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Gender Wise Comparison of Trained and Untrained Teachers' Performance on Students' Learning Achievement in Mathematics

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Abstract

The study was aimed at comparing the performance of trained and untrained teachers in the subject of mathematics and to find out the factors affecting teachers' performance. Sample of this study was comprised of the students of grade-4 and their teachers. 48 schools were selected conveniently. Achievement test for students and a questionnaire for teachers were designed. Data were analyzed by calculating mean score and independent sample t- test. Main findings were that trained male and female teachers are significantly better than untrained male and female teachers. On the basis of findings, recommendations were made.

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Keywords: teacher training, mathematics, learning achievement, teachers' performance

Education is an intellectual activity to change the behaviour and develop potentialities of individuals. It is a source to change social, economical and cultural setup of the societies. The role of the teacher in this development and change is imperative and the teacher remains the single most important school- based factor related to students' learning. Effective learning is the result of effective teaching. Effective teaching is the bail of bright future and has significant influence on promoting positive learning outcomes for students. Many other factors like class size, teachers' knowledge and qualification, teachers' training and other school variables play vital role in students' learning achievement especially in Mathematics because teaching Mathematics is the field in which knowledge of the subject matter is first necessity. However teaching mathematics according to Mayor (2005), involves more than knowing and enjoying the subject. Teachers must be able to adopt strategies to motivate the students for learning in this subject keeping in view the applicability of the subject in real life situations. For this purpose, teachers' professional development is required.

Literature indicates many studies in mathematics regarding teachers' performance and students' learning achievement. Farooq and Shahzadi (2006) conducted a study to compare the effectiveness of teaching of professionally trained and untrained teachers and the effect of students' gender on achievement in Mathematics. The results of the study supported that the students taught by trained teachers showed better results in Mathematics. A

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Sample Study was conducted in 1999 by Punjab Literacy Watch to find out the level of students' achievement at primary level in Punjab, Pakistan. It was concluded that students performed better in mathematics regarding sums, numbers, factors and multiples and different equations but their performance was poor in geometry, decimals, fractions and the sums related to application and thinking skills.

Bureau of Curriculum and Extension Wing (BCEW) Sindh (2000) conducted: A Base-line Survey of Learning Achievement to know the learning level of students of grade 3, 4 & 5 belonging to selected primary schools in rural areas and also to find out the factors responsible for low level of achievement of students at primary level. It was found that girls' performance was better in Sindhi language & Islamiyat as compared to boys. Boys' scores were better in other subjects included in this study i-e mathematics and science as compared to girls. Study also added some other factors like: Teachers often attend the classes late. Supervisors do not visit teaching material and the method adopted by the teachers in class room when they are trained on some desired directions. UNESCO conducted a comprehensive study in (2001) and categorized all these factors in three categories: school- related factors, teacher- related factors and student- related factors. The overlapping of all the factors indicates that they do not act in isolation but interact in a very complex manner and affect the learners to produce changes in very different way. In Pakistan, there are many organizations which are trying to find out the factors affecting students learning in different subjects. NEAS is also working to uplift the standard of education at national level in Pakistan. It published the results of its study of Grade 4 that was conducted at national level in 2006 in four subjects (Urdu, Mathematics, General Science and Social Studies). In Mathematics the most difficult items were found to be in the subject content areas of measurement and geometry. Students found items on number sense at all levels (conceptual understanding and procedural knowledge) the easiest. It is also seen that there is a gradual increase in the mean score of the students in different grades. This study was also an effort to compare teachers' performance, those teachers who were trained by DSD, and those who did not get any training to teach mathematics.

2. Objectives

The main objectives of the study was to compare the performance of trained (only the teachers trained by Directorate of Staff Development Lahore, Pakistan) and untrained teachers in the subject of mathematics and to find out the factors affecting teachers' performance in Mathematics at primary level.

3. Delimitations of the Study

The study was delimited to:

- Untrained primary school teachers and the teachers trained by DSD, being supervised by District teacher educators (DTEs) DSD.
- Study was conducted in District Faisalabad only

4. Methodology

The study was descriptive and quantitative in nature as the test and questionnaire was developed to get data at large scale.

4.1 Population and Sample

All public primary schools, students of grade-5 and their teachers in district Faisalabad, were considered as population of the study. Untrained teachers and DSD Trained teachers teaching Mathematics to grade-4 were the sample of this study. The respective students of these trained and untrained teachers who had passed their 4th grade examination were focused.

16 schools from each Tehsil were selected conveniently. There were 48 schools from District Faisalabad.

- 35 students of each of the respective teacher were evaluated through achievement test.
- 44 teachers of grade-4 teaching mathematics were also taken as sample of this study (24 trained, 24 untrained teachers from girls and boys schools).

4.2 Research instrument

Achievement Test was designed according to the national curriculum objectives. It was comprised of 48 items having three categories which include:

1. Conceptual understanding: There were 18 items in test to check the conceptual understanding of the students in mathematics
2. Procedural knowledge: There were 13 items in test to find out how much students are having procedural knowledge regarding the sums.
3. Problem solving ability: There were 11 items in test to check students' problem solving ability in mathematics.

Overall reliability of the test was 0.884 Cronbach's Alpha. A questionnaire comprised of 14 items having different factors affecting teachers' performance in mathematics was also used. Reliability of different items of the questionnaire was tested by Cronbach's Alpha using SPSS. The reliability of the questionnaire was .727 Cronbach's Alpha.

4.3 Data analysis

Data was analyzed by calculating mean score and independent sample t- test.

5. Findings

Table.1: Showing the difference in the achievements of the students in conceptual understanding taught by trained and untrained male and female teachers

Gender of Teacher	Category of Teacher	N	Mean	Std. Deviation	t-value	p-value
Male	Trained	325	5.4892	3.65791	2.251	.025
	Un Trained	327	4.8838	3.19393		
Female	Trained	202	6.8218	2.25002	8.384	.000
	Un Trained	315	5.2032	2.06964		

Table.1: indicates that the mean score of male trained teachers is greater than the mean score of untrained teachers and p- value is less than .05 significant level. It can be concluded that trained male teachers are significantly better than untrained male teachers in developing conceptual understanding of the students in mathematics. On the other hand trained female teachers are significantly better than untrained female teachers

Table.2: Showing the difference in the achievements of the students in procedural knowledge taught by trained and untrained male and female teachers

Gender of Teacher	Category of Teacher	N	Mean	Std. Deviation	t-value	p-value
Male	Trained	325	3.9108	3.50855	4.261	.000
	Un Trained	327	2.9388	2.15131		
Female	Trained	202	4.2723	2.02229	2.382	.018
	Un Trained	315	3.8159	2.27792		

It is evident from the table. 2 that the mean score of the trained male teachers is greater than the mean score of untrained teachers and p- value is less than .05 which indicates that trained male teachers are significantly better

than untrained male teachers in developing the ability of the students in understanding the procedures of sums in mathematics. On the other hand trained female teachers are significantly better than untrained female teachers because the mean score of trained teachers is greater than the mean score of untrained teachers and p- value is less than .05.

Table. 3 : Showing the difference in the achievements of the students in problem solving taught by trained and untrained male and female teachers

Gender of Teacher	Category of Teacher	N	Mean	Std. Deviation	t-value	p-value
Male	Trained	325	3.1754	3.00873	2.150	.032
	Un Trained	327	2.7462	1.98146		
Female	Trained	202	3.1089	1.55113	.910	.364
	Un Trained	315	2.9873	1.37070		

Table. 3 reveals that the mean score of trained male teachers is greater than the mean score of untrained male teachers and p- value is also less than .05 significant level. It shows that trained male teachers are significantly better than untrained teachers regarding problem solving abilities of the students in mathematics. On the other hand, the mean score of trained female teachers is greater than the mean score of untrained female teachers but p- value is greater than .05 which means that the difference is not significant. Trained and untrained female teachers are having almost same ability to develop students' problem solving skills.

Table. 4 : Showing the difference in the achievements of the students in overall, taught by trained and untrained male and female teachers

Gender of Teacher	Category of Teacher	N	Mean	Std. Deviation	Std. Error Mean	t-value	p-value
Male	Trained	325	14.5415	11.00543	.61047	2.627	.009
	Un Trained	327	12.6361	7.08054	.39155		
Female	Trained	202	16.6436	4.83578	.34024	6.436	.000
	Un Trained	315	13.9841	4.41513	.24876		

Overall results (table. 4) show that there is a significant difference between the mean score of male trained teachers and the mean score of male untrained teachers because p- value is less than .05 significant level which reflects that significant difference exists. It also reflects that male trained teachers are significantly better than male untrained teachers on overall teaching of mathematics. On the other hand, data also indicates in the above table that female trained teachers are significantly better than female untrained teachers on overall teaching of mathematics to grade-4.

6. Conclusions

1. Trained male teachers are significantly better than untrained male teachers in developing conceptual understanding of the students in mathematics. On the other hand trained female teachers are significantly better than untrained female teachers on the same parameters.
2. Trained male and female teachers are significantly better than untrained male and female teachers in developing the ability of the students in understanding the procedures of sums in mathematics.
3. There is a significant different between the mean scores of trained and untrained teachers on problem solving ability.
4. Male trained teachers are significantly better than male untrained teachers on overall teaching of mathematics. Teachers discussed different factors which are affecting their performance in mathematics as: they are not provided

with teaching kits to use as a.v aids during teaching, there is no appreciation from the administration on better performance, students do not cooperate even sometimes they do not bring text books with them, curriculum is overloaded with concepts these cannot be taught properly, time duration of class is short and there is large number of students in class etc. these problems are common everywhere but even then trained teachers are performing better in their schools.

7. Recommendations

1. Training program should focus more on methodology rather than contents
2. Trained teachers need further training in: Number sense properties and operations, Factors and multiples, Data analysis, statistics, probability and information handling along with developing logical ability of the students.
3. Teachers feel difficulty in word problems in mathematics. Training in this area is required.
4. According to the condition of schools, multi grade teaching skills are required in teachers. Training should also focus on developing these skills.
5. Number of students is more than 40 in many of the schools. It should be reduced to 25-35 students.
6. Teachers are also in need of training in classroom management skills
7. At least one mathematics teachers should be appointed in each independent primary school.
8. Another study should be conducted to find out those factors which are responsible for better performance of trained teachers, other than training factor.

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