Pinnacle Educational Research & Development

http:/www.pjpub.org

Research Article **Vol. 2 (3) 2014**

EFFECT OF TEACHING PHYSICS WITH PHYSICS SUITE ON THE ACHIEVEMENT OF SECONDARY SCHOOL STUDENTS

Salma Akhtar[1], Dr. Rabia Tabassum[2] & Prof. Dr. R. A. Farooq[3]*

[1]Ph. D. Scholar
Northern University
Nowshera, Pakistan.

[2]Associate Professor & HOD (Education)
Northern University
Nowshera, Pakistan.

[3]Dean, Faculty of Arts and Social Sciences
Northern University
Nowshera, Pakistan.

Accepted 1 March, 2014

ABSTRACT

Teaching of Physics with Physics Suite describes a variety of tools for improving both teaching and learning, including new kinds of homework and exam problems, ways of assessing the level of understanding in your class. It aims to help educators learn to be more effective at teaching Physics.

The major objective of the study was to see the relative effects of teaching Physics with Physics Suite instruction on the academic achievement of secondary school students in the subject of Physics. To achieve the objective of the study two null hypotheses were tested. The students of 9th class of the same school were selected as sample of the study. Sample students were divided into two group's i.e. experimental group and control group on the basis of previous results by applying pair random sampling. In order to secure data post-test, was administered to the experimental as well as control group.

The students of experimental group performed significantly better than those of control group on the post-test which proved that teaching of physics with the physics suite was more effective than the traditional method of teaching physics to secondary school students.

Keywords: physics suite, academic achievement, pair random sampling.

1. INTRODUCTION

The world is passing through an age of nuclear advancement and physics is an integral part of nuclear technology. Such type of situation has made the need of physics manifold and requires special attention to be devoted for its effective instruction in our institutions in general and institutions of secondary level in particular. Unfortunately a significant number of institutions providing secondary level educations remain without physics laboratories and the training of physics teachers carries a big question mark about their education and training.

There are many methods of teaching science at secondary level and the conceptual nature of physics has made two methods very popular in Pakistani situation. There is sufficient research based evidence that the textbook is not the only source of effective student learning. Students frequently happen to have difficulty in understanding the physics text, and, as a result, only a small minority actually read the text in the careful and thoughtful way it is expected. Effective student learning comes from brains-storming and activities exactly the time they are thinking hard and struggling to make sense of what they are learning. Effective instruction happens when such environments are created in which students are encouraged and helped to engage in those kinds of activities. Well-tested innovations that focus on building reasoning through carefully planned and structured *activities* in lectures, recitations, laboratories, or workshops are more likely to produce strong student learning. For most of the students, such types of activities are more important as compared mere reading the text (Lemke, 2000).

Teaching of physics has traditionally played two very obvious roles in the education of scientists: both to recruit and train professional physicists-to-be and to "screen out" those who might not be able to handle the mathematics of engineering or the memorization required in medical school. The former role becomes a smaller fraction of our teaching activities as the number of students studying other sciences grows. The latter, no longer, seems appropriate for present circumstances, when engineers, scientists, and medical professionals have an increasing demand to understand both the systems they are working with and the complex tools they are using to accomplish the job (Kramer, 2011).

The role of the physics teacher today is much more different from the previous one. He has to figure out how to help a much larger part of the population understand how the

Corresponding Author: Prof. Dr. R. A. Farooq[3]*
Dean, Faculty of Arts and Social Sciences Northern University Nowshera, Pakistan.
Email address: drfarooqch43@gmail.com

world works, how to think logically, and how to evaluate science. This role has become very important, especially in democratic countries where a significant fraction of the adult population is involved in selecting its leaders who will make decisions not only to support the basic science, but also on many other issues that depend intimately on technological information. It would be of considerable value to have a significant number of people who could not be fooled by the misuse of science or by scientific charlatanism (Kim, 2002).

The Physics Suite is much more than a text with a collection of ancillaries developed after the fact. The Physics Suite builds on integrating a series of strong activity-based elements with the text. The Physics Suite focuses on getting students to learn to do what they need to *do* to learn physics. The materials of the Suite can be used independently, but their approach, philosophy, and notation is coherent. As a result, you can easily adopt one part as a test of the method. (Redish, 2006)

The institutions who are going to adopt such materials may add a laboratory with lessons developed on Suite. But the text is of primary importance, and its selection usually depends critically on the content which is covered and to ensure whether it is treated correctly. Those are certainly important criteria for the success attached with physics suite (Steltzer, 2001).

Both Science and Technology has become an integral part of any culture in the world. This is because the economic and political strength of any nation depend on her scientific and technological advancement (Adepitan, 2003). It cannot be denied that the development of any nation is indicated by the overall social, economic and political progress and people's activities in their natural environment. These activities revolve around science and its technological applications. It, therefore, implies that for any meaningful national growth and development to be achieved, Science and Technology must be an integral part of the nation's culture Adeniyi, 2005). In fact, Science and Technology is a critical instrument for the uplift of the nation's economy. Therefore, it should form the basis for development as well as an influencing factor of peoples' thinking and working processes.

2. OBJECTIVES OF THE STUDY

The major objectives of the study were:

1. To investigate the relative effects of Teaching of Physics with Physics Suite on the academic achievement 0f secondary school students in Physics.
2. To see the effectiveness of independent variable in helping the learners to retain acquired knowledge for longer period.

To achieve the objectives of the study following null hypotheses were tested:

1. Mean scores of experimental group and control group do not significantly differ on post-test.
2. Mean scores of experimental group and control group do not significantly differ on retention test.

3. METHOD AND PROCEDURE

3.1 Sample

The students of 9th class of The Islamia Collegiate Peshawar (an English Medium Section), were selected as sample of the study. Only students of science group studying Physics as elective subject were included in the sample. Sample students were divided into two groups, i.e. experimental group and control group. Both the groups were equated on the basis of their scores in previous semester in the subject of Physics through pair random sampling. Each group comprised 20 students. The Post-test Only Equivalent Groups Design was adopted in this study.

3.2 Research Instruments

A teacher-made test was developed as instruments of the study, i.e. post-test. The tests were approved by the doctoral committee of the researcher. All the test items were based on the text of the unit taught to the sample students. Then reliability of the post-test was found to be 0.73.

4. RESULTS

Table 1: Overall comparison of experimental and control groups on previous test

Comparison Group	N	M	SD	t	P
Control	20	61.75	5.09		
Experimental	20	61.6	5.56		
				0.089	0.93

Table 1 shows that on previous test, calculated value of t was 0.089 with p>0.05. Hence there was no significant difference between mean scores of control and experimental groups on previous test. Therefore, the groups could be treated as equal and the null hypothesis, "Mean scores of experimental group and control group do not significantly differ on previous achievement test", is accepted.

Table 2: Comparison of experimental and control groups on post-test

Comparison Group	N	M	SD	t	P
Control	20	85.45	8.91		
Experimental	20	96.05	2.31		
				5.15	0

Cite this Article: Salma Akhtar, Dr. Rabia Tabassum & Prof. Dr. R. A. Farooq "EFFECT OF TEACHING PHYSICS WITH PHYSICS SUITE ON THE ACHIEVEMENT OF SECONDARY SCHOOL STUDENTS" Pinnacle Educational Research & Development, Vol. 2 (3) 2014, Article ID perd_124, 159-161, 2014.

Table 2 reflects that in the comparison of control and experimental groups on post-test' the value of t was 5.15 with $p<0.05$ showing a significant difference between the mean scores of comparison groups. Thus mean score of experimental group (96.05) was significantly greater than the mean score of control group (85.45) after treatment. Therefore, the null hypothesis, "Mean scores of experimental and control groups do not significantly differ on post-test", is rejected.

Table 3: Overall comparison of experimental and control groups on retention test

Comparison Group	N	M	SD	t	P
Control	20	82.4	9.39		
Experimental	20	93.85	2.7		
				5.24	0

Table 3 indicates that mean achievement score of the experimental group (93.85) is significantly greater than mean achievement score control group (82.40) as value of t is 5.24 and p is less than 0.05. Hence treatment had significant effect on the retention of acquired knowledge by the students. Hence, the null hypothesis, "Mean scores of experimental group and control group do not significantly differ on retention test" is rejected.

5. CONCLUSIONS

Following conclusions were drawn on the basis of statistical analysis and the findings of the study:

1. On the variable of previous achievement in physics both the experimental and control group were compared and treated equal as there was no significant difference in their performance.
2. High achievers of both experimental and control groups were found equal on their previous achievement test.
3. The students of experimental group performed significantly better than those of control group on the post-test which proved that teaching of physics with the physics suite was more effective than the traditional method of teaching physics to secondary school students.
4. The experimental group performed significantly better on retention test which lead to the conclusion that independent variable helped the learners to retain acquired knowledge for longer period.

BIBLIOGRAPHY

1. Adeniyi, A.G. 2005. Science and technology education in secondary schools. Need for manpower development. *Journal of the Science Teachers Association of Nigeria* vol 40 nos 1 & 2: 63-67.

2. Adepitan J.O, 2003. Pattern of enrolment in Physics and students' education of the contributory factors in Nigerian college of education. *African Journal of Educational Research* vol.9 nos 1&2:136-146 Published by the Department of Teacher Education University of Ibadan, Nigeria.

3. Kim, E. and Park,J.(2002) *Students do not overcome conceptual difficulties after solving 1000 traditional problems* . New York: Am. J. Phys.

4. Kramer, D. (2011) *A Cultural History of Physics*. NW Suite: CRC Press, Taylor & Francis Group.

5. Lemke, J. (2000). *Multimedia literacy demands of the scientific curriculum.* Washington: Linguistics and Education. Pp. 247-271.

6. Redish, E. F. (2006) *Teaching Physics With The Physics Suite, Sample Problems*. University Of Maryland PERG: UMD PERG.

7. Stelzer, T and Gladding,G.E. (2001) *"The evolution of web-based activities in physics at Illinois," News letter of the Forum on Education of the American Physics Society*. Washington:

Cite this Article: Salma Akhtar, Dr. Rabia Tabassum & Prof. Dr. R. A. Farooq "EFFECT OF TEACHING PHYSICS WITH PHYSICS SUITE ON THE ACHIEVEMENT OF SECONDARY SCHOOL STUDENTS" Pinnacle Educational Research & Development, Vol. 2 (3) 2014, Article ID perd_124, 159-161, 2014.