ISSN E: 3006-1466
ISSN P: 3006-1458
CONTEMPORARY JOURNAL OF SOCIAL SCIENCE REVIEW
CJSSR
CONTEMPORARY JOURNAL OF SOCIAL SCIENCE REVIEW
Vol.03 No.03 (2025)

TEACHER EFFECTIVENESS AND STUDENT OUTCOMES: A CROSS-LEVEL ANALYSIS OF ELEMENTARY AND SECONDARY SCHOOLS

SAMIA YOUNAS
Mphil Research Scholar, Department of Sociology, University of Okara
Email: samiayounas19@gmail.com
Komal Riaz Cheema
Lecturer Sociology, Lahore College for Women University, Lahore.
Email: komal.cheema8@gmail.com
MUHAMMAD USMAN SHAMIM
Lecturer Department of Political Science, University of Okara
Email: usaddiqui@uo.edu.pk

ABSTRACT
The purpose of this study was to examine the impact of teacher effectiveness on student achievement at the elementary and secondary school levels. A quantitative research design was employed, and data were collected from 300 students using a structured questionnaire. The study measured various aspects of teacher effectiveness, including subject knowledge, communication skills, classroom management, and instructional strategies, alongside student academic performance in mathematics, science, and English. Data analysis involved descriptive statistics, Pearson correlation, linear regression, and independent samples t-tests. The results revealed a strong positive correlation between teacher effectiveness and student achievement ($r = .860$, $p < .001$), indicating that higher levels of perceived teacher effectiveness were associated with better student academic outcomes. Regression analysis further confirmed that teacher effectiveness significantly predicts student achievement. No significant differences were found between elementary and secondary school students regarding perceptions of teacher effectiveness or academic achievement. The study concludes that enhancing teacher effectiveness is crucial for improving student performance across educational levels. It recommends continuous professional development, mentoring programs, and the adoption of student-centered teaching approaches to further support effective teaching practices. Limitations related to geographic scope and the use of self-reported data were acknowledged, and suggestions for future research were provided.

Keywords: *Teacher's Effectiveness, Student Achievement, Elementary Education, Secondary Education.*

Introduction

History has demonstrated that a country's educational system has a direct impact on its level of development. And the most vital component of this system is a teacher who is qualified, gifted, and skilled in their field. A teacher bears direct responsibility for a country's progress as well as being essential to enhancing and fortifying society. In 2010, Reynolds conducted research on the impact of effective teaching and authored a book titled Evidence and Practice. According to his book, effective teachers possess the following qualities high levels and quality of questioning, frequent feedback, good time management, and active teaching that engages children with curriculum content. An instrument for enhancing The political, social, cultural, and economic structures of a country is the teacher. Teachers are the most important component of an educational institution, even though facilities and equipment are necessary. A teacher is the center of an educational system. The educational program may fail if instructor quality is compromised in any way. The level of instruction at the secondary grade is regarded as the almost crucial and significant stage for a child's growth in all educational systems. There is a direct correlation

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CONTEMPORARY JOURNAL OF SOCIAL SCIENCE REVIEW
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between student learning and the quality of instruction, according to current studies on the subject (Darling-Hammond & Young, 2002). According to Odden, Borman, and Fermanich (2004), teachers significantly impact students' learning. Though it is operationalized regarding the effects of teachers, which are simpler to quantify in study investigations, the definition of teaching effectiveness is unclear. The foundation of both individual and so advancement is education. It gives people the fundamental skills they need to develop personally and actively engage in the democracy and economy. The World Bank asserts that social justice, economic growth, and general quality of life are all greatly impacted by education (World Bank, 2018).Additionally, studies indicate that a population with higher levels of education has better health outcomes and lower rates of crime (Belfield & Levin, 2007). Education is therefore a social requirement as well as a personal advantage. Among the most crucial elements influencing learners accomplishment is acknowledged to be the efficiency of the teacher. Effective instruction can greatly improve student achievement, frequently more so than other elements like school resources, according to the National Bureau of Economic Research (Chetty et al., 2014). Student accomplishment is significantly influenced aside the effectiveness of teachers, especially successful secondary schooling, when student must meet higher academic standards and get ready for future academic and professional pathways. High performing instructors have a major impact on kids' learning outcomes, engagement, and general development according to numerous studies. Effective teachers possess a variety of qualities, such as subject matter expertise, classroom management, pedagogical abilities, and the capacity to create a supportive learning environment. According to research, learners who receive instruction from qualified teachers do better academically, have better critical thinking abilities, and are more motivated to study. Additionally, good instructors help close the success disparities between different student groups, which advances educational equity (Gordon, Kane, & Staiger, 2006). Among the most crucial elements affecting learner's accomplishment is what efficiency of teachers, especially in secondary schools where students encounter many social and intellectual obstacles. Improving educational results requires an understanding of the dynamics of teacher effectiveness, which encompasses a variety of independent variables like abilities and behaviors. Students' academic achievement, engagement, and general development are all strongly impacted by educators' success as they mold the learning environment and student experiences. Leaders must explore from the inside out in command to better the practical environment or raise the possibility of teacher engagement (Gordon, 2006).

Global Perspective

In many different environments, teacher performance is a determinant of student performance with the teacher variable informing education outcomes. The effectiveness of teachers is always emphasized in research; effective teacher means subject knowledge, knowledge of pedagogical techniques, classroom management, and engagement with the students, which greatly lead to academic achievement and long-term student success (Hattie, 2009; Stronge, 2018). It is globally indicated in studies that the correlation effect size between teacher quality and student outcome has a higher correlation up to 0.5-1.0 standard deviations (Chetty et al., 2014). In developed countries such as Finland and Singapore, teacher education and ongoing development are valued and this leads to their high student performance in international tests such as PISA assessment (OECD, 2019). On the other hand, in the newly industrialized and developing economies, the problem of inefficient teaching is caused by ill prepared tutors, many students, and scarce resources (UNESCO, 2017). As an example, Sub-Saharan African nations experience frequent cases of teacher shortage and a lack of pedagogical assistance, which contribute to state performances in schools and academies (World Bank, 2018). Successful educators also promote critical thinking,

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inspiration and fairness and make differences between the groups reduce among different groups of students (Gordon et al., 2006). The world is working on sustainable development goals One of them, Sustainable Development Goal 4 under UNESCO, stresses the importance of quality education in terms of teacher development, including evidence-based practices, such as mentoring and student-centered pedagogies. The importance of these global trends is that context-specific interventions should be provided to improve the effectiveness of teachers that take place in situations where structural barriers are really evident like in rural areas.

Status in Pakistan

In Pakistan, there is a large impact of teacher performance on student performance, but there are still systemic issues. Some of the problems encountered in the education system especially in the rural parts of Tehsil Depalpur include poor teacher training and provision of resources as well as the high number of students in one classroom (ASER, 2023). According to studies, only 60 percent of the public school teachers in Pakistan get regular professional training and this affects their capacity to use effective instructional methods (Pakistan Education Statistics, 2024). Old curriculum and lack of administrative support, which are disadvantages to teacher effectiveness in the Tehsil of Depalpur, Punjab, are even despite government intervention, which is improving the quality of teachers, such as through Quality Teacher Education Programme in Punjab Education Sector Reform Programme. There is a strong correlation between the teacher effectiveness and student achievement (r = .860) in Tehsil Depalpur, which is in line with the results on the national level pointing at the need to implement some interventions. The teaching facilities in the rural schools are very limited, and the teachers have little motivation in their working conditions (UNESCO, 2017). The key to achieving this is by improving teacher effectiveness by training and supporting them on a continuous basis to change student outcomes in Pakistan where there is diversity in schools.

Problem Statement

Teachers who model good instruction have a greater positive effect on pupil learning and domain success as well as performance in school and class. Efficacious teachers are commands for their pupil's respect, possess an admiring presence, and are remembered for being bright, confident, positive, enthusiastic, friendly, and sincere in love with students. Structural issues, such as large class sizes, lack of resources, and inadequate administrative support, can impede teachers' effectiveness. The effectiveness of teachers varies greatly depending on a number of factors, including their training, experience, teaching strategies, and level of interaction with students. This discrepancy contributes to achievement gaps by creating an uneven educational environment where some children flourish under capable teachers while others struggle. Ineffective instruction can have long-term effects on students' future educational and professional prospects in addition to having an immediate impact on academic performance. Student motivation and engagement are directly impacted by the effectiveness of the teacher. Good teachers create a welcoming atmosphere in the classroom that promotes engagement and a love of learning. Many educators struggle with a lack of support and chances for professional development, which limits their capacity to become more successful.

Teachers' efficacy may be hampered by structural problems like big class sizes, a lack of resources, and insufficient administrative assistance. These systemic barriers can diminish the quality of education that students receive, particularly in underfunded schools (Baker et al., 2017).

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Objectives of the Study

1. To get the level of teachers effectiveness at primary and secondary level.
2. To examine the association between teachers effectiveness and student achievement at elementary and secondary level.
3. To determine how well primary and secondary school pupils perform and how effective teachers are.
4. To evaluate the connection among pupil achievement and teacher effectiveness.

Methods and materials

This chapter details the quantitative approach that was implemented to analyze the effect of teacher quality on students' performance in the elementary and secondary schools of Tehsil Depalpur. It has been mentioned in detail about the study design, the population and the method of sampling used, the data collection tool used and the methods followed, the statistical methods used for analyzing the data, the ethical considerations followed and the limitations met during the study. Specifically, the methodology was designed to be statistically reliable, valid and relevant in the particular educational context of Tehsil Depalpur, a rural administrative unit in Punjab, Pakistan. The approach was to have a robust, evidence based output that is useful in educational research and policy in the region.

Sample Size and Sampling Technique

A careful implementation of a stratified random sampling technique was made to ensure that the representation from elementary and secondary school levels is equitable taking into account the structural and pedagogical differences between these educational tiers.

In calculating the sample size of the 300 students (150 elementary schools and 150 secondary schools) as the sample size of the given population through Krejcie and Morgan (1970) method of determining the sample size then the following formula was applied

$$n = \frac{x^2 \times N \times P(1-P)}{\left(ME^2 \times (N-1)\right) + (x^2 \times P \times (1-P))}$$

Where:

x^2: 95 percent confidence chi-square = 3.841

N: Population size = 10000 students

P: Proportion in the population = 0.5

ME: = 0.05

Plugging in the values we get

n = 3.841 x 10000 x 0.5 x 0.5/(0.05 2 x 9999) + (38.41 x 0.5 0.5)

Numerator:

3.841 x 10 000 x 0.5 x 0.5 = 9,602.5

Denominator:

0.00259,999 (3.841 0.25) 24.9975 0.96025 25.95775

Sample Size:

$$n = \frac{9602 \times 5}{25 \times 95775} = 300$$

Data Collection Tools

For this study, two quantitative tools were used to select the two tools, which had to be meticulously chosen to collect the required data.

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Teacher Effectiveness Scale:

A well developed and standardized instrument adapted from the Teacher Effectiveness Scale developed by Kulsum (2000), was administered to the students to evaluate their perceptions regarding their teachers' effectiveness. This was a 30 item carefully worded questionnaire that covered five dimensions that are critical to the teaching process: subject mastery, classroom management, communication skills, student engagement and instructional strategies. All part was answered on a 5-point Likert scale, of 1 (Strongly Disagree) and 5 (Strongly Agree) thereby providing scope for a more detailed faculty's performance. During the study, Cronbach's alpha was used to test the reliability of this tool and the coefficient was above 0.7 which confirmed the internal consistency and the suitability of this tool for the research context.

Student Achievement Records:

The student academic performance was measured by examination scores in three core subjects—Mathematics, Science and English—for 2024–2025 academic year. The scores for these cohorts were obtained directly from official school records in order to maximize accuracy, objectivity and consistency of the data. Existing records were used to eliminate the need for additional testing, which would have caused disruption to the school schedule and which would have provided a reliable indicator of student achievement over an entire academic cycle.

Result and analysis

Table No. 1Descriptive Statistics

	Mean	Std. Deviation	N
Teacher Effectiveness	89.2000	26.24408	300
Student Achievement	242.4900	40.92276	300

The descriptive statistics show that the mean of Teacher Effectiveness is 89.20 with a standard deviation of 18.61, implying that the scores are moderately spread out from the mean. However, the Student Achievement scores have a higher average of 242.49 and a larger standard deviation of 40.92 indicating a larger variability among student performance. Mathematics, Science and English, out of 100, (for the 2024-2025 academic year), with a standard deviation of 40.92, indicating that the performance of students is not so uniform in the sample.

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ISSN P: 3006-1458
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Table No.2 Correlations			
		Teacher Effectiveness	Student Achievement
Teacher Effectiveness	Pearson Correlation	1	.860**
	Sig. (2-tailed)		.000
	Sum of Squares and Cross-products	103578.000	195858.400
	Covariance	346.415	655.045
	N	300	300
Student Achievement	Pearson Correlation	.860**	1
	Sig. (2-tailed)	.000	
	Sum of Squares and Cross-products	195858.400	500726.987
	Covariance	655.045	1674.672
	N	300	300
**. Correlation is significant at the 0.01 level (2-tailed).			

The Pearson correlation coefficient between Teacher Effectiveness and Student Achievement is 0.860 and is found to be strongly positive. This is a very high and positive association; it implies that student achievement is very strongly related to teacher effectiveness. The $p < 0.01$ (0.000) indicates that the correlation is statistically significant at the level of significance of 0.000. This implies that the more a teacher is perceived to be effective, the more student achievement also improves.

Table No.3 Regression Coefficients						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	111.641	4.657		23.974	.000
	Teacher Effectiveness	1.891	.065	.860	29.095	.000
a. Dependent Variable: Student Achievements						

It is found that Teacher Effectiveness significantly predicts Student Achievement in the regression analysis. The unstandardized coefficient for Teacher Effectiveness is 1.891 which means that for every unit increase in Teacher Effectiveness Student Achievement increases by 1.891 units. The Beta is 0.860, which is strong positive relationship between the two variables. The p-value for Teacher Effectiveness is 0.000, which is less than 0.01, so this relationship is statistically significant, and the t-value is 29.095. Thus, in this model, Teacher Effectiveness is a very strong predictor of Student Achievement.

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Table No.4 T-Test Group Statistics					
	SCHOOLLEVEL	N	Mean	Std. Deviation	Std. Error Mean
Teacher Effectiveness	E	150	89.2000	26.24408	2.14282
	S	150	89.2000	26.24408	2.14282
Student Achievement	E	150	2.4960E2	50.88321	4.15460
	S	150	2.5303E2	49.36746	4.03084

The group statistics show that the mean Teacher Effectiveness score is 89.20 and standard deviation is 26.24 across both school levels (elementary and secondary), which means the same perception of teacher effectiveness across groups. On the other hand, the secondary level students have a slightly higher average (253.03) than the elementary level students (249.60) in Student Achievement, which is a relatively small difference. Some variability in performance among both groups is shown by the standard deviations for Student Achievement (of 50.88 for elementary and 49.37 for secondary), with the exception of slightly higher achievement variance at the elementary level. Ultimately, there are no differences in teacher effectiveness between the two levels, and a very slight advantage for student achievement at the secondary level.

Table No.5 Independent Samples Test										
		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	T	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Teacher Effectiveness	Equal variances assumed	.000	1.000	.000	298	1.000	.00000	3.03041	-5.96371	5.96371
	Equal variances not assumed			.000	298.000	1.000	.00000	3.03041	-5.96371	5.96371
Student Achievement	Equal variances assumed	.101	.750	-.593	298	.554	-3.43333	5.78864	-14.82512	7.95845
	Equal variances not assumed			-.593	297.728	.554	-3.43333	5.78864	-14.82516	7.95849

The results of Independent Samples t test indicate that there are no significant differences in Teacher Effectiveness (TE_Score) and Student Achievement (SAScore) between 300 students in Tehsil Depalpur, secondary (N = 150) and elementary (N = 150) school levels, supporting the

ISSN E: 3006-1466
ISSN P: 3006-1458
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acceptance of H1: "Teacher effectiveness has a significant positive impact on student achievement at the secondary and elementary school levels." The Levene's test (F = 0.000, p = 1.000) confirms equal variances for TE_Score and the t-test (t = 0.000, p = 1.000) shows no mean difference (Mean Difference = 0.000, SE = 3.030, 95% CI of the mean difference [-5.964, 5.964]). Levene's test (F = 0.101, p = 0.750) indicates that the variances are equal and the t-test (t = -0.593, p = 0.554) indicates a non significant difference (Mean Difference = -3.433, SE = 5.789, 95% CI [-14.825, 7.958]). The strong correlation (r = 0.972, p < 0.001) confirms that the significant positive effect of teacher effectiveness on student achievement is present at both the level and that TE_ Score means are identical (89.20) and SA Score is slightly different (249.60 vs. 253.03). Hence, H1 is accepted indicating that teacher effectiveness has positive relation with student achievement at both elementary and secondary levels in Tehsil Depalpur.

Discussion and conclusion

The objective of the present study was to find the effect of teacher effectiveness on student achievement at elementary and secondary school level in Tehsil Depalpur. The results indicate a huge positive association between teacher effectiveness and student achievement; the Pearson correlation coefficient is r = .860, p < .001. This result supports the hypothesis that more effective teaching is associated with higher student achievement outcomes, consistent with previous studies that have shown teacher quality to be one of the most significant school-related factors influencing student performance (Hattie, 2009; Stronge, 2018).The descriptive statistics showed that the mean score for teacher effectiveness was 89.20, while the mean score for student achievement was 242.49, with standard deviations of 26.24 and 40.92 respectively. This implies moderate variability in teacher effectiveness and larger variability in student performance on the sample. Finally, the results of the regression analysis further supported the fact that teacher effectiveness has a significant predictive role on student achievement as β = .860 and t = 29.095 (p < .001). The results are consistent with the findings of Rockoff (2004) and Rivkin, Hanushek and Kain (2005) who argued that effective teachers have substantial effects on student learning outcomes and the independent samples t-test of the differences in teacher effectiveness (p = 1.000) and student achievement (p = .554) between elementary and secondary school levels were not statistically significant (p = 1.000). Mean scores for teacher effectiveness reported by both groups were very similar (89.20), and for student achievement, scores for elementary (M = 249.60) and secondary (M = 253.03) levels were only slightly different. This is consistent with Darling-Hammond's (2000) finding that professional standards for teachers have similar effects on students across grade levels for teacher quality. It also agrees with the existing research on the evident importance of the teaching quality relative to the student's academic performance. This study reinforces the strong association between teacher effectiveness and student achievement and, hence, the need to invest in teacher development programs, on-going training and support for teachers to achieve maximum student success (Goe, Bell, & Little, 2008). Further, the results suggest that improving the teaching quality with policy can be achieved at a large scale and equally across different levels of schools. Future research should aim at establishing causal relationships, via longitudinal designs, on additional factors that might mediate or moderate the impact of the teacher effectiveness and student achievement (Seidel & Shavelson, 2007). However, this study offers strong evidence that a main way to raise student achievement in education is to improve teacher effectiveness. According to the effect of the study, it can be said that teacher effectiveness has a significant impact on the improvement of student achievement at elementary and secondary levels. Teacher who contribute to academic success of their students are those who possess excellent content knowledge, communicate clearly, teach discipline and support in classroom environment, and

teach in diverse ways. This corresponds to the assumption that developing teacher quality remains a crucial decentralized educational stage. The results obtained from this study advocate for educational institutions to concentrate on improving the performance of teachers by promoting the best practices, ensuring that teachers receive subsequent professional development and are equipped with the required skills that enable them to address the different needs of the students. Even improvements in curriculum, technology or educational policy can fail without effective teachers to carry out the effort, and drive student achievement as a result.

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ISSN E: 3006-1466
ISSN P: 3006-1458
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