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.

Keywords: Mathematics Performance, School-Based Factors, Secondary School Students

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:
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.

| 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.

| Mean | Standard Deviation |
|------|--------------------|
| 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 |
|----------------------|----------------------|-------------|
| Instruction          | 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

|                      | Unstandardized Coefficients | Standardized Coefficients | t     | Sig.  |
|----------------------|-----------------------------|---------------------------|-------|-------|
| Achievement          | 58.363                      | 30.042                    | .000  |
| School Based Factors | 3.041                       | 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:
Role of School Based Factors in Improving Secondary School Students Performance in Mathematics

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

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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 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 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.
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