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Impact of Science Teachers' Attitude on Academic Achievement of Students at Secondary Level in Lahore

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Abstract: *The present study was designed to find out the effect of science teachers' attitudes on the academic performance of secondary graders. This study was quantitative in nature that employed a causal comparative research design. The tools used to measure the attitude of teachers was a questionnaire, while academic achievement was determined from the result of BISE. The data collection tool was validated by experts to check its validation, while the reliability of the tool was ensured by piloting it on 80 students. The final version of the questionnaire has a reliability value 0.83. for data collection, 700 teachers were sampled from the total population by using purposive sampling and a questionnaire was administered to them by the researchers personally. The results of the data show that the attitude of teachers are varied across different factors.*

Key Words: Science, Academic Achievement, Attitude, Secondary

Introduction

Attitude towards science is an important factor affecting students' achievement in science and understanding of different conceptions in the domain of science education. Through attitude, we can easily determine the likeness and dislike ness of students towards specific thing/aspect. Attitude can be expressed in either negative, positive or neutral terms. It is an approach, sensation or situation in regards of the mind to determine the inclination of students about a certain concept. It can be said that it is a mode of looking at things from different perspectives that may be varied according to the person (Muellerleile, 2005). Oskamp and Schultz (2005) stated attitude as the tendency to respond in positive or negative, favorable or unfavourable ways in regards to the objects towards which attitude is being measured. Cheung (2009) defined that every science teacher should consider the ways to develop a constructive attitude towards science subjects as his or her liability. Unluckily, the researchers in their research study revealed that what's going on in our science classrooms is not particular for students of all age groups (Cheung, 2009; Stark & Gray, 1999). The attitude of the teacher and the teaching strategy they adopt can have a high impact on student's attitudes. It may be positive or negative (Yara, 2009).

In the modern age, science teaching and learning have become very important, and it can become more interactive by using different modes of teaching such as communication technology or AV aids. Such different modes of learning are highly encouraged in our everyday life for better learning of students.

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Furthermore, science has been merged with other different subjects such as mathematics, history, geography, and other different languages. This may help the students to learn the concept of science by linking it with other different subjects in which they are interested, and in this way, students can learn different concepts or things at a time. Science is an ongoing learning process for students of all age groups. Therefore, teachers of science should also use different modes of teaching science by adopting technologies to make it more interesting and eye-catching for the students. In this way, they will enjoy learning science as a subject, and it will leave a lifelong impact on students. It is a better idea to tell students about the importance and significance of science in lectures to make them good scientists and to develop their scientific skills among them as they are the future of tomorrow.

The attitude of a teacher towards the subject of science is necessary for the achievement and professional extension of pupils. The reflection of science teachers about science influences their pupils' successes and their feelings and provide them direction for the quest of science knowledge (Onocha, 1985). The attitude of science teacher towards the discipline of science play a significant role on the mathematics achievement of their pupils instead of science subject (Igwe, 2002). Correspondingly, a study on science teachers' pupils' attitude towards mathematics achievement in which Chacko (1981) concluded that characteristics of science teachers' pupils not only correlate to science achievement but also predict significant influence on pupils' mathematics achievement.

Ali and Awan (2013) investigated a study on secondary school pupils to explore the relationship of their attitude towards Science subjects; they found that secondary school science achievement has a significant positive relationship with their attitude towards science. Another study conducted by Chidolue (1996) explained that the competency of science teachers affect the academic achievement of their pupils. Science teachers' competency not only affects the academic achievement of science students but also helps in developing a positive attitude among science pupils towards the subject of science, and we can say it can be the criteria for teachers for better teaching and they should empathize on their teaching. He further explained that the characteristics of science teachers must deeply observed and time to time, tested carefully. This will be a sign of valid performance. He also added that there is a need to organize a few programmes to test the characteristics of teachers achievement, and with the help of these programmes, we can examine not only teachers' competency but also their art of science teaching.

Significance of the Study

This study may help provide the kind of impact between teachers' attitudes and the academic success of their pupils. The research may also be useful for teachers as well as for the learners to enhance their attitude towards science. It may also help the stakeholders such as: curriculum planners and researchers to consider the suitable level of science teachers' attitude, qualifications and experience in obtaining the desired science students' academic achievements in future.

Objectives of the Study

1. Measure the attitude of science teachers towards science at the secondary level in Lahore across different demographic variables.
2. Investigate the impact of science teachers' attitude on their student's academic achievement at secondary level.

Research Methodology

The researchers adopted quantitative techniques to collect data. The researcher followed a causal-comparative research design as it is useful for this type of study.

Population and Sampling

The population for this study were 9087

secondary school male and female teachers of district Lahore. The purposive sampling technique was used. The sample selected for this study were 700 secondary school teachers, i.e. 350 male and 350 female teachers from district Lahore.

Instrumentation

A questionnaire was used to check the attitude of the students. The instrument was validated by three experts to check its validity and finalized under the suggestions given by experts. After finalization, the instrument was piloted to find its reliability. The overall reliability of the instrument was 0.833, and factor-wise reliability was interest towards science (0.846), involvement during teaching (0.863), career interest (0.728), social attitude development (0.880) and everyday problems with science students (0.846). Furthermore, students' academic achievement was measured by getting the results of the Board of Intermediate and Secondary Education (BISE) of the teachers whose attitude was being measured. In this way, attitude and academic achievement give us the appropriate data to be analyzed.

Data Collection

After the finalization of the instruments, data was collected by administering the questionnaire on the sampled 700 science teachers; researchers personally visited the schools to get data to avoid any ambiguity.

Results

Table 1. Comparison of Science Teachers' Attitude with Academic Achievement in terms of gender

Variables	Gender	*N	*M	*SD	t-value	*df	sig(2 tailed)
Overall Attitude	M	350	143.41	66.24	-2.207	698	.08
	F	350	152.28	35.51			

N= 700

Table 1 presents the comparison of science teachers' attitudes with academic achievement in terms of gender by applying an independent sample t-test at the secondary level. The mean and standard deviation value of male teachers (M = 143.341; SD = 66.24) shows that it has clear difference with the value of female teachers' attitude (M = 152.28; SD = 35.51). The value of $p < 0.05$ also shows a significant difference in the values of male and female science teachers' attitudes. Hence, it is concluded that there was a statistically significant difference in science teachers' attitudes toward academic achievement at the secondary level in terms of gender.

Table 2. Comparison of Science Teachers' Attitude with Academic Achievement in terms of Gender by Factor

Variables	Gender	N	M	SD	t-value	df	sig(2-tailed)
Interest towards Science	M	350	20.32	5.64	-21.442	698	.000
	F	350	30.68	7.06			
Involvement during teaching	M	350	32.33	7.025	-18.175	698	.120
	F	350	32.45	7.680			
Career interest	M	350	61.26	47.41	6.549	698	.000
	F	350	41.49	30.73			
Social attitude development	M	350	19.17	11.506	3.988	698	.002
	F	350	16.98	6.692			
	M	350	20.32	5.639	21.564	698	.000

Variables	Gender	N	M	SD	t-value	df	sig(2-tailed)
Everyday problems with science	F	350	30.68	7.065			

N=700

Table 2 presents the comparison of science teachers' attitudes by considering each factor of the attitude scale with academic achievement in terms of gender by applying an independent sample t-test at the secondary level. The mean and standard deviation value of male teachers (M = 20.32; SD = 5.64) across interest in science shows that it has a clear difference with the value of female teachers' interest (M = 30.68; SD = 7.06). The value of $p < 0.05$ also shows the significant difference among the values of male and female science teachers interest in science. Hence, it is concluded that there was a statistically significant difference in science teachers' interest in science at the secondary level in terms of gender.

Similarly, the mean and standard deviation value of male teachers (M = 32.33; SD = 7.02) across science involvement during teaching shows almost no difference from the value of female teachers' involvement (M = 32.45; SD = 7.06). The value of $p > 0.05$ also shows no significant difference in the values of male and female science teachers' interest in science. Hence, it is concluded that there was no statistically significant difference in science teachers' interest in science at the secondary level in terms of gender.

The mean and standard deviation value of male teachers (M = 61.26; SD = 47.41) across their career interests shows that it has a clear difference with the value of female teachers' career interest (M = 41.49; SD = 30.73). The value of $p < 0.05$ also shows a significant difference in the values of male and female science teachers' career interests. Hence, it is concluded that there was a statistically significant difference of science teachers' career interest at the secondary level in terms of gender. The mean and standard deviation value of male teachers (M = 19.17; SD = 11.506) across social attitude development towards science shows that it has a clear difference with the value of female teachers' social attitude development (M = 16.98; SD = 6.692). The value of $p < 0.05$ also shows the significant difference in the values of male and female science teachers' social attitude development. Hence, it is concluded that there was a statistically significant difference in science teachers' social attitude development at the secondary level in terms of gender.

The mean and standard deviation value of male teachers (M = 20.32; SD = 5.639) across everyday science problems shows that it has a clear difference from the value of female teachers' everyday science problems (M = 30.68; SD = 7.06). The value of $p < 0.05$ also shows the significant difference between the values of male and female science teachers everyday science problems. Hence, it is concluded that there was a statistically significant difference of science teachers' everyday problems at the secondary level in terms of gender.

Table 3. Comparison of Science Teachers' Attitude with Academic Achievement in terms of Academic Qualification

Variables	Qualification	M	SD	t-value	Df	sig(2-tailed)
Overall Attitude	B.A	143.76	66.29	-2.207	698	.034
	M.A	151.98	35.23			

N=350

Table 3 presents the comparison of science teachers' attitudes with academic achievement in terms of academic qualification by applying an independent sample t-test at the secondary level. The mean and standard deviation value of graduate teachers (M = 143.76; SD = 66.29) shows that it has clear difference with the value of postgraduate teachers' attitude (M = 151.98; SD = 35.23). The value of $p < 0.05$ also shows the significant difference among the values of graduate and post graduate science teachers attitudes. Hence, it is concluded that there was statistically significant difference between graduate and post graduate teachers' attitude.

Table 4. Comparison of Science Teachers' Attitude with Academic Achievement in terms of Academic Qualification by Factor

Variables	Qualification	N	M	SD	t-value	df	sig(2-tailed)
Interest towards Science	B.A	350	11.41	6.26	-21.442	698	.000
	M.A	350	15.28	8.16			
Involvement during teaching	B.A	350	28.93	6.22	-18.175	698	.000
	M.A	350	32.45	6.81			
Career interest	B.A	350	21.26	7.94	6.549	698	.000
	M.A	350	14.47	7.03			
Social Attitude development	B.A	350	13.68	8.37	3.988	698	.022
	M.A	350	20.36	7.51			
Everyday problems with science	B.A	350	18.91	4.32	21.564	698	.000
	M.A	350	11.57	5.64			

Table 4 presents the comparison of science teachers' attitude by considering each factor of the attitude scale with their academic achievement in terms of academic qualification by applying an independent sample t-test at the secondary level. The mean and standard deviation value of graduate teachers (M = 11.41; SD = 6.26) across interest towards science shows that it has a clear difference with the value of postgraduate teachers' interest (M = 15.28; SD = 8.16). The value of $p < 0.05$ also shows the significant difference among the values of graduate and post graduate science teachers' interest in science. Hence, it is concluded that there was a statistically significant difference in science teachers' interest in science at the secondary level in terms of academic qualification.

Similarly, the mean and standard deviation value of graduate teachers (M = 28.93; SD = 6.22) across science involvement during teaching shows that it has a difference from the value of postgraduate teachers' involvement (M = 32.45; SD = 6.81). The value of $p < 0.05$ also shows there is a significant difference among the values of graduate and post graduate science teachers interest in science. Hence, it is concluded that there was a statistically significant difference in science teachers' interest in science at the secondary level in terms of academic qualification.

The mean and standard deviation value of graduate teachers (M = 21.26; SD = 7.94) across their career interest shows that it has clear difference between the value of postgraduate teachers' career interests (M = 14.47; SD = 7.03). The value of $p < 0.05$ also shows the significant difference between the values of graduate and post graduate science teachers' career interests. Hence, it is concluded that there was a statistically significant difference of science teachers' career interest at the secondary level in terms of academic qualification. The mean and standard deviation value of graduate teachers (M = 13.68; SD = 8.37) across social attitude development toward science shows that it has a clear difference from the value of postgraduate teachers' social attitude development (M = 20.36; SD = 7.51). The

value of $p < 0.05$ also shows the significant difference among the values of graduate and post graduate science teachers' social attitude development. Hence, it is concluded that there was a statistically significant difference of science teachers' social attitude development at the secondary level in terms of academic qualification.

The mean and standard deviation value of graduate teachers (M = 18.91; SD = 4.32) across everyday science problems shows that it has clear difference with the value of postgraduate teachers' everyday science problems (M = 11.57; SD = 5.64). The value of $p < 0.05$ also shows the significant difference between the values of graduate and post graduate science teachers' everyday science problems. Hence, it is concluded that there was a statistically significant difference of science teachers' everyday problems at the secondary level in terms of academic qualification.

Table 5. Comparison of Science Teachers' Attitude with Academic Achievement in terms of Professional Qualification

Variables	Prof.	N	M	SD	t-value	df	sig(2- tailed)
Overall Attitude	B.Ed.	170	20.32	36.24	-2.207	698	.058
	M.Ed.	160	20.68	35.51			

Table 5 presents the comparison of science teachers' attitude with academic achievement in terms of professional qualification by applying an independent sample t-test at the secondary level. The mean and standard deviation value of B.Ed. teachers (M = 20.32; SD = 36.24) shows that it has no difference in the value of M.Ed. teachers' attitude (M = 20.68; SD = 35.51). The value of $p > 0.05$ also shows the significant difference among the values of graduate and post graduate science teachers' attitudes. Hence, it is concluded that there was a statistically significant difference in science teachers' attitudes at the secondary level in terms of their professional qualifications.

Table 6. Factor-wise Comparison of Science Teachers' Attitude with Academic Achievement in terms of Professional Qualification

Variables	Prof.	N	M	SD	t-value	df	sig(2- tailed)
Interest towards Science	B.Ed.	170	19.39	4.831	-3.168	698	.003
	M.Ed.	160	21.31	6.127			
Involvement during teaching	B.Ed.	170	21.58	6.954	-1.941	698	.000
	M.Ed.	160	23.08	7.130			
Career Interest	B.Ed.	170	19.15	8.602	-30.982	698	.000
	M.Ed.	160	22.66	3.137			
Social Attitude development	B.Ed.	170	19.39	4.831	-3.168	698	.000
	M.Ed.	160	21.31	6.127			
Everyday problems with science	B.Ed.	170	8.78	4.610	-32.754	698	.000
	M.Ed.	160	28.98	6.391			

Table 6 presents the comparison of science teachers' attitude by a factor with academic achievement in terms of professional qualification by applying independent sample t-test at the secondary level. By considering the mean and standard deviation as well as significant value, it is concluded that there was a statistically significant difference of science teachers' attitude at the secondary level in terms of their professional qualification across each factor.

Table 7. Comparison of Science Teachers' Attitude with Academic Achievement in terms of Experience by a factor

Variables	Groups	df	F	Sig
Interest towards Science	Between	3	147.071	.000
	Within	696		
	Total	699		
Involvement during teaching	Between	3	97.487	.000
	Within	3		
	Total	696		
Career interest	Between	699	101.031	.000
	Within	3		
	Total	3		
Social attitude development	Between	696	147.071	.000
	Within	699		
	Total	3		
Everyday problems with science	Between	3	66.390	.000
	Within	696		
	Total	699		

A one-way ANOVA was conducted to compare science teachers' attitudes with academic achievement at the secondary level. Hence, it is concluded that there was a statistically significant difference of science teachers' attitude by factor with academic achievement at secondary level in terms of experience.

Table 8. Regression Analysis to measure the Impact of Science Teachers' Interest towards Science on their Students' Academic Achievement by the factor in District Lahore

Variable	B	S.E	B	t	P
Constant	66.44	1.895		38.55	.000
Interest towards science	.037	.071	.020	.517	.605
(Constant)	66.317	1.878		35.32	.000
Involvement during teaching	.039	.065	.022	.591	.554
(Constant)	66.942	.931		71.91	.000
Career Interest	.008	.014	.022	.592	.554
(Constant)	64.64	1.915		35.06	.000
Everyday Problems with science	.040	.069	.026	.553	.599
(Constant)	66.636	1.253		53.16	.000
Social Attitude Development	.041	.061	.025	.663	.507

Regression analysis was conducted to find out the impact of science teachers' interest towards science (independent variable) on their student's academic achievement (dependent variable) in district Lahore, $\beta = .020$, $t = 35.055$, $p < .05$. The table shows that there was no statistically significant regression equation found between science teachers' interest in science and their student's academic achievement in all factors.

Conclusion

The study was conducted to find out the effect of science teachers' attitudes on students'

academic achievement at the secondary grade level. To measure the teachers' attitude, a questionnaire was developed having different constructs of attitude, i.e. involvement in teaching, interest in science, career interest, the everyday problem with science and social attitude development. The questionnaire was administered on 700 secondary teachers (male = 350; female = 350) to measure their attitude toward science. Along with this, students' academic achievement of the sampled teachers was taken by their Board of Intermediate and Secondary Education (BISE) scores. After getting the results, it was concluded that there exists a statistically significant difference in the attitude of teachers in terms of academic qualification, whereas no major difference was observed when the attitude of teachers was compared in terms of their gender and professional qualification. When the difference of attitude was observed across each factor in terms of gender, then there was also difference existed across all factors i.e. interest in science, career interest, the everyday problem with science and social attitude development except the involvement of teachers during teaching. Moreover, when the difference was observed across academic as well as professional qualifications across each factor, there existed a difference across all factors of attitude among malesmales and females. The findings of this study support the findings of Carroll et. al., (2009) findings who explored that attitude of teachers have a significant impact on their student's achievement. Babad (2009) further argued that students' high or low performance depends on their teachers' attitude in the specific subject.

In the light of the findings, the study recommended that there is a need to arrange refresher courses for novice teachers. In this way, they update their knowledge and information which impact on students' academic achievement. The researcher may conduct the same study on a different level because the present study was conducted on the secondary level.

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