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Impact of Teacher Effectiveness and Student Attitude on Students' Academic Achievement in Science Subjects in the Secondary Schools of Dera Ismail Khan (Pakistan)

Abstract

This study was conducted to find the influence of teachers' effectiveness and students' attitude on students' academic achievement in science subjects at secondary school of district Dera-Ismaail-Khan. An important aim of the study was to explore the impact of teacher's effectiveness and students' academic performance on the subject of science. A multi-stage and stratified random sampling technique was used for data collection. The survey questionnaire was used. A standardized questionnaire was used and this questionnaire was also validated. A normality test was applied to normalize all variables. Reliability was checked through Cronbach Alpha and it was found in the range given by (Pallant, 2010). The data-was-collected-from teacher at the secondary school level. The hypothetical influence was tested using simple regression. The teachers' effectiveness was found significantly on students' academic achievement as $\beta=0.727$ $p<0.05$. Similarly, the influence of students' attitude found significantly positive on students' academic achievement as $\beta=0.616$ $p<0.05$.

Key Words: Teacher Behavior; Student Attitudes; Academic Performance; Science Subject

Introduction

History has proved the fact that a nation's development depends upon the education system adopted by them. And in this system, the most important and crucial factor is a competent, talented and professionally skillful teacher. The teacher is directly accountable for the development of a nation as well as plays a vital and crucial role in improving and strengthening society. The teacher is an instrument that is used to improve the economic, cultural, social, and political system of a country. Premises and equipment are the prerequisites of an educational enterprise however teachers are essential to them and the utmost element is a teacher. In an education system teacher is a hub. Any compromise on the quality of teachers may lead to the failure of the Educational program.

In any of the educational systems, the secondary level of education is considered to be the most critical and most important level for the development of the child. This level of education plays an intermediate role between early education and higher education. This level of education is transforming the level in the life of a child. If the teacher at secondary level succeeds in providing a sound base especially in science subjects, it can reasonably be said that they have prepared the future scientists. Moreover, the student's attitude is an important factor in his/her achievement and interest in a subject. A general belief is that the attitude of a student is an important determinant of their achievements in that particular subject. Good achievements of students result from a favorable attitude in a particular subject.

The teacher role is changed due to emerging trends in the education sector. Now the teacher is playing a much challenging and multifaceted role. A teacher is now a leader, coach, mentor, and psychologist. Despite teacher multidimensional role, its efficiency cannot be denied at any stage. A teacher needs to be competent and knowledgeable to manage the teaching-learning process more

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effective. Those teachers who are aware of individual differences, can easily manage the classroom environment and Utilize resources that give a fruitful result. There is a paradigm shift in teacher role in the 21st century. A teacher has to acquire all the necessary knowledge and skills to deliver teaching more effectively. In the research of Afe (2001), it was concluded that the teacher's method of teaching is the more influential factors in students' performance. Educational aims or goals are set and the teacher is the person who can lead students to attain these goals. It is also the responsibility of the teachers to put into practice rules and regulations. The teacher role cannot be denied in the social and moral development of the student ([Uchefuna, 2001](#)).

Literature Review

Day by day the system is getting more sophisticated and more speculative due to which there is an unpredicted demand for an effective teacher to lead the children towards progress and improvement. Today the work of teachers has become more challenging and stressful. In the words of Crow and Crow "A good teacher and the quality of his teaching has always been of paramount to a free man and a free society". In the words of Afe (2001) research revealed that teachers have very crucial in educational attainment as the ultimate responsibility of putting the policy into action rests on the teachers. Since the process of teaching and learning is dependent on the teacher so an effective teacher is considered to be the one who provides desired results as being a teacher (Uchefuna, 2001).

The most important teacher-variables that immensely enhance the academic achievement of students are effective teaching. The term effective teaching is synonymous with teaching effectiveness. In today's era, the most efficient practice of teaching is considered to be the one in which the teacher possesses the ability to exhibit intellectual, emotional and social stability, soft and loving attitude for children along with the respect for his occupation and tries to transfer the most of the better qualities in students.

In their study [Stronge, Ward, and Grant \(2011\)](#) explored four main characteristics for an effective teacher to have. The instructional effectiveness of the teachers depends upon, positive learning environments, the use of effective assessment techniques, and the personal quality of the teacher. An effective teacher must have the ability to teach by using different methods of teaching and must be able to use the right method at right time during the lesson (Aina, 2013; Stronge et al., 2011). To achieve educational outcomes, it is central for the teacher to organize the classrooms and properly manage the students' behavior ([Oliver & Reschly, 2007](#)). Teacher and students' relationship and interaction are crucial for the motivation of the students as well as the improvement of the students' achievements in a particular subject ([Onah and Ugwu, 2010](#)). In her study, Aina (2013b) found that a very important factor i.e. lacks of teacher-student interaction results in poor academic performance of students.

The research explored the teaching methodology and personality of a teacher as the most important determinant of student's positive attitude in the subject of mathematics, moreover, a student cannot perform well in this subject without having interest and without putting personal efforts ([Olatunde, 2009](#)).

The nature of science subject is practical in life. It deals with the practical phenomenon and events that are happening around us. That is why laboratories are very essential for the effective teaching of science. Those institutions which have well equip laboratories shows good result. Students learn effectively and they display more enthusiasm for learning. It also affects a student's academic performance and student creative skills. Due to the unavailability of laboratories, student's creative skills do not develop properly and they remain backward in developing their ideas and concept. Physics is the subjects that deal with physical sciences. It requires practical knowledge and experience (Fenstermacher, 1996).

The teacher also plays a crucial role in motivating students about certain subjects. Sometimes students don't take interest in a subject due to some or other reasons. But the teacher method of teaching arises student's interest in that particular subject due to his method of teaching and how he

presents the contents of those subjects before students. According to Morakinwa (2003), teacher absenteeism from school or class also affects student performance. He found a positive relationship between teacher's absenteeism and student performance. A teacher also plays a significant role in molding student's behavior in the class. Teacher's positive attitudes towards works as reinforcement for students and students are motivated in the teaching-learning process (Okoronka & Wada, 2014).

For effective teaching of science subjects, it is essential for teachers that he may explain each concept in a precise way. If a teacher uses A. V. Aids in a science subject, he can deliver his knowledge more effectively and students can learn easily. Teacher's way of teaching also affects teacher behavior and teacher attitudes. If a teacher has a poor method of delivering his lecture, it negatively affects a student's performance and student's attitudes. Nzewi (2003), concluded that poor communication and teaching method of the teacher has a significant relationship with student academic performance. It was also found that there was a significant difference in gender regarding attitudes and performance. Teacher's interaction with students in the classroom also affects students' plans. In this study, it was concluded that students were not ready to adopt Physics as a career subject.

Education is the process of molding the behavior of students in positive. The teacher is a role model for students and his behavior and attitude have a direct influence on students' behavior. In a research study of Hacieminoglu (2016), it was found that students with positive attitudes towards science subject, high academic performance as compared to students with negative or low perceptions. Different factors are responsible for students' attitudes towards a particular subject. It depends upon the teacher's approach towards that subject and how he presents it before students. Student's perception of the school environment also has a significant relationship between student attitudes toward science subjects. If the school has well-equipped science laboratories, then the student has positive attitudes towards school and vice versa. In such an environment student are optimistic and they have a good plan (Osborne, 2003).

Practical work or experimental work of science subjects has a positive effect on student learning and students can learn more effectively. It was found that if scientific presentation matched with student's attitude and mind setup, it gives a fruitful result. Students have both positive and negative attitudes. Positive attitudes result in high academic performance while negative attitudes result in distraction from goals. When students are engaged in practical work in a science subject, it results in positive attitudes and also enhances students' creative skills. Students are more satisfied and motivated while doing practical work in a science subject (Kloppfer, 1976).

Student interaction with other peers also has a significant effect on students' attitudes and performance. Different research studies have been undertaken to find a peer's effect on a student's academic performance. In a research study, it was concluded that other students have significant and positive effect on student's performance. Student interaction with classmates encourages and motivates students for learning. With the help of other classmates, a student can easily understand content material. According to Newhouse (1990), if students have positive attitudes towards science subjects, it results in students' optimism and students feel satisfied with their job and plan. It was also found that the traditional method of teaching results in negative attitudes in students. The concept of teaching is changed from teacher-centered to student-centered. A student is a hub around which the whole teaching and learning process revolves. Teaching through a traditional method in science subjects does not provide fruitful results. The reason may be that science subject deals with practical work. All educational institutes need to establish well-equipped science laboratories. The teacher must adopt a practical approach in teaching-learning person

In a comparative study Burstein (1992) analyzed the factors influencing the students' mathematical achievement and found a direct-linkage between the attitudes of the students towards their outcomes. In their study Bassey, Umoren, and Udida (2008) showed the subject of chemistry is highly dependent upon their attitude. Similarly, Papanastasiou (2001) states that students having a positive attitude towards science subjects are more likely to perform better.

The very large number of students at the secondary level is lacking their interest in the educational system along with the methodologies of teaching in Pakistan. The students feel tedium, disaffection,

and absenteeism also grows in their schooling ([Larson & Richards, 1991](#)). The behavior of the overall institute and especially the teacher when he comments something about the student is very related to development of a positive or negative attitude of students for the science subjects. Science subjects require a complete methodology for teaching. Any teacher has to work for the development of the basic concepts of the students. The attitude of students becomes negative when the tutor goes with poor methodology ([Okoronka, & Wada, 2014](#)).

The attitude was the result of student's experiences from the class and if the experience with the subject was optimistic then the student was found to be satisfied and motivated for his educational carrier in the field of science subjects and if the experience was negative then it resulted in negative attitude for science subjects ([Newhouse, 1990](#)). The self-confidence of achievement and capabilities of students play a significant role in the development of a positive attitude for science subjects (Newbill, 2005). The congruity theory explains that when the student gets the positive perception from the general environment and surroundings about the science subjects than this will also result in the enhancement of a positive attitude for science subjects when he gets the lecture. Similarly, if the lecture delivered matches his existing concepts then it will also result in his positive attitude for science subjects ([Osgood & Tannenbaum, 1957](#)).

Therefore, based on the literature review, the following hypotheses are developed:

H1: There is a significant and positive impact of the Teacher-effectiveness on Student Academic Achievement

H2: There is a significant positive impact on the Students' Attitude on Students Academic Achievement.

Research Methodology

This study followed the hypotheses testing approach where data were cross-sectional. The hypotheses were tested using parametric statistical tools. Most of the student attitudes and performance theories are dominated by western culture educational models and frameworks. Most of the literature about attitude and performance is investigated from Pakistan's perspective in Pakistan's educational setting. Most of the studies done in management perspective but very few works have been done on the attitude of children for their studies and presentation of the students from Pakistan perspective (Hamzah *et al.*, 2002).

Population

The population for the present study comprising all secondary school teachers (SSTs) (1012) of both Public and private secondary-schools of District Dera Ismail Khan.

The convenient sample of SSTs was taken, from the private and public schools of district D.I.Khan (Sekran, 2003). The Yamane (1967) formula for calculating the sample size was used for the present study.

$$n = \frac{N}{1 + N(e)^2}$$

$$n = \frac{1012}{1 + 1012(0.05)^2} = 287$$

Data Collection and Analysis Methods

A total of 287 questionnaires were distributed among teachers and 265 were received back. Among received data, 15 respondents did not fill the questionnaire properly and these were excluded from the analyses. Questionnaires generated a large amount of unprocessed data which was easy to analyze the data in software SPSS 21 by using tools mentioned below. Data was developed in SPSS 21 before analyzing data all the missing values and data normality were treated first by checking Skewness and Kurtosis values. Skewness and Kurtosis value ranged between +3 -3 (Pallant, 2010). Simple regression used to check the achievement of the respective objectives. The reliability of the data was tested by using Cranach's Alpha coefficient.

Instrument and Constructs

To obtain the data regarding research variables namely, Teacher's Effectiveness, Students Attitude, and Students' Academic Achievements, a questionnaire was developed from already literature review. Before, finalization, the questionnaire was distributed to different educational experts for the face and content validity. Some changes were made in the questionnaire in the light of experts' suggestions. Teachers' Effectiveness consisted of 48 items while Students' Academic Achievement and Student's Attitude consisted of 10 items each. The reliability of Teacher's Effectiveness was measured using Cronbach's alpha which was .92 and for Student's Attitude, it was .71, whereas it was .70 for Student's Academic Achievement.

Findings

Demographic statistic of the respondents

Variables	Characteristics	N	%age
Gender	Male	164	65.6
	Female	86	34.4
Age	21-30	185	74
	31-40	60	24
	41-50	5	2
Education	Graduate	74	29.6
	Master	159	63.6
	Ph.D. Scholars	17	6.8
Length of Service	1-5	145	58
	6-10	85	34
	11-15	20	8

Hypotheses of the study

H1: It is a significant positive impact of the Teacher-effectiveness on Student Academic Achievement.

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
1	(Constant)	.967	.091	10.644	.000
	TEffectiveness	.642	.038	.727	16.673

The table above shows that one-unit change can bring change in the dependent variable. So as the value of $\beta=0.727$ $p<0.05$, which explains 72.7% change in science subject performance because of a tutor's efficiency. Therefore, H1 is accepted as true.

H2: There is a significantly positive-impact of Students Attitudes on Students' Academic-Achievement.

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1	(Constant)	1.235	.101	12.255	.000
	Student Attitude	.528	.043	.616	12.323

The table above shows that one-unit change can bring change in the dependent variable. So as the value of $\beta=0.616$ $p<0.05$, which explains 61.6% change in the attitude of children for motivating learning because of tutors' efficiency. So, hypotheses H2 is accepted.

Discussion & Recommendations

The impact of teachers' effectiveness in student academic achievement in science subjects was assessed in hypothesis 4 where the impact was found positive and significant $b=.727$, $P=000$, so at the secondary level, the teacher's effectiveness improves the student's achievement in a science subject at District D.I.Khan level. In the words of Afe (2001) research revealed that teachers have the most important influence on the academic achievement of the students and their role is very crucial in educational attainment as the ultimate responsibility of putting the policy into action rests on the teachers. In the words of Aina and Adedo (2013), there is too much importance of feedback in the teaching-learning process because proper feedback leads to improve students' learning. Similarly, it was assumed in hypothesis 5 that students attitude has a significant positive impact on student academic achievement, the $b=.616$, $P<.001$ shows that if a student has a positive attitude toward science subject then their achievement in this subject would also be positive and improved at the secondary school level of D.I.Khan. In a comparative study [Burstein \(1992\)](#) analyzed the factors influencing the students' mathematical achievement and found a direct linkage between the attitude of the students towards mathematics and their outcomes. In their study Bassey, Umoren, and Udida (2008) developed the performance of chemistry is highly dependent upon their attitude. The referred literature in this study supports the findings of this research that teacher's effectiveness and students attitude influence students' academic achievement in science subjects at secondary the school-level of district Dera Ismail Khan. It is mentioned that teacher's effectiveness should be maintained at the secondary school level for gaining higher marks in a science subject. Moreover, a student's attitude may also be boosted to help to achieve high grades in a science subject. Future researches may discover more factors contributing to a student's academic achievement. Apart from science subjects, more subjects may be included in future researches to compare results with science subjects.

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