



RESEARCH PAPER

Role of School Based Factors in Improving Secondary School Students Performance in Mathematics

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ABSTRACT

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The current study was carried out to identify the role of school-based factors to influence the students' achievement in mathematics. Cross-sectional survey research under the umbrella of descriptive research of quantitative approach was carried out. With the help of a two-stage random sampling technique, the sample was selected. A questionnaire-based on two sections demographic and 3 factors (teaching methodologies, the working routine of teachers, and resources) were comprised of 5 points Likert scale developed by the researcher. The validity of the questionnaire was assured with the help of experts whereas reliability was checked through piloting having a value of 0.72. on the other hand, the students' performance was measured through their midterm exams prepared by their mathematics teacher. The findings of this study helped the researcher to conclude that students are agreed that they have sufficient resources in their schools as its mean value is highest among other factors and students achieve satisfactory marks in mathematics as well as there is a positive as well as significant but week correlation between these two variables which highlighted there is the influence of school-based factors on students' achievement in mathematics who are learning in 10th grade at secondary schools of Lahore. These results provide a guideline to policymakers to update their policies regarding curriculum implementation at the school level regularly by keeping in mind the students' needs, potential, and requirements of the present era.

Introduction

Education turns into the motivation to acquire change the existence of an individual, it promotes the development of a healthy society by advancement and

the development of economic development of the society that all in all build up a general society (Bhardwaj, 2016). There is a need to support and promote the attention along with the education of student teachers and the parents of students which results in the advancement of living standards of people for this there is need to improve the system of schooling i.e. primary education because the primary education is the basic representation of individual of the society (Gakidou, Cowling, Lozano, & Murray, 2010). As at that level, understudies need substantially more consideration of their folks, family yet additionally of their teachers. For the satisfaction of this essential prerequisite, a trademark was raised by most of under developing and developing countries non-industrial nations that were Education For All (EFA) (Miles & Singal, 2010).

According to the school of thought that to improve the system of education students are the basic element of any educational institution but along with the students to improve the quality and standards of educational society and system to ensure the quality and performance of the teacher. Teachers are the key element after students. A. Ayeni and Afolabi (2012) recommended that the performance of educators relies most on the subject and mastery of subject knowledge which they are going to teach, by following the skills, related competencies which they used towards the achievement of their desired educational goals. To achieve the purpose of effective and quality teaching in the school environment, the teacher needs some skills, qualities, and competencies that help her/ his in effective teaching and learning (Ayeni & Amanekwe, 2018).

Educators need to realize what to instruct, how to educate which method of teaching is appropriate, and to whom he/she educate. The conclusion of Ayeni and Afolabi (2012) was that the nature and quality of educator's work essentially affect students and their performance and achievements, the instructors are required to have extraordinary information and knowledge about teaching method (pedagogy) which they are using in their subject of teaching and its related areas of teaching. The teacher is the only element to whom the education and purpose of education cannot be served (Del Vecchio & Matsuura, 2016; Zaare, 2013).

After the inclusion of primary education, secondary education is assumed important to build a nation by developing an individual and healthy citizen of society. Secondary education is served as a reason for the development of the child. Pupils got ready to work in such a way that they could their job in a better manner (Memon, 2007; Tatlah, 2015). So, that they become the supportive and serving participant of society by dealing with economic and social activities. The instructions received after primary education i.e., secondary education is considered significant as it defining moment of individual from where they choose what subject they will opt-in their further future studies and professional studies (Mahmood, Zahid, & Ghafoor, 1992). It demonstrates a linkage between essential and advanced education. If we consider primary education as output then secondary is taken input.

Akram, (2010) suggested that curriculum of this level is considered very significant as it guides the pupils to choose subjects as per their interest and aptitude.

Schools are usually evaluated utilizing pupil's accomplishments records. Educators are the fundamental piece of educational institutes; they can't be isolated from the accomplishments of pupils and educational institutions as a whole entity. It is very more legitimate to utilize such tests which are standardized for the appraisal of educators, by keeping in mind all the logic and standards teachers struck with their curriculum and its implementation. The teachers' performance is estimated and evaluated by the performance of students in examinations and teachers' training and evaluation. the students' achievement in both summative and formative assessment is estimated as the ultimate criteria to judge and evaluate teachers, effectiveness(Dee & Wyckoff, 2015; Taylor & Tyler, 2012).

In other words, the achievement of students directly or indirectly represent the teachers' performance, the success of student consider as the success of teacher and failed of students represent the deficiency of teacher. In the life of every human and its activity education and instruction are considered as the first step towards the development of countries in this time of globalization and the age of technology resolution (Taylor & Tyler, 2012).

Dee and Wyckoff (2015)stated that education is assumed as an integral part of human development and provides a link between personal opportunities and well-being towards better and healthy living. Education not only satisfies our basic needs but it also guarantees knowledge acquisition along with skills, it helps individual to improve the quality and productivity towards healthy and satisfactory life(Craft, 2005).Students' achievement and performance quality is the major priority and concern for teachers. The quality of students' performance and achievement is the responsibility of teachers, trainers, coaches, and researchers who have highly interested in students' quality-related various variables. These variables are mentioned in the curriculum served as indoor and outdoor activities which cause effects on students' academic performance and achievement in terms of quality. These elements might be named student factors, family factors, school factors, and peer factors(Crosnoe, Johnson, & Elder Jr, 2004).

According to Marzano, Waters, and McNulty (2001)variables that support student achievement, there are such variables with lead towards the deficiency of quality and affect the quality of students. Literature explores the various series of elements that are considered significant while investigating the factors that affect students' quality, achievement, and success in academics. it is a very challenging and complex job to identify such variables which are most appropriate for performance, academic achievement, and quality(Waters, Marzano, & McNulty, 2004).

A school of thought after the comparison of Japan, the USA, and Korea explored the study related to factors that affect mathematics achievement of school and students (Onderi et al., 2015).The motivation behind the examination was to

nearly explore school-level components and students' related factors affecting and influencing mathematics students' achievement of Japan, USA, and Korean students. The consequences of the investigation showed that various examples of the relations among school-level indicators and students' related factors and mathematics achievement were found significant among Japan, America, and Korea.

For the last few decades, the teachers are trying to explore the more effective and quality base teaching methodology of teaching Mathematics as it is stated in SDGs about the equality base learning of students so all females, males, and transgender need to get a proper education in all subjects. Likewise, it is significant to get teaching and learning of mathematics of equality basis. According to Onderi et al. (2015), to meet the need and demands of society towards a flexible and competent workforce, it is necessary to educate students properly in math. School administration trying their best to meet the level of proficiency in the education of students of all ages and levels. Even though the government and local community together strive to change the situation of education but still there are some problems in front of education and its improvements (Bhardwaj, 2016).

Math improvement is at the center of the educational procedure taking all things together over the world, yet in Pakistan still, educators and students face problems related to mathematics and there are huge differences are founded concerning gender in the achievement of mathematics. Consequently, this study is conducted to the identification and distinguishing the secondary school levels' school-based elements that cause an impact on pupil performance and achievement in the subject of mathematics. the study along with its finding may be useful for stakeholders in the education ministry to fill the gap and provide a bridge in all areas of knowledge in regards to mathematic curriculum implementation at the secondary level. Meanwhile, this study may be helpful for professionals, researchers, teachers, and career guides to improve the usage and proper implementation of the math curriculum. This investigation may likewise give assistance and further understanding to future scientists to lead more studies in the areas.

Material and Methods

Cross-sectional survey research under the umbrella of descriptive research of quantitative approach was carried out to identify the school-based factors that become the reason to improve the performance of students in mathematics learning in government schools at Lahore. According to the school education census in Lahore male schools are 373 and 355 female schools, in these schools number of boys is 35797, whereas 33913 girls are learning in 10th grade are 899 and 2174 respectively. With the help of a two-stage random sampling technique, the sample was selected.

The details of sampling are given below:

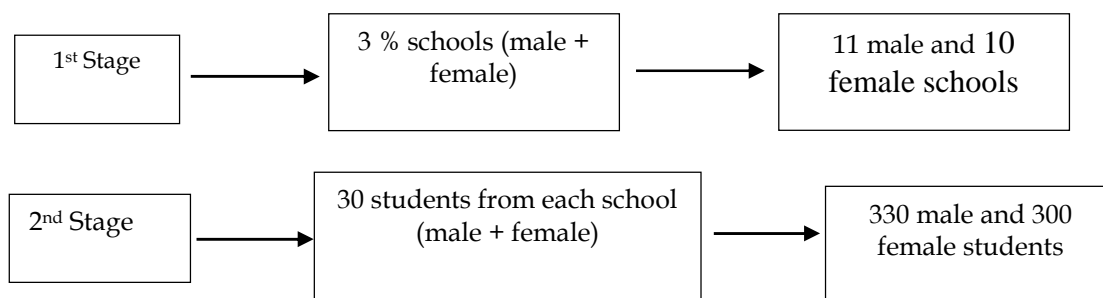


Figure 1: Sampling Frame

A questionnaire based on two sections demographic and 3 factors (teaching methodologies, working routine of teachers, and resources) were comprised of 5 points Likert scale developed by the researcher to inquire about the school based factors that become the reason to improve the students' performance in mathematics. The validity of the questionnaire was assured with the help of experts whereas reliability was checked through piloting having a value of 0.72. on the other hand, the students' performance was measured through their midterm exams prepared by their mathematics teacher.

Results and Discussion

The researcher utilized mean and standard deviation to represent the central tendency of the data, while the influence of school-based factors on students' mathematics performance was calculated with the application of simple linear regression analysis.

Table1
Students Perception about School-Based Factors

Sr. No.	Factors	Mean	SD
1	Teaching Methodology	3.68	1.04
2	Working Routine	3.58	1.06
3	Resources	3.77	1.00

N= 630

Table 1 represents the mean and SD values against the students' responses that they gave against school-based factors. These aforementioned values highlighted that students are agreed that they have sufficient resources in their schools as its mean value is highest among other factors.

Table 2
Students' Achievement in the Subject of Mathematics

	Mean	Standard Deviation
Achievement	69.90	8.426

Table 2 is about the mean and SD values of students' mathematics scores that they achieve in their midterm exams. The values indicating that students achieve satisfactory marks in mathematics as the mean value was 69.90, whereas SD = 8.426.

Table 3
Correlation between Students' Perception about School-based Factors and Achievement in Mathematics

	Classroom Management	Achievement
Insturction	1	.234**
Achievement		1

The researcher incorporated correlation analysis in order to identify the relationship between said variables. The values pointed out that there is a positive as well as significant but week correlation between these two variables. Based on these results the researcher rejected the null hypothesis as $r = .234$ and $p < .05$.

Table 4
Influence of School-Based Factors on Students' Achievement in Mathematics

R Square	Adjusted R Square	df	F	Sig.
.055	.053	1	36.260	.000

The researcher incorporated regression analysis in order to identify the influence of school-based factors on students' achievement in mathematics and its results represented in table 4 which indicated that variance between variables is .05 % because the value of R square = .053, $F = 36.260$, and $p = .000$. These results highlighted the model fitness.

Table 5
Regression Coefficient Showing Influence of School-Based Factors on Students' Achievement in Mathematics

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
Achievement	58.363	1.943		30.042	.000
School Based Factors	3.041	.505	.234	6.022	.000

The results of regression analysis reflecting through coefficient value shows that there is the influence of school-based factors on students' achievement in mathematics who are learning in 10th grade at secondary schools of Lahore. The values of $B = .234$, $t = 6.022$, $p = .000$, sufficient to reject the null hypothesis. The normality, linearity, and homogeneity are reflected through the below-mentioned figures:

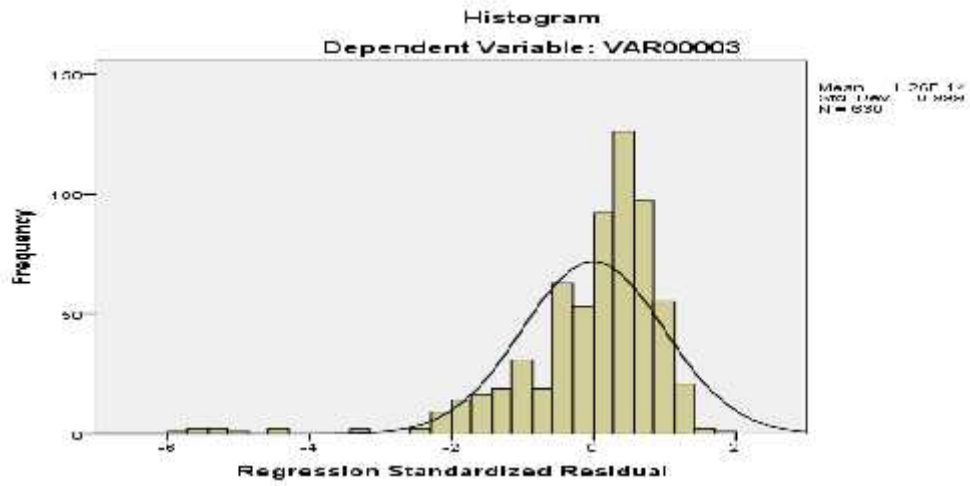


Figure 2: Histogram of School-Based Factors and Achievement in Mathematics

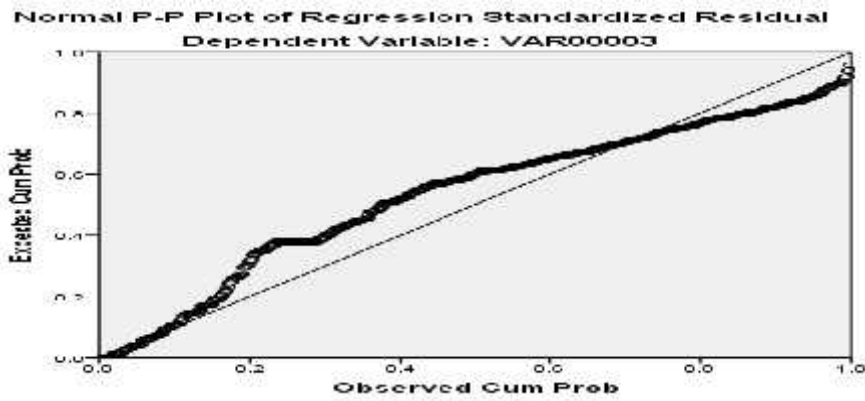


Figure 3 P-P plot of School-Based Factors and Achievement in Mathematics

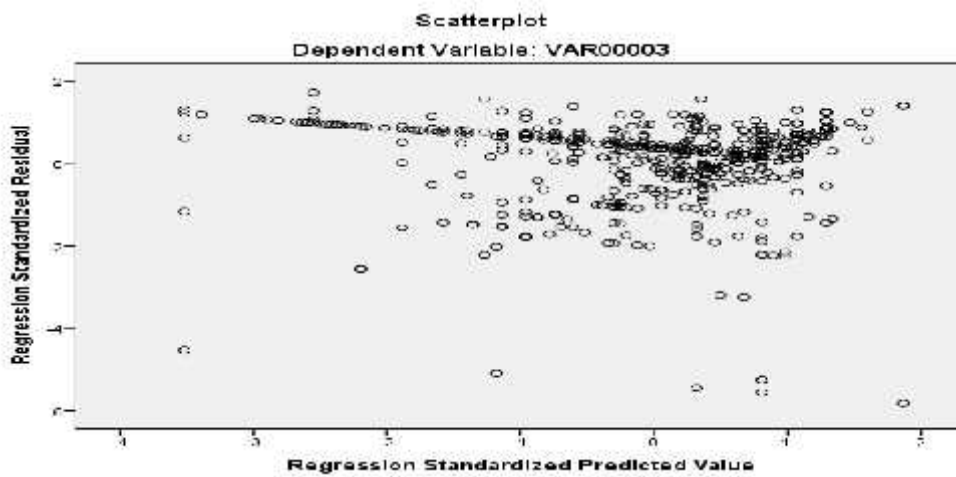


Figure 4 Scatter plot of School-Based Factors and Achievement in Mathematics

Conclusion

The findings of this study helped the researcher to conclude that students are agreed that they have sufficient resources in their schools as its mean value is highest among other factors and students achieve satisfactory marks in mathematics as well as there is a positive as well as significant but weak correlation between these two variables which highlighted there is the influence of school-based factors on students' achievement in mathematics who are learning in 10th grade at secondary schools of Lahore. These results are consistent with the results of studies (Adeyemo, 2010; Bangert-Drowns, Hurley, & Wilkinson, 2004; Jacob & Parkinson, 2015; Jaiyeoba & Atanda, 2011). These results provide a guideline to policymakers to update their policies regarding curriculum implementation at the school level regularly by keeping in mind the students' needs, potential, and requirements of the present era.

References

- Adeyemo, S. A. (2010). The relationship between students participation in school based extracurricular activities and their achievement in physics. *International Journal of Science and Technology Education Research*, 1(6), 111-117.
- Ayeni, A., & Afolabi, E. (2012). Teachers' instructional task performance and quality assurance of students' learning outcomes in Nigerian secondary schools. *International journal of research studies in educational technology*, 1(1), 33-42.
- Ayeni, A. J., & Amanekwe, A. P. (2018). Teachers' Instructional Workload Management and Students' Academic Performance in Public and Private Secondary Schools in Akoko North-East Local Government, Ondo State, Nigeria. *American International Journal of Education and Linguistics Research*, 1(1), 9-23.
- Bangert-Drowns, R. L., Hurley, M. M., & Wilkinson, B. (2004). The effects of school-based writing-to-learn interventions on academic achievement: A meta-analysis. *Review of educational research*, 74(1), 29-58.
- Bhardwaj, A. (2016). Importance of education in human life: A holistic approach. *International Journal of Science and Consciousness*, 2(2), 23-28.
- Craft, A. (2005). *Creativity in schools: Tensions and dilemmas*. USA: Psychology Press.
- Crosnoe, R., Johnson, M. K., & Elder Jr, G. H. (2004). Intergenerational bonding in school: The behavioral and contextual correlates of student-teacher relationships. *Sociology of education*, 77(1), 60-81.
- Dee, T. S., & Wyckoff, J. (2015). Incentives, selection, and teacher performance: Evidence from impact. *Journal of Policy Analysis and Management*, 34(2), 267-297.
- Del Vecchio, M., & Matsuura, M. (2016). Student teacher observation: Perspectives on evaluation and criteria. *Studies in International Relations*, 37(1), 53-72.
- Gakidou, E., Cowling, K., Lozano, R., & Murray, C. J. (2010). Increased educational attainment and its effect on child mortality in 175 countries between 1970 and 2009: a systematic analysis. *The lancet*, 376(9745), 959-974.
- Jacob, R., & Parkinson, J. (2015). The potential for school-based interventions that target executive function to improve academic achievement: A review. *Review of educational research*, 85(4), 512-552.
- Jaiyeoba, A., & Atanda, A. (2011). Effects of school-based quality factors on secondary school students' achievement in English language in south-western and north-central Nigeria. *Journal of Emerging Trends in Educational Research and Policy Studies*, 2(2), 93-99.

- Mahmood, N., Zahid, G., & Ghafoor, A. (1992). Measuring the Education Gap in Primary and Secondary Schooling in Pakistan [with Comments]. *The Pakistan Development Review*, 31(4), 729-740.
- Marzano, R. J., Waters, T., & McNulty, B. A. (2001). *School leadership that works: From research to results*. USA: ASCD.
- Memon, G. R. (2007). Education in Pakistan: The key issues, problems and the new challenges. *Journal of Management and Social Sciences*, 3(1), 47-55.
- Miles, S., & Singal, N. (2010). The Education for All and inclusive education debate: conflict, contradiction or opportunity? *International journal of inclusive education*, 14(1), 1-15.
- Onderi, P. O., Okwara, M. O., Raburu, P., Barongo, S., Mokaya, E., Mokogi, H., & Omaa, D. (2015). Assessment of School Factors Related to Academic Achievement in Mathematics among Secondary School Students of Masaba South Sub County, Kenya. *Assessment*, 6(12), 70-73.
- Tatlah, I. A. (2015). *Effect of leadership behaviour and school organizational health on students' achievement*. Lahore: (Unpublished Doctoral Thesis) University of Management and Technology, Lahore.
- Taylor, E. S., & Tyler, J. H. (2012). The effect of evaluation on teacher performance. *American Economic Review*, 102(7), 3628-3651.
- Waters, J. T., Marzano, R. J., & McNulty, B. (2004). Leadership that sparks learning. *Educational leadership*, 61(7), 48-51.
- Zaare, M. (2013). An investigation into the effect of classroom observation on teaching methodology. *Procedia-Social and Behavioral Sciences*, 70, 605-614.