

A Comparative Exploration of the Effect of Differentiated Teaching Method vs. Traditional Teaching Method on Students' Learning at 'A' level

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Abstract

This study explores the effect of differentiated teaching method vs. traditional teaching method on students' learning at 'A' level. It is an experimental research, conducted in Aitchison College. By applying simple random sampling technique, 70 students are selected as a sample from the population. Pre-test and post-test are conducted for data collection. Research investigates, how differentiated method of teaching effects learners' academic achievement. The retention level of the students who are taught via differentiated teaching and traditional teaching method is. After conducting a post-test, data is analyzed with pair-sample and independent sample t-test by using SPSS. Analysis shows that the students taught via differentiated teaching have more power of retention than the students taught via traditional teaching methods. The control group perform up to application level while experimental group perform up to evaluation level of cognitive domain.

Key Words

Differentiated Teaching Method, Traditional Teaching Method, Students' Learning, Physics

Introduction

The recent educational trends have been reflected important changes globally from eras. The non-native students in English speaking countries have some disabilities due to change in cultural background, different of interests, learning styles, experiences and strengths. For this the teachers must have to review their instructional practices and teaching for healthier approach towards learning and teaching. Owing to this the students get numerous options for getting information and ideas. The different instructions were made to satisfy a range of learning profiles.

The disabilities regarding learning varies from person to person and it is a common understanding that students could not enter in the classroom with the same abilities, needs and experiences. In simple words we can say that, one person have different kind of learning problem as compare to another. For example, one person may have difficulties in understanding subject course and about what people are saying, another person may face distress in reading and writing. There are different factors can varies in a particular class group which may be learning styles, language ability, background knowledge and some more factors.

There is no doubt, physics signifies to science related courses like pharmacy, agriculture, micro physics, medicine etc. due to which it maintained a unique position in school, college curriculum. These disciplines could not be studied without physics. The consideration of curriculum planners and researchers towards physics has been drawn in school; college curriculum due to these factors (Kareem, 2003). The performance of physics is still poor within Pakistani students at secondary school and college level in spite of physics' popularity. (Ugbaja, et.al 2011)

Now the focus of researchers is to know the grounds of poor performance in physics. It seems that such poor performance is due to lack of qualified science teachers, absence of science equipment, overloaded classrooms, ill equipped laboratories and poor teaching techniques (Armed, 2008). It is confirmed that quality of good education depends on teachers and their teaching methods. (Admins, 2011)

Yahaya (2012), Usman (2009), and Duze (2008) believe that the education standard in Pakistan is falling day by day. The reason of it is that teachers are not acquainted with the use of different methods of teaching. Many of the teachers use traditional methods or techniques like demonstration methods, lecture and discussions. While using these methods the expected result is not produced yet in learners' academic achievement. Another distinguished instructional method

relating to traditional one is quite depended upon innovative instructional approaches whose good results are not received yet in Pakistan by the teachers. The Hodge (1997) and Mc. Admins (2001) conducted research in the overseas atmosphere which effectiveness cannot be generalized for Pakistani students. Now the question is, if the differentiated method of teaching will be employed in the classrooms by teachers will help or not in improving Pakistani students' understanding and learning for the enhancement of achievement in physics. This provides the impetus to researcher for this study. The present study is designed to investigate Effect of Differentiated Teaching Method vs. Traditional Teaching Method on Students' Learning 'A' level in Pakistan. (Hestenes, & Halloun, 2014)

Statement of the Problem

A comparative study to explore the effect of differentiated teaching method vs. traditional teaching method on students' learning 'A' level"

Research Objectives

Keeping in view the research topic, the following research objectives were formulated:

- To analyze the achievement of the students who were taught via traditional and differentiated teaching method in subject of Physics.
- To compare students' power of retention who were communicated through traditional method and differentiated method of teaching in the subject of Physics.
- To compare levels wise students' learning who were taught via traditional and differentiated instructional technique in the subject of Physics.

Research Hypothesis

- H₁:** The mean achievement score of the experimental and control group not significantly differ on pre-test and post-test in subject of Physics.
- H₂:** The mean achievement score of the control group and experimental group not significantly differ on pre-test and post-test to compare the power of retention in the subject of Physics
- H₃:** The mean achievement score of the experimental and control group's students not significantly differ on level wise pre-test and post-test in subject of Physics.

Research Methodology

Research Design

It was experimental research and pre-test and post-test design in nature.

Population

Population comprised all (130) students who were enrolled in the A2 level in Aitcheson College, Lahore in the academic year of 2017-2018

Sample

By applying simple random sampling technique, 70 students were selected from 130 students of "A" level (Physics) class students.

Research Instruments

For this study, the researcher used self-developed pre-test and post-test from "A" level Reference book for collection of data from the subjects. The researcher followed the Bloom Taxonomy while developing pre-test and post-test. The researcher developed 10 items of knowledge level of the cognitive domain, 10 items of comprehension, 5 items of application, 2 items of analysis, 1 item of synthesis, and 1 items of evaluation level of cognitive domain from Cambridge Reference Book.

Pilot Testing of the Instruments

When research instruments initially developed, after that, it was discussed with the teachers of Physics who were teaching in Aitcheson College Lahore. The research committee of the Lahore University also validated it. To discover the efficiencies/deficiencies of the research instruments and to confirm reliability and content validity was the purpose of the pilot testing. To define content validity of the research tool, test-retest method was applied in.

Procedure of the Study

The researcher, himself was an employee in Aitchison College and working as Deputy Headmaster and member of teaching faculty as well over there. The researcher personally visited Principal's office for seeking permission of conducting research over here. After permission, researcher conducted pre-test. After that, by using simple random sampling technique, 35 students were randomly selected as experimental and 35 students were selected randomly as a control group. The researcher continued experiment for 16 weeks. Traditional method of teaching was used to teach control group and experimental group was taught via differentiated method of teaching by the researcher himself. After completion of 16 weeks treatment, the post-test was conducted.

Data Collection and Analysis

Data was gathered by conducting pre-test and post-test. The collected data was coded and inter into computer. To analyze the data inferential statistics was applied by suing SPSS software.

Results

Table 1. Experimental and Control Group Students Mean of Achievement Score

Groups	$\bar{x}$ Pre-test	$\bar{x}$ Post-test	$\bar{x}$ Gain
Control group (N=35)	11.77 (df=2.021)	18.54 (df=2.021)	6.77
Experimental group (N=35)	11.89 (df=2.021)	43.69 (df=2.021)	31.8
Mean Difference	0.12	25.15	25.03

Table 2. Independent sample t-test for testing H_0

Tests		Test of Levene for Equality of Variances		Equality of Means' t-test				
		F	Sig.	T	df	Sig. (2-tailed)	MD	Std. E.D
Pre- test & post- test	Equal variances assumed	1.21	.27	-27.73	68	.000	-25.143	.907
	Equal variances not assumed			-27.73	66.12	.000	-25.143	.907

Independent Sample t-test is significant at 0.05

Table No.1 shows that the mean of control group in pre-test score is 11.77 and mean of experimental group in pre-test score is 11.89 which show no difference. In post-test the mean score of control group is 18.54 and in post-test, the mean score of experimental group is 43.69 which indicate that experimental group's students performed high as compare to control group in the post test. The computed t-value for (table No.2) df (68) is -28.192 which is less than table t-value (1.990) at 0.05 level of significant. Therefore, the null hypothesis stating that "The mean achievement score on post-test of control and experimental groups' students not significantly differ" is rejected. Hence concluded that experimental group's students get high score in the post-test than the control group.

Table 3. Comparison of Level Wise Performance of Students of Experimental and Control Groups

Groups	Tests	Performance					
	Learning levels	Knowledge	Comprehension	Application	Analysis	Synthesis	Evaluation
Control Group	Pre-test	24	5	0	0	0	0
	Post-test	30	8	3	0	0	0
Experimental Group	Pre-test	27	9	0	0	0	0
	Post-test	35	35	35	20	18	12

Pearson Chi-Square=.850, sig=.356 witch is not significant at 0.05 level of significance

Pearson Chi-Square=.70.000, sig=0.00 witch is significant at 0.05 level of significance for post-test

The table No.3 shows comparison of level wise performance of students of experimental and control groups. In pre-test, the items which were developed knowledge level, majority of the both groups managed to solve, while only few students of the both groups managed to solve comprehension level item in the question paper and no one managed to solve application, analysis, synthesis and evaluation level items in the pre-test questionnaire.

In the post-test which was conducted after 3 months treatment, 86% of the control group's students were managed to solve knowledge level items in the question paper while 100% of the experimental group's students managed to solve, 23% of the control group's students were managed to solve comprehension level items while 100% of the experimental group's students managed to solve comprehension level items in the question paper. Only 9% of the control group's students were managed to solve application level items while 100% of the experimental group's students managed to solve application level items in the question paper. No one student of the control group managed to solve analysis, synthesis, and evaluation items in the question paper while 57% experimental group's students managed to solve analysis level items, 51% synthesis level items and 34% of the experimental group's students managed to solve evaluation level items in the question paper of the post-test. It is concluded that the student who were taught via differentiated teaching method performed "excellent" in knowledge, comprehension and application levels and performed "very good" at analysis, performed "good" at synthesis level, and performed "average" at evaluation level. So, it is said that students of experimental group had highest level of retention power than the control group.

Conclusion and Discussion

In this study the researcher only tried to explore the effect of differential method of teaching on students' learning. So, conclusion drawn from the findings which arise from the analysis, it is concluded that It is concluded that all students have almost same power of retention in pre-test regarding subject of Physics. It means all students who participated in research had almost same power of retention in the domain of knowledge and performed good in the domain knowledge, perform average in the domain of comprehension, and application. It is noted that as level of learning domain in being increase, the performance of students on pre-test in being decreased as "very good" to "average" because in the domain of knowledge, students perform "very good" while as level increase as comprehension, and application, they perform "Average" in these domains. But all students achieved "Zero" score in the domain of analysis, synthesis, and evaluation on pre-test which shows that they had little ability to solve these level of question of the subject of physics. But after conducting experiment, it was noted that in the post-test, the students who were taught via differential method of teaching get higher as compare to control group. So, it is proved that the students who were taught via differential method of teaching had high level of retention power of physics subject. Moreover, majority students of the control group got "average score" in the domain of knowledge, perform "good" in the domain of comprehension, average in the domain of application but perform "Zero" in the domain of analysis, synthesis, and emulation while majority student of the students who were taught via differential method of teaching got "Very good score" in the domain of knowledge, "excellent score" in the domain of comprehension, and application, "very good" in the domain of analysis, and "good" in the domain of synthesis, and evaluation. It reveals that the students who were taught via differential method of teaching had high level of retention and are able to solve question of the all levels of cognitive learning domain from knowledge to evaluation level of the subject of Physics while the students who taught via traditional method of teaching had the ability to solve question of knowledge, comprehension, and hardly application of the cognitive learning domain, and concluded that differential method of teaching play more potential role in the learning of Physics as compare to other method of teaching.

On the other hand, it could be said that differentiated method of teaching is more effect than the traditional or any other method of teaching because traditional method of teaching develop the ability in the students who just able to solve the question which are knowledge, comprehension and application levels while differential method of teaching develop such ability in the student which enable them to solve questions not only knowledge, comprehension and application levels but also solve analysis, synthesis, and evaluation levels. It was found in the present research that the students who were taught through traditional method of teaching perform "very good" in the domain of knowledge, perform "good" in the domain of comprehension, and perform "average" in the domain of application. It is notable that as learning level is being increase, the performance of the students who were taught via traditional method of teaching in being decreased as the level of learning is being increase. On the other hand, the students who were taught via differential method of teaching perform "very good" in the domain of knowledge; perform "excellent" in the domain of comprehension, and application; perform "very good" in the domain of analysis, and perform "good" in the domain of synthesis, and evaluation. Therefore, differential method of teaching is more effective as compare to traditional or any other method of teaching. Therefore it is recommended that overall all teachers should and the teachers who teach Physics subject in particular, should teach via differentiated

method of teaching in their classroom to boost the learning of their students. The teacher who is not familiar with the use of differential method of teaching, it is responsibility of school administrators of education department to organize seminars and workshops to familiar with differentiated teaching technique the teacher for its implementation in the classroom.

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