Effects of Physical Facilities at Public Schools on Students' Achievement in Punjab, Pakistan

Muhammad Arshad[*] Zia Ahmad Qamar[†] Faheem Huma Gulzar[‡]

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Abstract *This paper determines the influence of school's physical facilities on students' achievement. The study was quantitative in nature and survey technique was used. The sample of the present study was selected by multi-stage random sampling method from Sahiwal division of Punjab, Pakistan. The researcher developed and validated a Check-List for Physical Facilities (CLPF) prior to data collection. Multiple regression analysis are run in the current research to analyze data. Measurement of the achievement of students from test scores of grade 8th conducted by Punjab Examination Commission in the year 2017 is analyzed. The study shows that ventilation, plants, play grounds, first aid medical box, LCD/LED significantly influenced students' achievement. All the physical facilities contributed about 15.4% towards students' academic achievement.*

Introduction

The child born in family with any status takes admission in school for educational purpose. The children spend five to six hours in a school building and seek basic education, moral values and discipline. The physical environment of school consists of standard building having good ventilation; indoor air quality and thermal condition enhance directly or indirectly students' outcomes and also increase overall performance of school.

The parents think that all schools had basic physical facilities for students whereas some schools have not appropriate physical facilities. The school size, aesthetic and number of class rooms enhance students' enrollment and act as strong driving force which create and stimulate the students action participate actively in curricular and co-curricular activities.

[*] PhD Scholar (Education), Department of Education, University of Lahore, Lahore, Punjab, Pakistan.
[†] Teacher. Govt. High School No.1, Haveli Lakha, Okara, Punjab, Pakistan.
Email: ziahmadqamar@gmail.com
[‡] PhD Scholar (Education), Department of Education, University of Lahore, Lahore, Punjab, Pakistan.

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The schools maintain safe environment for students, more positive, challenging environment and have best satisfaction place for parents, communities, learners and educators. The cleanliness condition and healthy environment play a significant role in successful teaching and learning process. Ramli and Zain (2018) pointed out three important factors which affect students' academic achievement like system management, learning environment and infrastructure. The component like system management consists of e-learning and management information system whereas the class rooms, teaching aids and library include in learning environment. The infrastructure of school accounts the hostels for students, sports facilities (playground) and transport facilities. The above stated factors contributed about 51.5% towards student achievement.

Physical, academic and classroom services are the three main components of school environment. These components play an important function in teaching and learning process. These learning supportive components had significant impact on science students' achievement. Furthermore the sympathetic environment of the school improves the results of both the English medium as well as Urdu medium schools. The better learning and sympathetic elements i.e. physical facilities, academic facilities and the school atmosphere enhance better teaching learning process (Mahmood & Gondal, 2017).

The students' achievements are significantly influenced by the aesthetic beauty of the school. The school infrastructures have the positive effect on students' academic performance. The students from schools with good infrastructure performed better academically than students from schools with poor infrastructure. The equipment of the school as well as instructional resources stimulus significantly academic performance of the students. The performance of the urban schools' students remained better than the performance of the students belonging to the rural schools (Koroye, 2016).

The school physical infrastructure was a basic key to success and helpful for real teaching learning process of a schools. It was the central focus of school infrastructure that it helps to increase the students' attendance rate, enhance motivation within the school staff and enhance the performance of students. The infrastructure of a school included schoolrooms for classes, research laboratories as well as sports goods. The formal process of daily teaching and learning always takes place in classrooms. The improved achievement associated with more adequate and well-spaced classrooms and adequate laboratories.

Objectives of the Study

The main objective of this study was to evaluate the influences of the school physical facilities on the achievement of the students at public schools of Punjab, Pakistan.

Research Questions

What are the effects of school physical facilities on students' achievement at public schools of Punjab, Pakistan?

Method and Procedure of the Study

Punjab is called the land of five rivers and most populous province of Pakistan. The province Punjab is the lifeline of Pakistan and administratively consists of nine divisions. The study was quantitative in nature and survey technique was administered to collect the data. The population of the study was the head teachers of the government elementary schools of both gender located in Punjab, Pakistan. The sample was selected by multi-stage random sampling method and total of 506 head teachers were selected from target population. The researcher developed check list for physical facilities (CLPF) validated before actual data collection. The check list for physical facilities (CLPF) was a compatible and suitable tool for data collection. The institutional physical facilities are considered to be the relevant for the learning outcomes of the students. The checklist for physical facilities consists of two sections like infrastructure and support facilities of school. The checklist for physical facilities accounts two major options: i.e. available and not available. The expert opinion was taken from educational experts, educational administrators and stake holders. The research tool was piloted before actual data collection. The school principals were taken as the most appropriate source for detailing the available physical facilities at the school premises. So, the information about school physical facilities was collected from head teachers. To measure students' academic achievement, average was taken from the gazette notification 2017 of Punjab Examination Commission for eight grade students.

Review of Related Literature

The material facilities are required for the students and essential for the establishment of the school organization. The school physical facilities such as office, class rooms, staff rooms, store rooms, wash rooms, ECE rooms, portable water, canteen, library, laboratory, transport, building, boundary wall, sport items, playground, electricity, tablet, LED/LCD (for Nursery class), IT lab, white boards, plants and mosque play a positive role to operate a school smoothly.

The available school physical facilities and their influence on the quality of education were studied by Afework and Asfaw (2014) The sample population of their research was twenty-four government primary schools of Eastern Hararge zone as well as twelve primary schools from Hariri regional state. School principals, the district and regional heads of education were carefully chosen at random as the sample of the study. They used a questionnaire, interview protocol

as well as observations as the instruments. They found negative effect of inadequacy of physical facilities and resources of school on teaching learning practice. They concluded that the availability of physical facilities at school helps to improve quality of education as well as to achieve the educational goals.

The recent research has recommended that maintenance and repair of physical facilities at school directly affect the student's achievement. The stake holders, administrators, supervisors, educationists, and policy makers suggested maintenance and repair of school facility quality which has a positive influence on the improvement of schools at district, provincial and national level. Bowers and Urick (2011) addressing the checklists of facilities survey used two level hierarchical linear model to check the effect of facility disrepair on students' performance in the subject of mathematics at the institution level. They said there is no direct effect of facility disrepair on student's achievement in the mathematics subject. This study helps the administrators to allocate funds for the maintenance of disrepair of facilities for the betterment of schools. They made a proposed mediated model of facility quality and achievement. The school leaders, headmasters, principals, teachers, students and parent's motivation and attitude are influenced by qualities provided by school. All these things affect overall academic climate which in turn influence student's achievement.

The school facilities affect teaching and learning process. Provision of facilities with poor conditions put more hurdles in delivering and conveying education to the students. Facilities of school directly influence on teacher's health and their career decisions. No doubt that he school facilities add positively to the process of education. Physical education as well as recreational activities are very important for student's wellbeing and achievement. Teaching and learning is a complex task, which requires collaboration, flexibility and learning with colleagues. The teachers' effectiveness and the students' achievements are directly affected by the school facilities (Schneider, 2003).

Akhtar and Tariq (2015) analyzed the status of infrastructure, facilities and level of achievement of the students at secondary school level. Many schools lack in basic facilities, minimum land and majority have insufficient classrooms and furniture. Many schools have no science apparatus and library. Majority of schools have no multimedia and have insufficient computers to implement the modern techniques of teaching and learnings. Largest numbers of schools have no tuck shop and insufficient washrooms and playgrounds. The urban male schools have better facilities than rural and female schools. Female schools show better results than males while urban and rural schools have progressed at the same pace. Male schools have more facilities than female schools. All the schools show good results irrespective of their facilities. All head teachers and teachers are accountable and have stressed for good results. Female students show better results because of their more concentration on studies than male students. Co-curricular achievements are highly appreciated in male and urban schools which have better facilities than

others. The facilities affect nonacademic activities more than academic activities. The urban and male schools performed better in co-curricular activities due to excessive facilities.

The academicians and policy makers focus on teacher quality, school choice and curriculum reforms for increasing educational performance. School physical facilities influence learning environment. Noise, heat, cold, light and air quality do have a bearing on students and teacher performance. Facilities attribute towards academic outcomes. Schneider (2002) categorized facilities into six main varieties; internal quality of the air, ventilation system and lighting facility, sound quality, fresh and clean water availability, quality of the school building, size of a school and size of class. A school needs better ventilation; bad ventilation hampers student performance and capacity to learn. Good acoustics are fundamental to good academic outcomes. Good facilities produce long term positive effects on academic achievements.

Earthman (2002) establishes that the conditions regarding the facilities of a school have tangible effect on student's achievement and learning effectiveness. Better conditions of school buildings enhance the teaching and learning environment. Overcrowding in school buildings and classrooms put hurdles in the students learning. Small class size also enhances student's achievement through maximizing teacher student interaction. Students cannot perform better in noisy classrooms. Poor school facilities put a negative influence on overall climate which in turn effect students' academic achievement and teacher performance.

The infrastructure of the school including the building of a schools as well as the class rooms are considered very essential part of the institution. These facilities play a pivotal role in student's attraction, retention and contribution towards schools. The physical environment of school such as spacious classrooms, attractive school buildings, and better facilities reduce tension, depression, frustration and anxiety. The basic physical facilities of a school play an important and positive role for the high achievement of the school children. The school size as well as physical infrastructure effect the attitude and the process of personality development of the students. Physical facilities improve confidence level and student's potential. In the same way, institutional facilities for instance physical in addition to instructional, effect the social as well as sociological development process of students (Naz, et. al, 2013).

The infrastructural physical facilities play a pivotal role in student's academics, participation in co-curricular activities, making lectures participative, attendance and extension of learning activities. These facilities also act as the motivating factor towards behaving patterns and hushing of stress, tension, frustration and negativity towards others the students interact with (Naz, et. al, 2012).

Urwick and Janaidu (1991) described the effect of quality of school physical facilities on teaching and learning operation. The teaching and learning processes

established an important link between school inputs and students' performance. The physical facilities like furniture and classrooms maintenance influence on student's achievement. The school physical facilities promote the quality of teaching and learning for enhancing quality education. These physical facilities significantly influence on student's achievement (Hasbullah, Yusoff, Ismail & Vitasari, 2011).

The physical facilities of school remained the most vibrant factor of students' achievement. The facilities like laboratory, library, school buildings and white boards play very essential for higher academic achievement. The achievement is the utility of all the available resources for the students (Owoeye & Yara, 2011). Akhihiero (2011) explained that the school physical facilities stand for the real equipment that assist and promote teaching learning process within the institution. The physical facilities include school buildings, teaching aids and laboratory equipment influence on academic achievement.

Presentation and Analysis of Results

A multiple regression model was run to examine the influence of physical facilities on students' achievement. For model with dependent variable student's achievement, the variables which have same value for all schools, are constants or have missing correlations: Office, Class Rooms, Canteen, Transport, Laboratory, Wash Rooms, Lifts, Air Conditioning, Mosque, Electricity, Water, Gas, Furniture, Boundary Wall, Telephone/Mobile, White Boards and Tablet. They will be deleted from the analysis.

  a. Dependent Variable: Students Achievement
  b. Predictors: (Constants), Tablet, Library, Store Room, Gas, I.T Lab, Ventilation, Sports Items, Staff Room, ECE/Kids Room, LCD/LED, Play Grounds, First Aid Medical Box, Plants.

Table 1 Regression Statistics for Public Schools to Assess the Effect of Physical Facilities on Students Achievement

Physical Facilities	B	SE b	Beta	t	Sig.
(Constant)	170.377	75.875		2.245	.025
Library	-24.645	24.059	-.042	-1.024	.306
Ventilation	46.011	19.686	.097	2.337	.020
Plants	27.864	8.644	.189	3.223	.001
Sports Items	1.720	7.383	.024	.233	.816
Staff Room	12.051	13.847	.052	.870	.385
Play Grounds	-19.234	6.040	-.262	-3.184	.002
I.T Lab	-3.318	5.288	-.044	-.627	.531
First Aid Medical Box	17.531	7.972	.112	2.199	.028

ECE/Kids Room	11.199	12.345	.045	.907	.365
Store Room	4.569	28.165	.008	.162	.871
LCD/LED	-10.103	5.922	-.107	-1.706	.089
Multiple R	0.392	R Square	0.154		
Durbin Watson	1.633	F-statistic	8.176		
Observations	506	F-significance	.000		

From the above table, the value of R which is 0.392 shows the correlation between dependent variable and independent variable. The goodness of fit tested and reported by the value of R square. A model fits the data well, if the difference between the observed value and the model predicted value are small. The value of coefficient of determination R square is 0.154, which is low. The value of R square provides an estimate of the strength of the relationship between dependent and independent variables. The low value of R square did not provide a formal research questions testing. Therefore, F- statistics was reported, which is 8.176 and the value of significance is .000. The significance value shows the group of explanatory variables had statistically significant relationship with dependent variables. The above table also shows that the value of Durbin Watson 1.633, which indicates that data is not auto-correlated. According to Rule of Thumb, if the test statistic value in the range of 1.5 to 2.5 are relatively normal.

Linear regression analysis of variance ANOVAs significance and the value of R-square describe the overall fitness of the model and the value of significance must be less than .05 on 95% of confidence interval. The value of $p=.000$ showed that the model is significant and fit as per results. It was concluded that the linear regression model shows 15.4% significance of the set of independent variables, the remaining explanation of 84.6% is from other external factors which are not included in the study.

The values in the parameters are standard errors of the estimators of parameters. Basically, the coefficient shows the relationship of individual independent variable with the dependent variable. The mean effect of incorporated variables reproduced by the model takes 170.377 value at 1 percent level significant.

The above table shows that independent variables i.e. library and I.T. lab had negative influence on students' achievement. It means that a unit increase in these variables reduced the student's achievement. However, there exist a negative relationship between the school facilities i.e. library, I.T. lab and the student's achievement. While the t-statistics and 'p' values indicate that this association is statistically insignificant.

The above table also indicates that the school facilities like ventilation, plants, first aid medical box had positive influence on students' achievement. The Beta value of ventilation is .097 which shows that a unit increase in this variable will leads to increase of 10% in the students' achievement at 1 percent level of

significance. Beta of plants is .189, which means change of one unit in this facility will results in increase the 19% students' achievement at 1 percent level of significance. The Beta value of first aid medical box is .028, which indicates that a change of one unit in this facility will leads to increase of 3% in the students' achievement at 1 percent level of significance. However, there exist a positive relationship between these elements of physical facilities and dependent variable students' achievement. The t-statistics and '*p*' value reveals that the associations are statistically significant.
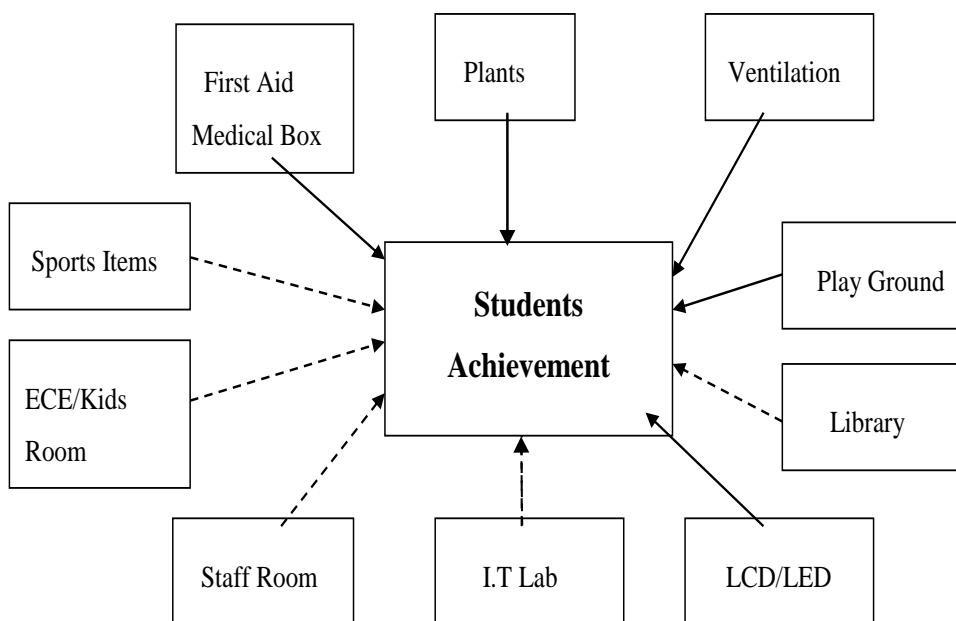
___ Significant **………non-significant

Figure 1: Effect of Physical Facilities on Students Achievement

The above table shows that independent variables i.e. sports items, staff room, ECE/Kids room and store room had positive effect on student's achievement. It means that a unit increases in these variables increase the student's achievement. However, there exist a negative relationship between the school facilities like sports items, staff room, ECE/Kids room, store room and the dependent variable students' achievement. While the t-statistics and '*p*' values indicate that this association is statistically insignificant.

The above table reveals that school facilities i.e. playground and LCD/LED had negative influence on students' achievement. It means that a unit increase in these variables reduced the students' achievement. However, there exist a negative

relationship between the school facility and the student's achievement. While the t-statistics and '*p*' values indicate that this association is statistically significant at 1 percent level of significance.

Findings

1. The value of R (0.392) shows the correlation between dependent variable and independent variable. The value of coefficient of determination R square (0.154) provides an estimate of the strength of the relationship between dependent and independent variables. The F- statistics (8.176) and the value of significance (.000) shows the group of explanatory variables has statistically significant relationship with dependent variables. The value of Durbin Watson (1.633) indicates that data is not auto-correlated. The regression statistics explains 15.4% variance in overall students' achievement.

2. The mean effect of incorporated variables reproduced by the model takes 170.377 value at 1 percent level significant.

3. The school physical facilities (independent variables) i.e. library and I.T. lab have negative effect on students' achievement. It means that a unit increase in these variables reduced the student's achievement while the t-statistics and '*p*' values indicate that this association is statistically insignificant.

4. The school facilities like ventilation, plants, first aid medical box effect positively on the outcomes of the students. The Beta value of ventilation (.097) shows that one-unit increase in this variable will leads to increase of 10% in the students' achievement at 1 percent level of significance. Beta of plants (.189) means change of one unit in this facility will results in increase the 19% students' achievement at 1 percent level of significance. The Beta value of first aid medical box (.028) indicates that a change of one unit in this facility will leads to increase of 3% in the students' achievement at 1 percent level of significance. The t-statistics and '*p*' value reveals that these associations are statistically significant.

5. The school physical facilities (independent variables) i.e. sports items, staff room, ECE/Kids room and store room have positive effect on student's achievement. It means that one-unit increase in these variables enhance the student's achievement while the t-statistics and '*p*' values indicate that this association is statistically insignificant.

6. The school physical facilities i.e. playground and LCD/LED has negative effect on students' achievement. It means that one-unit increase in these variables reduced the students' achievement while the t-statistics and '*p*' values indicate that this association is statistically significant at 1 percent level of significance.

Conclusion

The school physical facilities like library, ventilation, plants, play grounds; first aid medical box, sports items, staff rooms, I.T labs, store room, LCD/LED and ECE/Kids rooms at the Public schools have influence on the student's achievement.

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