
5 Chapter 5: Summary, Findings and Conclusion

5.1 Introduction-

This chapter deals with the summary of the entire experimental research study, results, discussions, recommendations and suggestions for the further study in the field of education. This study also is an attempt to develop the scope of some more virtual laboratory platform to make science education more meaningful.

5.2 Restatement of the problem-

“A study of effect of virtual laboratory on achievement in science of class IX students of Government Inter Colleges of Kotdwara”

5.3 Need for the present study-

The pandemic like situation was unexpected for teachers as well as for learners. Before this time every teacher was dependent on using traditional method but this pandemic situation has changed the whole scenario of teaching-learning process. The world is moving steps towards technical world. This is the time when we are facing paradigm shift in the teaching-learning process and such type of innovative ideas we need to move from local to global. Everyone is accepting the change in teaching-learning process.

In an overcrowded classroom where there is less individual attention, it is felt that virtual laboratory can be introduced and the students from the

socially and economically deprived sections of the society will be benefited much than at present. Most of our schools are deprived of laboratory facilities available to teach scientific concepts and principles and adoption of innovations is very slow. In addition the investments to construct a well-established lab in rural hilly area are too high. In such situation virtual laboratories can be solution of so many problems.

5.4 Objectives of the study

The objectives this study was to compare the mean scores of pre-test and post-test of the students after integration of virtual labs with subject and to compare the influence of gender in terms of understanding the science.

5.5 Sample-

25 students of class IX of Government Inter College Lalpur, Kotdwara were selected as sample to conduct this study. Sample was selected by using purposive sampling technique.

5.6 Tool of the research-

An objective type test, developed by O-labs to test the different domains of bloom's taxonomy was selected as a tool to conduct this study. This test had 27 items which deals with force and laws of motion.

5.7 Administration of the Pre-test-

As science teacher had just finished the chapter "The Force and laws of motion" so the Pre-test was conducted by the researcher in pen-paper mode at government inter college lalpur, kotdwara.

5.8 Administration of the Post-test-

After the successful teaching of 10 days a post-test was conducted by the researcher through on-line mode. Post-test was conducted to check the effectiveness of the treatment

5.9 Administration of the retention test-

After a period of 10 days a test was conducted in order to find out the retention potentialities of the developed memory in science through integration of virtual laboratory with subject.

5.10 Research Design-

The investigator has employed experimental design, single group pre-test treatment- post-test design.

5.11 Data Analysis-

The collected data were subjected to various statistical analysis; descriptive and inferential analysis and the result obtained were interpreted.

5.12 Delimitation of the study-

Due to the constraints of time, pandemic situation and administrative difficulties, the researcher delimited the study as given below

1. The researcher adopted single group experimental design. This design did not use any control group.
2. The researcher confined to the research only in physics part of science of class IX students.
3. The research has been conducted by the researcher only in Government Inter College Lalpur, Kotdwara.
4. The study has been conducted only for one month.

5.13 Major findings of the study-

Finding 1- There is significant difference in mean scores of achievement in physics at pre-test and post-test stages of students of class IX taught through integration of virtual laboratory with subject at government Inter College Lalpur, Kotdwara, Uttarakhand.

Finding 2- There is no significant difference in mean scores of achievement in physics at pre-test stage of boys and girls of class IX at government Inter College Lalpur Kotdwara, Uttarakhand.

Finding 3- There is no significant difference in mean scores of achievement in physics at post-test stage of boys and girls of class IX at government Inter College Lalpur Kotdwara, Uttarakhand.

Finding 4- There is significant difference in mean scores of achievement in physics at post-test and retention-test stages of students of class IX taught through integration of virtual laboratory with subject at government Inter College Lalpur Kotdwara Uttarakhand.

Finding 5- After analyzing the responses of students from feedback forms, it is again cleared that online learning is better than traditional methods.

5.14 Educational Implications-

1. The results of the study have proved that integration of virtual laboratory with subject is more effective than the traditional method of teaching-learning science. Hence it is recommended to utilize this technological innovation by secondary teachers.

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2. Since the integration of virtual lab with subject enhances the achievement and progress in physics part of science, so this technique can be used in other part of science like in chemistry and biology.
 3. Virtual laboratory has become the one of the alternatives of physical laboratory.
 4. This strategy develops the creative and innovative mind among the students.
 5. The integration of virtual laboratory with subject can be used in Distance Education, particularly for adult learners and for continuing.
 6. Virtual learning can be used in all levels for scoring more marks in all subjects.
 7. It may be implemented to compensate the manpower and infrastructure boundaries.
 8. Virtual laboratory is very useful to teach in remote areas.
 9. Teachers should be trained in conducting virtual lab experiments.

5.15 Suggestion for further research-

1. The present study is conducted for IX class students only. Studies may be taken up for the upper primary, senior secondary and university level.
2. A similar study can be done in other subjects like mathematics, biology, chemistry etc.
3. A comparative study can be done to check the effectiveness like the same study can be done in urban, rural and tribal area and obtained results can be compared.
4. Effectiveness of Virtual Learning in learning Social Science, such type of study can be done.

5.16 Conclusion-

The present study reveals that the integration of virtual labs with subject is very effective than the traditional method in terms of achieving good marks in science.

The students enjoyed an interesting and memorable laboratory learning experience through virtual lab. The integration of virtual lab with subject motivates students towards self-learning. So there is an urgent need to gear up at the national level towards the implementation of this integration of virtual labs with subject wherever possible in the teaching-learning process of science.

6 Bibliography

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