

**TEACHERS' COMPETENCIES AND STUDENTS'  
SCIENCE LEARNING: COMPARISON FOR FIRST AND  
SECOND LANGUAGE AS MEDIUM OF INSTRUCTION**

Tariq Mahmood<sup>1</sup> and Ashiq Hussain<sup>2</sup>

**Abstract**

*Main focus of this study was to know the relationship of teachers' individuality and students' learning achievement at elementary level. Teachers' individuality refers to teachers' designation, qualification, experience, salary, gender, locality and marital status. A sample of seventy two subject teachers who were teaching science subject to 8<sup>th</sup> class were selected as sample of this study. Teachers were selected from only those high and higher secondary schools, where both Urdu medium and English medium classes were present for science teaching. A rating scale was developed and administered on selected sample for data collection purpose. Response rate from teachers remained ninety four percent. Data was analyzed by using t-test and ANOVA as statistical techniques with the help of SPSS software. Results revealed that teachers' designation, qualification, experience and salary has positive impact on students' science learning. Similarly, female teachers and urban teachers performed better than their counterparts. While, marital status of teachers has no impact on students' achievement. On the basis of conclusions it was recommended that teachers' background variables may be considered strictly while recruiting new teachers.*

**Key Words:** Students' Achievement, Teachers' Background, Medium of Instruction, Elementary School Level

**Introduction**

Education always remained an important tool for the development of any nation or society. Adams (1998) was of the view that education is main pillar for the development of society. Development of education promotes development of all fields of life. Education promotes creative thinking among individuals, which ultimately guides the country towards invention of modern things. American Federation of Teachers (2000)

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<sup>1</sup> University of Education Lahore, tariq903@hotmail.com

<sup>2</sup> University of Education, Lahore, drashiqhussain@ue.edu.pk

highlighted that educationally strong country can hold on the world economy and become the ruling power all over the world. Pakistan is a developing country and needs extra struggle for improvements in education sector. Jaffer (2005) critically examined the education system of Pakistan and concluded that the quality of education in public sector is very poor. There are many factors which affect the quality of education in public sector.

Teachers and the factors affecting their performance strongly influence the quality of education system. Teachers' salary and demotivation has become a major issue in deterioration of education system. Maclure (1997) views that teacher's demand increase in salary and reduction in class size. Teachers unions all over the world protest against any decline in salary and demand higher salaries (UNICEF 1999). Teachers claim that there low level of motivation is due to insufficient salary package. This issue is not only in developing countries but developed countries also face such problems (Spear, Gould and Lee 2000).

Academic as well as professional qualification of teachers is directly related to the performance level of teachers. Ferguson (1992) conducted a study on teachers' performance and concluded that qualified teachers performed in a better way as compared to less qualified teachers. Furthermore, Wenglinsky (1992) and Sanders (1982) highlighted that teachers' higher qualifications increases their efficiency in teaching learning process.

Halai et al., (2004) and Sykes (1999) also found a relationship between students' learning and teachers' qualification. Trained and qualified teachers are necessary for quality education. In Pakistan majority of the teachers in public sector are trained (Academy of Educational Planning and Management, 2009) but teachers training either in-service or pre-service does not impact on students' achievement. Ahmed (2009) was of the view that the main reason of low quality education in Pakistan is the in-efficiency of teachers working in public schools.

Gender of teachers and students also impact on the teaching learning process. Oregon (2007) is of the view that female teachers' performance is better than male performance in teaching profession. Along with the gender of teachers their family background also affects quality of

teaching. Lam et al (2010) conducted a large scale research and found that both male and female students performed better when taught by female teachers. On the other side Skelton, Carrington, Francis, Hutchings, Read, & Hall (2009) found that gender of teachers do not matter in students' achievement.

“After interviewing with a number of students found out that on one hand teachers of either gender tend to treat boys negatively as compared to girls while on the other hand they also expect girls to perform better both in terms of behavior as well as academics. Based on this, it is more logical to appeal that boys' underperformance is due to differential treatments between boys and girls rather than being taught by a female teacher. The studies also found out that male teacher tend to be biased by gender whereas female teachers are perceived to be less influenced by gender expectations” (Myhill& Jones, 2006).

It is expected that experience enhances specific knowledge, skills and effectiveness of the work. Harris and Sass (2007) conducted a study and concluded that experience matters in teaching learning process up to normal level and very high experience with old age has negative impact. On the other side, it was also found that fresh teachers' efficiency is also low. Soelein (2010) and Fafunwa (1975) conducted a study specifically to see the impact of teachers' experience on their performance in science teaching. Both the researchers found that there is positive correlation between teachers' teaching experience and students' science learning. This is due to the reason that experience enhances pedagogical and practical skills.

Kim and Wei (2007) advocated that Science learning in other than mother tongue or local language is a very difficult task for students. Students have to do double struggle to understand Science i.e. in the first place they have to understand the second language and then they will have to understand the scientific concept. In this way language of instruction becomes a barrier for students. Abdullah (2009) conducted a study in Malaysia for the teaching of Science subject in English language and found that students faced many problems in learning of Science due to English language instead of local language. Rollnick (2000) highlighted the students also face difficulties in understanding scientific terms due to language barrier. Therefore this is the duty of

teachers to be efficient to communicate with students properly so that they may understand the concept and terminologies completely. To solve this problem the most effective strategy is that the communication process of teacher should be lenient and elastic in the way that teacher should present the concept in a very easy and understandable form both in explaining and use of language.

Keeping in view the effect of teachers' related variables on learning the researchers decided to diagnose the relationship of teachers' designation, qualification, experience, salary, gender and marital status on students' science learning in English and Urdu medium classes at Grade VIII level".

#### **Methodology and Results**

To conduct this study seventy two science teachers equal in number across gender groups were selected as sample for this study. Out of seventy two teachers thirty six were teaching in Urdu medium and thirty six were teaching in English medium. The location wise number of teachers was kept almost same. A rating scale was developed on five pointscale to collect the data. While developing instrument teacher's competencies considered under consideration were: teachers' designation, academic qualification, experience, salary, gender and marital status of teachers. Instrument was got validated from educational experts who had knowledge and experience of assessment and instruments development. Data was collected by researcher himself visits and with the help of his colleagues. The response rate of teachers was ninety four percent. To measure achievement level of students in science subject, science scores of Punjab Examination Commission' annual examination were used.

#### **Analysis and Results:**

Collected data was entered in Excel file and converted into SPSS file. Frequency measure was run to check out outliers and other factors to prepare data for final analysis. Inferential statistics i.e. t-test and ANOVA techniques were used to measure the significant difference. The detailed analyses of all aspects of teachers' background variables in both Urdu and English medium of instruction classes are as under:

**Table 1. Effect of Teacher’s Designation on Student’s Science Scores in English and Urdu Medium**

Medium	Primary School Teacher’ Student Score		Elementary School Teacher’ Student Score		Secondary School Teacher’ Student Score		<i>f</i>	<i>Sig.</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
English	32.40	7.436	50.09	14.423	52.76	17.670	5.980	.003
Urdu	53.93	15.480	53.79	13.814	51.14	14.509	2.334	.098

In government school sector of Pakistani education system, there are mainly three types of teachers according to their designation i.e. Primary School Teachers (PST) having grade 9 and are entitled to teach classes from 1st to 5th, Elementary School Teachers (EST) having grade 14 and are entitled to teach classes from 6th 8th and Secondary School Teachers (SST) having grade 16 and are entitled to teach classes from 9th to 10th. Furthermore, there are two option of language for the use of medium of instruction in government schools for science teaching at grade VIII level i.e. Urdu language and English language. ANOVA results’ statistical value ( $p = .003$ ) show that there is significant difference of science scores among students of primary school teachers (PST), elementary school teachers (EST) and secondary school teachers (SST) in English medium classes, while there was no significant difference ( $p = .098$ ) in the science scores among students of Urdu medium classes. For further clarity about difference, post hoc analysis in English medium showed that there was significant difference in all three groups (PST and EST, EST and SST, PST and SST). Similarly post hoc analysis in Urdu medium showed that there was only significant difference between EST and SST groups. Mean values in the table number one show that there is gradual increase in science score as the teachers’ designation increase rank wise in English medium classes. Keeping in view the above results the null hypothesis “Teachers’ background (Teachers’ designation) does not affect students’ science scores in public schools” was rejected in English medium classes and accepted in Urdu medium classes.

**Table 2. Impact of Teacher’s Academic Qualification on Science Score in Both English and Urdu Medium**

	FA, FSC		BA, BSC		MA, MSC			
<b>Medium</b>	<i>Mean</i>	<i>SD</i>	<i>Mean</i>	<i>SD</i>	<i>Mean</i>	<i>SD</i>	<i>f</i>	<i>Sig.</i>
	<i>n</i>		<i>n</i>		<i>n</i>			
<b>English</b>	42.02	11.97	50.81	14.45	52.15	16.35	11.27	.00
		0		6		0	0	0
<b>Urdu</b>	50.17	14.64	56.16	14.48	51.79	14.08	3.776	.02
		6		9		1		4

Teachers’ qualifications were further subdivided into three main categories i.e. FA/FSC, BA/BSC and MA/MS. ANOVA test was applied to know the level of significance among above three categories. Results shown in the table number two highlight that students studying from teachers having different qualifications have significantly different achievement both in English medium ( $p = .000$ ) and Urdu medium ( $p = .024$ ) classes. In English medium classes there is gradual increase of science scores of students taught by highly qualified teachers, while on the other side in Urdu medium classes students having teachers with BA/BSC qualification performed better than all other more or less qualified teachers. As the difference of scores of students taught by different qualification teachers is significant therefore, null hypothesis “Teachers’ background (teachers’ academic qualification) does not affect students’ science scores in public schools” was rejected. It means teachers’ qualification has positive effect on students’ science scores.

**Table 3. Impact of Teacher’s Experience on Student’s Science Scores in English and Urdu Medium**

	Low Level Experience (1-10 years)		Medium Level Experience (11-20 years)		High Level Experience (21-30 years)			
<b>Medium</b>	<i>Mean</i>	<i>SD</i>	<i>Mean</i>	<i>SD</i>	<i>Mean</i>	<i>SD</i>	<i>f</i>	<i>Sig.</i>
<b>English</b>	44.19	16.017	52.62	15.224	50.71	16.180	7.312	.001
<b>Urdu</b>	51.01	13.563	55.02	14.228	50.45	14.255	5.537	.004

Teachers’ teaching experience was further subdivided into three main parts i.e. Low level experience (1-10 years), Medium level experience (11-20 years) and High level of experience (21-30 years). Statistical values of ANOVA results show that there is significant difference of achievement of students both in English medium ( $P = .001$ ) and Urdu

medium classes ( $p = .004$ ). Further, post hoc analysis of above three categories of experience of teachers highlighted that the performance is significantly different between low level experience and medium level experience teachers, low level experience and high level experience. In both Urdu and English medium classes medium level experienced teacher performed better as compared to less or high experienced teachers. This shows that medium level of experience is the best for science teaching. Results showed that hypothesis “Teachers’ background (teachers teaching experience) does not affect students’ science scores in public schools” was rejected.

**Table 4. Impact of Teacher’s Salary on Student’s Science Scores in English and Urdu Medium**

	(13000-24000) Rupees		(25000-36000) Rupees		(37000-48000) Rupees		(49000-60000) Rupees			
<b>Medium</b>	<i>Mea</i>	<i>SD</i>	<i>Mea</i>	<i>SD</i>	<i>Mea</i>	<i>SD</i>	<i>Mea</i>	<i>SD</i>	<i>f</i>	<i>Sig</i>
	<i>n</i>		<i>n</i>		<i>n</i>		<i>n</i>			
<b>English</b>	48.8	14.4	52.1	16.1	59.3	14.8	53.8	15.2	3.8	.00
	4	9	2	1	6	4	6	2	7	9
<b>Urdu</b>	51.4	14.4	53.5	13.1	48.9	14.1	55.8	14.2	3.0	.02
	2	8	7	9	7	2	4	8	6	8

There were teachers having different pays but they were divided into four groups and ANOVA test applied to know the level of impact on students’ science learning. Results from table number four highlight that teachers having different monthly salary affect their students’ performance significantly both in English medium ( $p = .009$ ) as well as in Urdu medium classes ( $p = .028$ ). As the salary of teachers increases there is gradual increase of students’ science scores. But this gradual increase in students’ science scores goes up to salary amounting from Rs. 49000 to 60000. The increase in salary after this amount has adverse effect in English medium classes. This significant difference of science scores among teachers having different amounts of salary clarifies that the null hypothesis “Teachers’ background (teachers’ monthly salary) does not affect students’ science scores in public schools” was rejected. Teachers having higher salary perform better for students’ science scores.

**Table 5. Effect of teachers' Gender on Students' Science Scores in English and Urdu Medium**

	Female Teachers		Male Teachers		<i>t</i>	<i>p</i>
	<i>Mean</i>	<i>SD</i>	<i>Mean</i>	<i>SD</i>		
<b>English Medium of Instruction</b>	54.42	15.903	48.68	15.426	4.850	0.000
<b>Urdu Medium of Instruction</b>	56.65	13.989	50.12	13.845	5.237	0.000

T-test was applied to diagnose the impact of teachers' gender on students' science achievement both in English medium and Urdu medium classes. Table number five shows, female teachers' students performed significantly better than male teachers' students both in English medium ( $P = .000$ ) and Urdu medium ( $P = .000$ ) classes for the teaching of science subject to 8<sup>th</sup> class. Overall the achievement level is better in Urdu medium as compared to English medium classes. Keeping in view the above results it is concluded that null hypothesis "Teachers' background (teachers' gender) does not affect students' science scores in public schools" rejected and found significant impact of teachers' gender on their students' performance.

**Table 6. Effect of Teacher's Locality on Students' Science Score in English and Urdu Medium**

	Rural Teachers		Urban Teachers		<i>t</i>	<i>P</i>
	<i>Mean</i>	<i>SD</i>	<i>Mean</i>	<i>SD</i>		
<b>English Medium of Instruction</b>	47.17	14.827	51.78	15.964	-2.912	.004
<b>Urdu Medium of Instruction</b>	51.28	13.997	52.98	14.318	-1.244	.214

Location of teachers may also impact on human a lot particularly in the use of Urdu or English language for communication because language of communication has close relationship with the surrounding people. T-test results show that students of urban teachers performed significantly better than students of rural teachers ( $p = 0.04$ ) in English medium classes, while on the other side, in Urdu medium classes both urban and rural teachers' students have same level of performance with slight difference. So it can be concluded that the null hypothesis "Teachers' background (with reference to teachers' locality) does not affect



students' science scores in public schools" was rejected in English medium and accepted in Urdu medium classes.

**Table 7. Effect of Teachers' Marital Status on Students' Science Score in English and Urdu Medium**

			Married Teacher		Un-married Teacher			
			Mean	SD	Mean	SD	t	p
English	Medium	of	51.00	15.884	56.00	1.414	-.444	.657
<b>Instruction</b>								
Urdu	Medium	of	52.48	14.333	52.84	13.048	-.146	.884
<b>Instruction</b>								

Teachers' marital status was observed in only two forms i.e. married and un-married. Table number seven clarifies that performance on students is at the same level either their teachers are married or un-married. These non-significant results are found in both in English and Urdu medium classes. Therefore, the null hypothesis "Teachers' background (teachers' marital status) does not affect students' science scores in public schools" was accepted.

**Discussion**

There is association of teachers' background aspects and students' achievement. Adeyemo (2005) found that teachers' background characteristics i.e. qualification, teaching experience, monthly salary and teachers' gender affect students' achievement in science subject. Carey (2004) also resulted that different characteristic of teachers' impact on students' science learning. Teachers' designation is an important indicator for their satisfaction and honor in the profession. This study concluded that better teachers' designation has positive impact on students' science achievement in English medium classes. Adeyemo(2012) also supported that specialized teachers (EST teachers are for elementary classes i.e. six to eight) performed better than other teachers (PST teachers are for primary classes i.e. class one to five and SST teachers are for secondary classes i.e. ninth and tenth). It means that teachers who are selected for science teaching at elementary level performed better than other teachers who are selected for primary or secondary classes.

Teachers' subject knowledge is base for better teaching in any subject particularly science subjects. Therefore academic qualification of teachers is necessary for good command on subject knowledge. This

study highlighted that academic qualification has positive impact on science learning of students (higher the academic qualification of science teachers better will be the results of their students). Thomas and Olugbenga (2012) and Akinsolu (2010) supported the results that there is positive association of academic qualification of teachers and their students' achievement level. This positive association was found both in Urdu medium classes as well as in English medium classes. Teachers' teaching experience is also an important aspect of teachers' background variables. In this study teaching experience of teachers was divided into three parts i.e. (1-10 year), (11-20 year) and (21-30 year) teaching experience. Results highlighted that teachers having medium level experience performed better than less or highly experienced teachers. The results supported Thomas and Olugbenga (2012) and Akinsolu (2010) study in which they concluded that teachers' teaching experience has positive relationship with students' science learning.

Gender is also a main aspect of teachers' background variable. Results showed that students of female teachers performed significantly better than students of male teachers. This trend was found in both English medium classes and Urdu medium classes. Results of this study were also supported by Hoque, et al, (2013), because females may understand child psychology more easily and can hold children effectively. Female prefer cooperation, caring and love as compared to male who prefer leadership (Kerka, 1993).

Teachers' locality was included to see its impact on students' science learning. Results showed that performance of urban teachers was significantly better than rural teachers and these results were also supported by Ramos, Duque and Nieto (2012). This impact of urban teachers was seen more in English medium classes as compared to Urdu medium classes. Above discussion showed that almost all the personal characteristics of teachers affect students' science learning in Urdu medium classes as well as in English medium classes.

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