research findings elucidated that there are various benefits associated with the introduction of Virtual Reality--in South African Higher Education Institutions--the diverse population of participating students, and the varying differences in their socioeconomic statuses, would result in the inequitable distribution and usage of its resultant advantages.

Alhudaithy & Hana(2021) studied the perception of Saudi Faculty. A mixed method research design was applied. A questionnaire and focus group interviews were used to collect quantitative and qualitative data. Results indicated a limited use of VR among faculty due to lack of facilities, insufficient support (particularly for junior faculty), and lack of female technicians for the female-only campus and cultural aspects (e.g. female privacy). It is important to consider the need for high-speed internet and enhanced facilities for both students and faculty alike.

Chia-Chun Yuan et al (2021) examined the perception of Virtual reality for implant surgery. The methodology used in this study was experimental study. Sample for the study is dental college students. In this study, Selected students filled out a survey before and after using the program. Then, a focus group discussion for the students was held to analyze the program further. Seven dental students enrolled in the Advanced Predoctoral Implant Program (APIP) participated in the study. Qualitative analysis of this study suggests that virtual reality can be used as a supplemental resource to enhance student learning of specific topics. Additionally, the students had positive outlooks for using virtual reality as a resource in dental education and were hopeful to use it in the future for particular topics and subjects. The advantages and disadvantages of VR applications in education were described. This application allows the students to be immersed fully with virtual dental operatory.

OBJECTIVES OF THE STUDY

1. To find out the significant difference between Experimental Group pre test and post test scores in the criterion test.
2. To find out the significant difference between Control Group pre test and post test scores.
3. To find out the significant difference between Control Group post test scores and Experimental Group Post test scores.
4. To find out the significant difference between Control Group pre test scores and Experimental Group pre test scores.

HYPOTHESES OF THE STUDY

1. There is no significant difference between Experimental Group pre and post score in the criterion test.
2. There is no significant difference between Control Group pre test and post in the criterion test.
3. There is no significant difference between Control Group post test scores and Experimental Group Post test scores.
4. There is no significant difference between Control Group pre-test scores and Experimental Group pre test scores.

METHODOLOGY

The design selected for the present study is True experimental pre test and post test method. The design of the study has the following structure.

TABLE 1.0- Design of the Study

GROUPS	EXPT	PRE TEST	POST TEST
EG	Given	Yes	Yes
CG	Given	Yes	Yes

EG- Experimental group

CG-Control Group

The investigator selected 2 groups of students.

Control Group will be given pre test and post test. They will be taught using Traditional learning method.

Experimental Group will be given pre test and post test. They will be taught using Virtual reality.

VARIABLES OF THE STUDY

a. Independent Variable

1. Learning the concept ‘The structure of Heart’ and ‘Pollination’ through virtual reality- Experimental group.
2. Learning the concept ‘The structure of Heart’ and ‘Pollination’ through traditional teaching method- Control group.

b. Dependent Variable

Criterion test in the conceptualization of ‘Structure of heart’ and ‘Pollination’.

TOOLS USED IN THE STUDY

1. Criterion test on the conceptualization of ‘Structure of heart’ and ‘Pollination’ among X std students used in Pre test and Post test.
2. The stimulus material used is Virtual reality developed on ‘Structure of heart’ and ‘Pollination’.

HYPOTHESIS-1

There is no significant difference between Experimental Group pre test and post test scores in Criterion test.

TABLE 1.1
N, MEAN AND STANDARD DEVIATION VALUES OF EXPERIMENTAL GROUP PRE TEST AND POST TEST SCORES

Variables	N	Mean	S.D	‘t’	Significance
Experimental Group Pre test scores	15	22.46	3.09	11.423	Significant for the df of 14 at 0.05 level (1.761)
Experimental Group Post test scores	15	35.20	3.46		

It is evident from the above table that the ‘t’ value found out is 11.423. It is higher than the critical value of 1.761 and it is significant at 0.05 level. Hence, it can be concluded that there exists significant difference between the pre test and post test scores of experimental group. The mean value of the post test (35.2) scores of experimental group is higher than the mean value of pre test (22.46) scores of experimental group. The experimental group has performed well after the experiment. So, the null hypothesis stated is rejected. It can be interpreted that the student learnt structure of heart and pollination through virtual reality scored higher marks in their post test compared to their pre test scores. Thus there is a significant difference between Experimental group Pretest scores and Posttest scores.

HYPOTHESIS - 2

There is no significant difference between Control Group pre test scores and post test scores.

TABLE 1.2
N, MEAN AND STANDARD DEVIATION VALUES OF CONTROL GROUP PRE TEST AND POST TEST SCORES.

Variables	N	Mean	S.D	‘t’	Significance
Control Group Pre test scores	15	22.53	3.05	4.068	Significant for the df of 14 at 0.05 level (1.761)
Control Group Post test scores	15	27.33	3.84		

It is evident from the above table that the ‘t’ value found out is 4.068. It is higher than the critical value of 1.76 and it is significant at 0.05 level. Hence, it can be concluded that there exists significant difference between the pre test and post test scores of control group . The mean value of the post test (27.33) scores of control group1 is higher than the mean value of pre test (22.53) scores of control

group. So, the null hypothesis stated is rejected. It is concluded that the students who were taught structure of heart and Pollination through traditional method scored higher marks in their post test than their pre test scores. Thus there is a significant difference between Control group Pre test scores and Post test scores.

HYPOTHESIS-3

There is no significant difference between Experimental Group and Control Group Post test scores.

TABLE 1.3
N, MEAN AND STANDARD DEVIATION VALUES OF EXPERIMENTAL GROUP POST TEST SCORES AND CONTROL GROUP POST TEST SCORES

Variables	N	Mean	S.D	't'	Significance
Control Group Post test scores	15	27.33	3.84	5.913	Significant for the df of 14 at 0.05 level (1.761)
Experimental Group Post test scores	15	35.20	3.46		

It is evident from the above table that the 't' value found is 5.913. It is higher than the critical value of 1.761 and it is significant at 0.05 level. It is significant. Hence, it can be concluded that there exists significant difference between the experimental group and control group in their post test scores. The mean value of the post test (35.2) scores of experimental group is higher than the mean value of post test (27.33) scores of control group. So, the null hypothesis stated is rejected. The students belongs to the experimental group excelled in their post test scores than their control group. It is evident that the conceptualization of structure of Heart and pollination through virtual reality was more clear than their counter parts. Thus there is a significant difference between Experimental group post test scores and control group Post test scores.

HYPOTHESIS-4

There is no significant difference between Experimental Group and Control Group in their Pre test scores.

TABLE 1.4
N, MEAN AND STANDARD DEVIATION VALUES OF EXPERIMENTAL PRE TEST AND CONTROL GROUP PRE TEST

Variables	N	Mean	S.D	't'	Significance
Control Group Pre test scores	15	22.53	3.05	-0.067	Not Significant
Experimental Group Pre test scores	15	22.46	3.09		

It is evident from the above table that the 't' value found is -0.067. It is lower than the critical value of 1.761 at 0.05 level. It is not significant. Hence, it can be concluded that there is no significant difference between the experimental group and control group in their pre test scores. So, the Null hypothesis stated is accepted. Thus There is no significant difference between Experimental Group and Control Group in their Pre test scores..

Table 1.5
Effectiveness of Virtual Reality among X Std Students

VARIABLES	SIGNIFICANCE	REMARKS
Pre test scores and Post test scores of Experimental Group	Significant	Experimental Group post test scores > Experimental Group pre test scores
Pre test and Post test scores of Control group	Significant	Control group post test scores > Control group pre test scores

Post test scores of experimental group and control group	Significant	Experimental Group post test scores > Control Group post test scores
Pre test scores of experimental group and control group	Not Significant	Experimental group Pre test scores = Control group pre test scores

CONCLUSION

The results explicate that X standard students in experimental group studied the structure of heart and pollination through virtual reality have excelled in their post test scores than their pre test score and also in the post test scores of control group who studied the structure of hear and Pollination through traditional learning. It is concluded that the virtual reality is highly effective for conceptualizing the structure of heart and pollination among X standard students. This elucidate that the virtual reality is more effective tool in teaching the science concepts.

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