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IMPACT OF STUDENT TEACHER RATIO AND CLASS SIZE ON ACADEMIC ACHIEVEMENT OF STUDENTS AT SECONDARY LEVEL

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***ABSTRACT*:** *The study was conducted to investigate the impact of student teacher ratio (STR) and class size on the academic achievement at secondary level. These two indicators are also the proxy of facilities provided or expenditure incurred. These are two main indicators of the provision and use of school resources as well as their use, and an essential function to perform throughout the teaching-learning process. These show the overburden of students or less burden with higher cost or average cost with average STR and class size.*

Keywords: Student teacher ratio, Class Size, Academic achievement

INTRODUCTION

STR and class size are very important and are the proxy of facilities provided or expenditure incurred. These are two main indicators of the provision and the use of school resources as well as their use, and an essential function to perform throughout the teaching-learning process. These show the overburden of students or less burden with higher cost or average cost with average STR and class size. These are very important determinants of academic achievement of students.

Student Teacher Ratio and class size

Among school resources, the factor of student teacher ratio and class size have significant bearing on academic achievement of students. The teacher is in a better position to reciprocate with students, and teach them in a better way provided that their strength in a classroom is minimumized.

In 1985, a project by the name of "The Student Teacher Achievement Ratio (STAR)" was initiated Tennessee to examine the impact of STR and class size on academic achievement of students. Series of research discussions and conclusions were drawn about STR and class size, with sound recommendations and suggestions. The study came up with an observation that student's from low class size resulted in higher academic achievement, while class with high student strength resulted in lower academic achievement. Yet, the sample comprising of regular class size.

Further studies conducted in this regard, including Tennessee's Project Challenge[1] and Wisconsin's SAGE program [2];[3] were conducted. It was examined that SAGE classroom the recommended lower STR for better performance for students belonging to grade 1 in the year 1996-97 and 1997-98. Contrary to the recommendations, the SAGE classrooms more students were enrolled with provision of subsidized lunch, nevertheless the results showed a slightly different picture and it was seen that higher STR produced better academic achievement of students as compared to other school classrooms.

[4] investigated and explored that if size of the class matters methodically, then STR has somewhat 15% more correlation between teacher strength and academic achievement of student and teacher strength. On the contrary,[5]accomplished that academic achievement of the students is enhanced, when supplemented with additional school resources, where STR has an edge over other school resources.

[6]extended the earlier discussion. A consistent The negative impact was recorded on academic achievement of students where STR was higher especially on learning language skills. Though, [7]established that STR was an important determinant of selection of schools by parents and setting of fee structure. [8]investigated that STR has statistical important positive impact on academic achievement of students, particularly on securing high grades in math. Still, it was observed tha STR has little impact on science achievement and no impact on student achievement in English.

Here is the summary of the studies carried out to locate the impact of STR on academic achievement of students. The STAR project initiated a discussion in 1985. This wide ranging study highlighted that lower STR and small class size have great impact over the academic achievement of students. Tennessee's Project confronts [1] and Wisconsin's SAGE program [2];[3] also recommended the lower STR. Many studies concluded that STR has some positive effects [5]; [7]. However, [4] and [6] concluded the negative effect of STR; whereas,[8] showed mixed results.

In the light of the above discussions, the researchers are unable yet to make up any single generalization about measuring the extent of STR and class size on the academic achievement of the students. The main hindrance recorded is the non-availability of funds, for which it's difficult to draw a line that what should be the STR, and to find out its direct impact upon academic achievement of students at secondary stage in schools.

Discussion about the class size has developed to a considerable body of research on class size reduction because of expenditures it increases.

Several other studies analyzed the STAR data and drew conclusions. According to [9] found out that impact of the class size on academic achievement of student achievement is much pronounced in the STAR project experimentation. Similarly, student's academic achievement, enhanced in the small, regular classes supplemented with aid by a great margin. Still, it was examined that the students continued to perform better even after returning to the regular classes. Their performance was better than those students who remained in a regular class size with or without a teacher's aid.

In the same way, [10] analyzed the STAR project experiment yielded the same result and found that smaller class size has a positive impact on the standardized test scores.,which continue to enhance in subsequent grades. However, this effect was larger for the beneficiaries of the free lunch program and the minority students. Similarly, [11] observed

and came up with the same conclusions that this impact remains pronounced for at least five years after being enrolled in regular classrooms.

[12] designed six theories and models that clearly showed that how class size has an impact on academic achievement of students. Declining achievement test scores were recorded in relation to class size and emphasized direct correlation between them. These theories are namely "Increased Student Interaction Time" and "Decreased Access to Fixed Instructional," "Greater Instructional Overhead."According to these theories the impact of teacher lessens with inclusions of more students in a class. Yet, according to other three theories the class size impact and academic achievement of students are in indirect relationship. These theories are "Class Heterogeneity," "Instructional pacing," and "Student Grouping or Achievement Modeling". Apart from these factors, the assigning of students to small or large class sizes have their own plus and negative points, those contributes in creating the impact of those factors.

Most of the other studies of class size were also conducted at the lower grades including STAR. [13] was carried out at the primary level, and yielded a conclusion which emphasized that small class size has positive impact on academic achievement especially in math, which was recorded as one third of a standard deviation. In Wisconsin (SAGE Program) and North Carolina many studies were carried out on the impact of class size on academic achievement. At primary grade, these studies showed highest achievement test scores in smaller class size than large ones. [3] Likewise, [14] study maintained that the enhanced performance at lower grades latterly also contributes to higher academic achievement in higher grades in later periods.

In [15], authors used a regression discontinuity design to investigate and analyze the impact of class ize on academic achievement. According to this findings of this study, class size has important impact on student achievement in mathematics and reading comprehensions.[16] criticized large class size on account of the fact that in large class size the students could not get equal opportunity and quality time, provided that there could be scarcity of aid material, especially in the developing countries. In spite of the large class size, most of the Asian students performed well in international math achievement tests. Still, the academic achievement level is high as compared to the international average. Besides, the ethnographic studies crried out in China and Japan depicted that teachers observed little relationship between academic achievement and class size in schools. Though, many researchers remarked that the success of the large class size in China and Japan is the result of the fundamental role of groups in the Confuscian heritage.

Some others [17], made their share too. They established that the impact of class size was not clear especially for senior grades in many countries where data was selected and statistically treated. The countries included Botswana, Philippines, and Thailand. On the other hand, a considerable positive impact of class size on academic achievement was observed in Tanzania. Moreover, in Norway same kind of investigation of the impact of class size on academic achievement of students was carried out by [18]. Conversely from [19,18] observed that impact of class size varies on academic achievement among student's sub-groups. Another important outcome was that students from intact families in a school have high academic achievements, but still it was conditionally related to student's efforts. This effect was larger in schools with a higher proportion of students from intact families; however, it was conditional on student effort.

[19] explored and concluded noteworthy impact on academic achievement of students as a result of small class sizes. The study observed the impact of class size in natural variation by using longitudinal approach. Then, [20] examined and investigated the impact of resource policies in both developed and developing countries especially in USA. The study comes up with a simple conclusion that commonly these policies relating to impact of class size on academic achievement fail to make any significant impact.Still, there were some contradictory findings, where small classes or additional resources resulted in unusual results. [21] analyzed the cross-sectional and panel data of research study on the school funding and the impact made by it on academic achievement of students. Therefore, class size made up an important determinant of academic achievement of student.

Here is the summarized discussion about the studies of the effects of class size on student achievement. The discussion was initiated by the STAR project since 1985 about the impact of class size on academic achievement of students. The STAR project recommended small class size. This point of view was extended by most of the later studies and come up with conclusion that smaller class size has significant impact on academic achievement of students [22;23;12;24;9;10;11;25;19].

Yet, there were studies conducted in the same area which explored very marginal or zero impact of class size on academic achievement of students. [20;17,26]. However, impact of class size in higher grades was not pronounced.[21]. As discudded earlier, in Asian countries the large class size has little impact on academic achievement of students and therefore generally seen securing high test scores [27;28]. The lower and ineffective method of learning has a long bearing on academic achievement of students. This has become a core issue. Still, there is always room for improvement which demands utilization of proper school resources and its equal distribution along with raising the standards of teaching and learning [29].

Shortly the researchers disagree on the core issues relating to differential impact of family background, SES, school resources on academic achievement of students at secondary stage in school. However, the present study comes up with a conclusion that considerable decrease in class sizes may have substantial and long-lasting constructive impact on academic achievements of students at secondary stage, mainly in the developing countries where students are mostly from low SES background.

Objectives

1. To identify the STR and class size in 9^{th} and 10^{th} classes.
2. To find out the academic achievement of students.
3. To analyze the differential impact of STR and class size on the academic achievement of students.

Delimitations

1. Public schools
2. Secondary stage of education
3. District Layyah
4. Aggregate marks of students in the Annual SSC Examination 2015 at secondary stage were taken as academic achievement.

MATERIAL AND METHODS

Type of Study

This study is correlational. The main purpose of the study is to find out the differential impact of STR and class size on the academic achievement.

Population

The students of 10th Grade of public secondary and higher secondary schools who appeared in the Annual SSC Examination 2015 in District Layyah were the population of the study. Most of the people of District Layyah live in rural areas because of the small urban population.

Sample

At the first stage, 40 high schools (including higher secondary schools) were selected from District Layyah. These schools were selected from urban and rural areas based on random sampling technique. At the second stage, 10 students were randomly selected from each school. However, if there were students ≤ 10 in Class X in a school, all these students were selected. Furthermore, 10 students were selected from science and arts stream on proportionate random sampling method

Instrument

A School Profile Proforma was developed to collect the information regarding the availability of school resources from the records of schools. Second instrument "Questionnaire" was administered to the 10th Grade students in the selected secondary and higher secondary schools to identify the information about STR and class size. Through third instrument "Result Sheet," the aggregate marks of the students for The Annual SSC Examination 2015 were recorded from the Gazettes of the relevant boards of intermediate and secondary education.

DATA COLLECTION

The data were collected in person where possible. However, some research assistants were also employed for help during the data collection process. Other means of communication such as telephone, mail, and email were also used where the researcher could not collect data personally.

DATA ANALYSIS

The data were summarized and analyzed first at school level. Mean was used for the interval data of school profile Proforma. Then, qualitative data of the questionnaire were transformed into the quantitative data. Likewise, the computed mean of aggregate marks of The Annual SSC Examination 2015 was computed at school level. Then this mean data were carried into both the data files in SPSS as a dependent variable. Regression analysis was used to find out the differential impact of STR and class size on the academic achievement of students.

Table1: Descriptive statistics

	Mean	Std. Deviation	N
Students Teacher Ratio (STR)	25.7250	11.57138	40
Class Size	45.4250	19.40379	40

Table 1 shows the mean and Standard deviation of the data of 40 secondary schools. Standard deviation (79.09324) shows that there is much variation in the academic achievement of students. Likewise, the variation in Teacher Ratio (STR) and Class Size are also very clear.

Table 2: Impact of STR and class size on academic achievement of students

	Unstandardized Coefficients		Standardized Coefficients		
Model	B	Std. Error	Beta	t	Sig.
STR	-6.145	2.482	-.899	-2.476	.020
Class Size	3.143	1.248	.771	2.518	.019
a. Dependent Variable: Academic Achievement					

Table 2 shows that all the variables except Students Teacher Ratio and Class Size have insignificant impact on the academic achievement of student as their t-value is very less. The negative and significant impact (at 0.05 level of significance) of Student Teacher Ratio on the academic achievement means if more teachers teach fewer students, then its impact is significant; however, if fewer teachers teach more students, then its impact is insignificant. Class size is also very important aspect of educational process. Table 2 shows that there is positive and significant impact (at 0.05 level of significance) of class size on the academic achievement of students. This variable is very tricky. This shows that the higher the class size, the higher the academic achievement of students, and the lower the class size, the lower the academic achievement of students.

DISCUSSION

The discussion about STR started from the STAR project, 1985. This gigantic study found that smaller class size and the lower STR have impact on student achievement. Tennessee's Project Challenge [1,2,3], also recommended the lower STR. Many studies concluded that STR has some positive effects [5,7]. However, [4] and [6]concluded the negative effect of STR; whereas, [8] showed mixed results. The researchers have yet, not agreed upon a point of view that the lower STR have an impact on academic achievement. The discussion about the class size started with STAR project since 1985. The STAR project recommended lower STAR. Afterwards, most of the studies concluded that smaller class size has a significant impact on student achievement [23;12;25;9;16;13;10,11,25;19,20,17]. However, some studies found very small or no effect of class size [17;26,21]. Likewise, class size effects in upper grades were not evident [18]. Contrary to the above, class size in the Asian countries is quite large; however, the students in these countries consistently get highest scores [27, 28]. The teaching and

learning process in the developing countries is substandard. This is key and is the real issue. However, this process can be improved by enhancing the capability of teachers and school leaders to handle this setting and identifying ways for students to be successful [29]. The researchers are still not agreed upon this issue. It is concluded that significant reductions in class sizes may have considerable and lasting positive effects on students, particularly in the developing countries and the low-income students.

CONCLUSION

It was concluded that STR and class size are the most important variables. Higher STR influences negatively and lower STR influences positively. When more teachers teach fewer students, then its impact is significant; however, when fewer teachers teach more students, then its impact is insignificant.

The study found that the schools that have better learning environment attract more students and ultimately have large class size, and the schools that have worse learning environment, cannot attract more students and ultimately have small class size. Therefore, there is positive and significant impact of class size on the academic achievement of students. The higher the class size, the higher the academic achievement of students, and the lower the class size, the lower the academic achievement of students.

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