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IMPACT OF SCIENCE TEACHING METHODOLOGIES ON STUDENTS' PERFORMANCE

Abstract

Students' attention towards learning science subjects appears to be reducing at all levels of education in developing countries, like Pakistan. This problem is influenced by science teaching methodologies and learning processes. The exploration of factors influencing teaching and learning, provides suitable information for enhancing the learning of science subjects. Main objective of this study is to discover science teaching and learning methodology in secondary schools of District Khairpur Mir's. The Questionnaire was prepared for students to explore the aspects that motivate students towards studying. The questionnaire identifies teaching methodologies with students' achievements in response of their results. A sample of 82 students (both male & female) were selected from different schools of District Khairpur Mir's. The age of the participants ranged between 15-18 years (with mean of 15.56 years). Their educational levels were students of grade ninth and tenth, and their socio-economic status ranged from lower-middle to upper-middle income groups. The data obtained were tabulated and analyzed by percentage values.

KeyWords: *Students, Teaching Methodology, Achievements.*

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Introduction

Science is a major and & significant subject at secondary school. Science (Physics, Chemistry and Biology) subjects play a vigorous role in the field of Education. Through studying the subject of Science, students develop their' observation, experiment, critical thinking, problem solving techniques and it develops practical work strategies. Students will learn new theories by emphasizing the skills of deploying the physical world, they will inculcate perceptive from data, because the students study in an innovative way and are introduced to unique ideas and to think over and observe them.

The principle reason for initiating to any level of training is to obtain a dynamic change in the study (Baviskar, 2009). To construct basic techniques for learning correspondence, instructors must apply appropriate instructional strategies that mostly suit to adjust targets. In the anticipated age, educator focused techniques to convey data to learners in respect to focused approaches. Till today, inquiries regarding the productivity of showing plans on understudy learning have constantly brought extensive consideration up in the topical field of instructive research. Furthermore, investigation on teaching and learning continually endeavor towards observing the area to which unusual teaching methods improve development in student knowledge. Moderately unfortunate educational performance via the well-liked students is basically related to request of unsuccessful teaching methods by teachers to transfer knowledge to listener (Chanddrasegaran, 2008).

Education is a practice that includes required changes for learners to get clear results, (Chanddrasegaran, 2008) keeps

up that instructors require mindful arrangement with the expectation of catching acknowledgment of the span of difficulty of the ideas to be secured.

Science subject shows techniques containing the qualities and strategies utilized for instructing to be actualized by educators to achieve learning objectives. These teaching methodologies' problems are solved decently on topics' to be educated and imparted by the way of the learner. These days' educators make use of only lecture method but other instruction approaches are not implemented in the classes throughout teaching. In lecture method instructors connect information to learners in the conservative way & students were inactive (Hake, 2007).

The Purpose of this Study is to Examine:

The purpose of this study are:

a. Students' belief about science teaching and learning and its effects.

b. Students' belief about achieving their goals through effective science teaching methodologies.

c. Students' belief about science classroom environment on students' performance.

Research Hypothesis

There is no significant impact of science teaching methodologies on students' performance.

Scope of the Study

This research study is conducted to determine the position of teaching of science, students learning & students' achievements at secondary schools of District Khairpur Mir's, province of Sindh. The methods used to teach science will be investigated. This research suggests solutions to the existing

Science teaching learning and students achievement related problems.

Literature Review

Science Education and Its Importance

Science education provides information to academics, and also it practices other kind of knowledge such as the investigational abilities (Kumar, 2004). "Science education is important for today's world because science subject is linked real world, through science knowledge students understand and find the answer which are arises in the students minds and intellectual activities occasioning in linking concepts in natural atmospheres (Buck, 2008).

The purpose of science instruction into secondary schools is to change the student thinking of understanding. Consistently the essential knowledge of physical sciences is required in the complementary learning of science for better understanding of laws of contents and real natural things. It must to facilitate to investigation of all abilities; create the power to suppose and make use of arithmetic data to solve the relating problems.

In science education as well as learning science on different stage, the academics' face numerous difficulties during perceptive logical thoughts, laws & theory within science school class room & laboratories. According to (Wood, 1991), "science learning must be concerning the training of scientific processes than the training of scientific facts." Consistent with (Hackling, 2005), this era is understood since of the era of science.

Science Teaching in Pakistan

As Brew (2003), said that the science instruction plays a vital role in the economic development of various social orders &

peoples. Science education has established a good place in the secondary schools. Especially since the last few decades in the Pakistan, science is instructed completely diverse angles like lecture method & that it has been continuously growing subsequently the last few decades in Pakistan (Iqbal, 2008).

In the developing countries for understanding of students, focus on curriculum because curriculum is the base of learning in subjects. If curriculum includes examples & activities in the contents it is better to science subject because science subject like Physics, Chemistry & Biology are the core subject of all subjects ((AAAS), 1993); (NRC, 2006).

But in case of Pakistan quit different because curriculum in Pakistan not up to date that reason students facing different problems in the field of science subject.

Research Methodology

This study was undertaken to evaluate the diverse effects of teaching methodologies of science subject on students' achievement & to find out the effective teaching methodologies of science subjects. The research work was carried out in fourteen Government secondary schools and two Government Comprehensive higher secondary schools of District Khairpur Mir's.

Research Strategy

The present study is conducted by survey method. Quantitative research methodology is used for collecting data in pure sciences such as Physics, Chemistry, and Biology. In this research questionnaire was used for collecting of data. Through this survey method irrelevant variables are eliminated. In this research male & female students are involved under beginning of mean score into examination of science teaching methodologies and students achievements.

Population & Sampling

There are ten High Schools for boys & girls in District Khairpur Mir's, Sindh, Pakistan. Students (male & female) of high Schools of Khairpur Mir's District, Sindh (Pakistan) during session 2015-2016 were population of this survey study.

There were eighty-two (82) students of ninth and tenth class of Schools of District Khairpur Mir's during the session 2015-2016. The sample was categorized into two equal groups under the origin of an achievement from the ninth and tenth science classes.

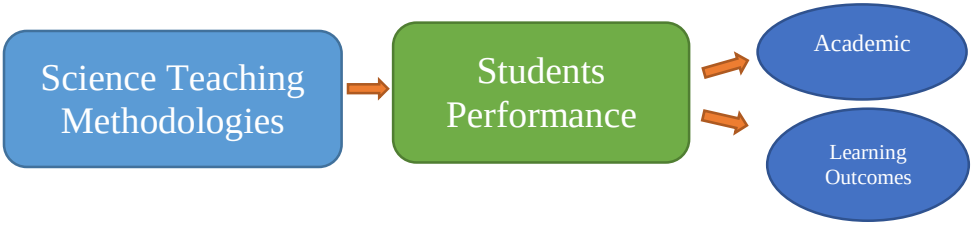
Data Collection & Data Analysis

The data was collected by using a questionnaire. The questionnaire was distributed among boys' & girls' students of ninth and tenth class of secondary school District Khairpur Mir's, Sindh, Pakistan.

The data was analyzed by using SPSS by applying Linear Regression for analysis of research hypothesis and percentage for item analysis on collecting data in order to draw an appropriate information based on authentic conclusions on impact of science teaching methodologies on students' performance.

Conceptual Framework

In this research there were two variables, independent variable which is science teaching methodologies and dependent variable which is students perforamnce and this further divided in two subgroups, academic achievement and learning outcomes.



Analysis of the Questionnaire

Reliability of the Questionnaire

Table 1 (a)

Case processing summary

Case Processing Summary

		N	%
Cases	Valid	82	100.0
	Excluded	0	.0
	Total	82	100.0

a. List wise deletion based on all variables in the procedure.

Table 1 (b)

Reliability Statistics

Reliability Statistics

Cronbach's Alpha	N of Items
.914	14

(1) Demographic Information of the Questionnaire

(i) Gender

Table 2
Gender Summary

Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	41	50.0	50.0	50.0
	Female	41	50.0	50.0	100.0
	Total	82	100.0	100.0	

(ii) Academic Education

Table 3
Academic Education Summary

Academic Education

		Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
Valid	**IX & X class**	**82**	**100.0**	**100.0**	**100.0**

Analysis of Student Questionnaire Results

Table 4
Item analysis

Items	**Total**	**SA**	**%**	**A**	**%**	**U**	**%**	**DA**	**%**	**SDA**	**%**
Science is a primarily a formal and practical way of representing the real world	82	70	85.47	16	9.95	02	2.4	1	1.20	2	2.4

It is good to use teaching Aids material in science class	82	61	74.48	13	15.14	2	2.4	2	2.4	4	4.77
It is important for science teachers to give students directions for doing effective science subject learning	82	61	74.48	16	19.09	2	2.4	2	2.4	1	1.20
To linking of one topic with other, is essential for understanding achievement of the students	82	49	59.12	19	23.44	4	4.87	6	7.31	4	4.87

Science teachers facilitate you to work together for understanding difficult topics	82	53	64.63	22	26.82	2	2.4	3	3.6	2	2.4
Science teacher use different ways to stimulate students' science skills, for learning out come	82	61	74.27	16	19.09	2	2.4	2	2.4	1	1.20
Science teacher adapts different ways to teaching learning strategies and techniques for student's achievements	82	61	74.27	15	17.21	2	2.4	2	2.4	2	2.4

For science subject achievement it is necessary for Students to accompanied practical work for achievement in science subject	82	55	67.07	21	25.60	2	2.4	2	2.4	2	2.4
The science teacher provide help when you there are difficulties in understanding a topic or task	82	62	75.31	8	9.75	8	9.75	2	2.4	2	2.4
Science teacher manage a class in discussion, demonstration, activity, project base	82	52	63.41	19	23.17	5	6.09	4	4.87	2	2.4

method for student's achievements											
Science teacher deliver clear & simple examples to explain difficult concepts	82	51	62.65	21	25.60	4	4.87	4	4.87	2	2.4
Science teacher uses alternate explanations when students do not understand a topic	82	53	64.10	13	15.85	3	3.6	1	1.20	1	1.20
Teacher has knowledge & skills of teaching of science subject	82	70	85.47	7	8.53	3	3.6	1	1.20	1	1.20

The teacher establishes & maintains eye contact with the class	82	70	85.47	7	8.53	1	1.20	1	1.20	3	3.6

Coefficients

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	.875	.105		8.240	.000
Science teaching methodologies	1.000	0.53	1.000	51.996	.000

a. Dependent Variable: Students performance

Analysis of Research Hypothesis

Null Hypothesis

There is no significant impact of science teaching methodologies on students' performance.

Regression Analysis

Here, the null hypothesis is rejected because t-value is greater than 2 and sig. value less than 0.05. In simple words, there is significant impact of science teaching methodologies on students' performance.

$$Y = \alpha + \beta 1X_1 + \varepsilon$$

$$\text{Science Teaching Methodologies} = \alpha + \beta 1\ (\text{Students Performance}) + \varepsilon$$

$$STM = 0.875 + 1.00(SP) + \varepsilon$$

If there is 1% change in (Science Teaching Methodologies), there will be 1% change in the Students' Performance.

Discussion

The statistical results are interesting regarding teaching science subjects at the schools. With response to the statement 01, 70% respondents are strongly agreed science is a primarily a formal and practical way of representing the real world, 61 % are strongly agreed which indicates It is good to use teaching Aids material in science class. In response to the statement 3, 61% respondents are strongly agreeing and 16% agree which indicates it is important for science teachers to give students directions for doing effective science subject learning. In response to the statement 4 to linking of one topic with other, is essential for understanding achievement of the students, shows that 49% are strongly agree, 19% agree which indicates a good number of teachers use different techniques for linking one topic to other topic. In response to the statement 5, 53 % are strongly agree and 22% are agree which indicates science teachers facilitate you to work together for understanding difficult topics. In response to the statement 6, 61% of the teachers assign students homework while 6.2% are undecided and 2% are Disagree and 1 % are strongly disagree that shows that a good number of Science teachers use different ways to stimulate students' science skills, for learning outcome. Statement 7 shows that majority of Science teachers adapts different ways to teaching learning strategies and techniques for student's achievements. Statement 8 indicates that 21% teachers are agree and 55% are strongly

agree that for science subject achievement it is necessary for students to accompanied practical work for achievement in science subject. While 2% are disagree and 2% are strongly disagree. Statement 9, indicates that majority of the science teacher provides help when you there are difficulties in understanding a topic or task. Statement 10 results indicates science teachers manage a class in discussion, demonstration, activity, project base method for student's achievements. Statement 11 results indicates the science teacher explain clear & simple examples to clarify difficult concepts. In statement 12, 53% students strongly agree and 13% are agree in favor the science teacher uses alternate explanations when students do not understand a topic. In statement 13 & 14, 70% students are strongly agreeing about teachers have subject knowledge and maintain eye contact during the class.

Finding

There is significant impact of science teaching methodologies on students' performance.

Conclusion

It has been observed that majority of the students answered in strongly agree and agree, these answers show that Science is primarily a formal and practical way of representing the real world. It has also been shown in the results of this study that it is good to use teaching aids/ material in science class. Majority of the students of schools of Khairpur Mir's favour in linking of one topic with other topic and is essential for achievement of the students. Majority of the students of schools of Khairpur Mir's emphasize on teachers to facilitate students and work together for understanding difficult topics, and it helps students achieve good grades. Students

suggest science teacher uses different ways to stimulate students' science skills, for students learning outcome and also science teacher adapts different ways to teaching learning strategies and techniques for student's achievement. Majority of the students of schools of Khairpur Mir's emphasized on practical work with theory for better understanding. Majority of students replied in the favor of linkage between theory and practical work. It is good to know that science teachers help students when students have difficulties in understanding a topic, as when students understand topic then they achieved good grades. Results also indicate that the teachers use other teaching methodologies when students don't understand topic from one teaching method, those other methods are project based method, activity base, discussion & demonstration method may help in the better understanding of topics for students. Results of item no.11 clearly declares that Science teacher presents clear & simple examples to clarify difficult nconcepts when students do not understand a difficult topic. It is necessary for science teacher to use alternate explanations when students do not understand a topic. For the science subject achievement, it is necessary that the teacher has knowledge and skills of teaching the subject. Results also indicate that for understanding topics, science teacher establishes & maintains eye contact with the class & recognizes who learns and who does not learn.

Above conclusion tells us that if teacher wants a student to achieve good grades in science subject then he/she will perform well and with full dedication, incorporating various teaching techniques in the lessons.

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