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Using Students' Ratings to Compare Teacher Effectiveness in English and Mathematics



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Abstract: *The study aimed to compare teacher effectiveness in English and Mathematics by using students' ratings on quality factors such as learning environment, instructional planning and strategies, subject matter knowledge, assessment, and effective communication. Through using a multistage sampling technique, the data was obtained from the students of 10th grade (N=2009), who evaluated their teachers' performance on STEQ developed by Akram (2018). The five factors of STEQ exhibited a high level of reliability ($\alpha=.88$) with factor-wise reliability ranging from 0.74 to 0.86. T-test for independent samples was used to compare boys' and girls', and urban and rural students' perceptions of teacher effectiveness in English and Mathematics. Female teachers were perceived as more effective than male teachers by their students in Mathematics and English, while urban teachers were perceived as more effective as compared to rural teachers by their students in Mathematics and English. Student achievement in English and Mathematics also statistically significantly differed based on the gender of students and school location. The study also gave recommendations.*

Key Words: Teacher Effectiveness, Assessment, Knowledge about Subject Matter, Learning Environment, Instructional Planning and Strategies, Effective Communication, Student Achievement

Introduction

Teacher evaluation is an organized and formal process to identify effective teachers. Effective teachers exhibit essential skills or qualities and make efforts to enhance student outcomes (Akram & Zepeda, 2015). Various kinds of research found that quality teachers demonstrate knowledge about the subject matter, employ different teaching strategies, exhibit knowledge of assessment, develop a supportive learning environment, and ensure effective

communication with all stakeholders (Akiri, 2013; Akram, 2019; Markley, 2004; Stronge, 2010; Stronge & Tucker, 2000). Effective teachers are essential to enhance student performance than less effective teachers. Effective teachers are therefore required to ensure quality teaching and quality education to their learners (Aziz, 2010; Delvaux et al., 2013; Mathus, 2017; Sanders & Rivers, 1996; Siddiqui, 2010). Further, teacher effectiveness can be measured through their students which are the key stakeholders and their ratings have a significant influence on

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achievement (Follman, 1996; Peterson, 2000). To make the teacher evaluation, their students hold a better position among other stakeholders to evaluate them based on quality performance indicators (Akram, 2018; Akram, 2019; Stronge, 2010).

Previous, multiple works have been made in the world to recognize the quality of teachers (Al-ghanabosi & Idris, 2010; Bichi, 2017; Delvaux et al., 2013; Mathus, 2017). In Pakistan, there are also some studies that were performed to determine teacher effectiveness (Aziz, 2010; Siddiqui, 2010), and some other studies were also conducted by taking National Professional Standards for Teachers (Akram, 2018; Akram, 2019; Akram & Zepeda, 2015) concluded that effective teacher having required skills or qualities is direly required to enhance the student outcomes. These studies hold the idea that most effective teachers produce required and sustainable results rather than less effective teachers. This study determined that there might be no single study to compare school location-based and gender-based teachers' effectiveness and their student achievement. School location-based and gender-based comparison of teacher effectiveness and student outcome was required due to many reasons. *First*, it is essential to identify the less effective teachers among male or females and rural and urban based on national professional standards for teachers to provide training for their professional development that influence student achievement. *Second*, policymakers and district authorities have no idea how to determine the difference in teachers' effectiveness to make a need-based decision to improve the overall quality of education in their institutions. This study indicates the existing gap of previous studies based on the literature review and the need to fulfil it.

Effectiveness can be defined as the capability of generating desired results or the ability to get the required output. When we talk about the effectiveness of something, it actually means the predictable or proposed outcomes, or producing a deep or vivid impression about something (Clifford et al., 2012). Accurate and meaningful feedback based on quality indicators enhances the effectiveness of teachers, and quality teachers produce more effective and sustainable results (Stronge, 2006). Through using students' ratings, there were multiple studies conducted to evaluate

the teachers' effectiveness and revealed that their ratings over the year could remain consistent and predict student outcomes (Akram, 2018; Akram, 2019; Aziz, 2010). Based on that, the study framed that the effectiveness of teachers can be examined by using quality factors of effective teachers such as learning environment, instructional planning and strategies, subject matter knowledge, effective communication, and assessment through the perceptions of their students that influence student outcomes. The study supposed that the students might evaluate teachers on the quality indicators of teachers.

Teacher Performance and National Professional Standards in Pakistan

Teacher performance is being measured by employing Performance Evaluation Report (PER) and teachers are promoted as well based on this report in the public schools of Pakistan. The major portion of the PER involves personality characteristics which are not essential to measure teacher performance. The professional standards for effective teachers mention the essential qualities of a teacher and assist them in recognizing their professional needs. The Ministry of Education (2009) provided ten essential standards of quality teachers for evaluating the performance of teachers. These given standards are extremely compatible with the standards of teaching used internationally (Akram & Zepeda, 2015). The researcher used the five most essential standards to measure teacher performance such as learning environment, instructional planning and strategies, subject matter knowledge, effective communication, and assessment in the present study.

Knowledge about the Subject Matter

Knowledge about the subject matter is the most essential quality of an effective teacher that improves student outcomes (Danielson, 1996). It refers to teachers' comprehension of subject information, principles, concepts, pedagogical thinking and decision-making. An effective teacher exhibits precise knowledge about a subject, links preceding learning experiences with the existing knowledge, and implements the skills related to the subject matter (Darling-Hammond, 2000; Stronge, 2010). A teacher is considered to be a quality teacher if he has a better

understanding of the content of the subject and mastery to transmit the knowledge towards meeting objectives (Liakopoulou, [2011](#); McBer, [2000](#)). These studies revealed that strong knowledge of subject matter is correlated with student outcomes particularly in mathematics subjects (Aaronson et al., [2007](#); Akram, [2018](#); Hill et al., [2005](#)).

Instructional Planning and Strategies

A quality teacher demonstrates various methodologies of teaching and implements different strategies to involve learners in their quality of education (Stronge & Tucker, [2000](#)). To make classroom learning interesting and meaningful, an effective teacher uses different teaching strategies (Stronge, [2013](#)). Chang ([2010](#)) described that an effective teacher develops effective instructional planning and strategies to enhance student achievement.

Assessment

Assessment is a method of evaluation of student achievement in which teachers collect and analyze the data to evaluate students' outcomes (Stronge, [2010](#)). Assessment is an essential part of the teaching-learning process and effective teachers must possess knowledge about various types of assessment and use them effectively (Akiri, [2013](#)). Through assessment, the teacher provides feedback to learners for their improvement and improves the own quality of instruction (McBer, [2000](#)). Various studies found that assessment is highly interlinked with student achievement (Black & Wiliam, [1998](#); Sanders & Sullins, [2005](#)).

Learning Environment

An effective learning environment is an essential aspect to improve student performance. Teachers maximize interaction with the learner and build a good relationship by making a supportive learning environment in the classroom that influences student learning positively (Danielson, [1996](#); Good & Brophy, [1997](#); Marzano, [2011](#)). Effective teachers establish rules and regulations and maintain a healthy environment that enhances student achievement in mathematics (Kunter et al., [2007](#); Stronge, [2007](#)).

Effective Communication

Effective head teachers communicate effectively with learners, actively listen and respond in an effective manner, and develop different communications between school and home to inform the student's progress (Stronge & Tucker, [2003](#)). It involves healthy interaction between teachers, parents, and students through discussion and appropriate language that enhances the learning of the student (Fullan, [1993](#); Akram & Zepeda, [2015](#)).

Measuring Teacher Performance through Quality Standards

There are multiple studies that were reviewed by the researcher which confirmed the essentiality of effective teachers for better student achievement. Al-ghanabosi and Idris (2010) examined the practices of leaders to evaluate their teachers' performance. The collection of data was made through observation, interviews, and document analysis through the purposeful sampling method in this qualitative study. Heads of institutions used quality practices such as supervising teacher performance through observation, goal setting and improving teachers' competency through training and feedback to evaluate their teachers. The study suggested that the quality of teacher and student achievement can be enhanced by employing quality practices of teacher evaluation. In another study, Aziz ([2010](#)) investigated how much student achievement can be predicted by the competence of teachers by collecting data from the head of institutions, students, and teachers by employing questionnaires. The study further explored that score of teacher evaluation on factors of classroom management, evaluation techniques, and planning was positively correlated with student outcomes. Quality practices of effective teachers were recommended to evaluate the teachers' effectiveness and use to enhance their competency as well.

Siddiqui ([2010](#)) measured the competence of teachers by employing mix method approach involving a random sampling technique to collect data from the head of institutions and teachers in Pakistan. A positive relationship was revealed between both school effectiveness and teachers' competence which confirmed that effective teacher is most required for student improvement. The study recommended that heads of institutions

should make arrangements to enhance their teachers' effectiveness which might improve student results. In another study, Delvaux et al. (2013) evaluated a quality-based evaluation system of teachers through teachers' perceptions that affect the teachers' effectiveness and their development. The study found that an effective model to recognize the quality of teachers based on quality factors is essential to enhance student results and is also recommended for enhancing the quality of education.

The teacher self-assessment tool was developed by Akram and Zepeda (2015) by using five indicators such as learning environment, instructional planning and strategies, subject matter knowledge, assessment, and effective communication. The study explored the moderate association between both self-teacher evaluation scores and student outcomes which confirmed the reliability and validity of the tool to evaluate teacher effectiveness and further recommended that the tool might be employed to evaluate teachers and improve the professional development of teachers which is most required to compete with the world.

Mette et al. (2015) conducted a study on teacher evaluation through their ratings involving two factors i.e. engagement of students in instruction and improving teacher competence in teaching through using the tool. The study confirmed that the evaluation of teachers through quality indicators can enhance student achievement. Both head teachers and teachers were suggested to work together to maximize student participation and teachers' competence. Similarly, in another study, the teacher evaluation system was evaluated involving limitations and benefits by Ladd (2016) through teachers' ratings. By using the questionnaire, the data was collected by employing a mix-method approach. The study determined that each evaluation system must have the two purposes such as accountability and improvement of the teachers. The results confirmed that to understand the teaching practices, pieces of training should be arranged and valid tools based on quality factors should be used to evaluate teachers that might assist teachers to improve their competencies in teaching.

Evaluation of teacher performance was made by Bichi (2017) by exploring the process of an effective evaluation system such as criteria for

teacher evaluation, the purpose of teacher evaluation, and multiple methods of teachers involving ratings of students, supervisors, peers, and self. The study provided a valuable integrated model of teacher evaluation that might assist to obtain valid information on teachers' effectiveness and enhance the quality of education and professional development of teachers. In another study, the association between student outcomes and teacher evaluation scores was also examined by Mathus (2017) by using mix method approach to obtain data from the teachers. The study explored that the achievement of students could be predicted through the evaluation of teachers and recommended improving student outcomes by employing the quality indicators of teacher evaluation. Similarly, the relationship between the quality of teachers and student outcomes was examined by Darling-Hammond (2015) by using a survey method. The study confirmed the effectiveness of teachers' predicted student outcomes by using both quantitative and qualitative analysis and suggested to use of quality factors of teacher effectiveness while making their evaluation that may enhance the student performance.

An instrument to evaluate the effectiveness of teachers was developed by Akram (2018) by involving quality factors of an effective teacher in Pakistan. By using a questionnaire, the data were gathered from the student of the 9th class involving the stratified technique of sampling. The reliability and validity confirmed that the tool might be employed to evaluate the quality of teachers and recommended to use of that tool in schools by the policymaker to maximize the quality of education, teachers' effectiveness, and achievement of students. Further, in another study, the association between both effectiveness of teachers and the achievement of students was examined by Akram (2019) by employing a multistage technique of sampling for the collection of data with the help of a questionnaire. The study explored the significant association between both variables, and further student outcomes were also predicted in English and Mathematics subjects through the effectiveness of teachers which confirmed the significance of effective teachers for the student outcomes.

Multiple studies on teacher evaluation or teacher effectiveness based on professional standards were reviewed by the researchers to

find out the effect on student outcomes which provided evidence that teacher evaluation based on quality factors improves the effectiveness of teachers and students' performance. However, the researchers found a gap in the literature to compare teacher effectiveness based on teacher quality standards by using students' ratings. The researcher might not found the study that was conducted to compare teachers' effectiveness and student achievement based on gender and school location in Pakistan and direly needed to fulfil the gap in the literature.

Research Questions

The following research questions are being involved in the given study:

1. Do male and female students perceive their teachers' effectiveness in Mathematics and English differently?
2. Do rural and urban students perceive the effectiveness of their teachers in English and Mathematics differently?
3. Does the student achievement score of boys' and girls' high schools significantly differ in English and Mathematics?
4. Does student achievement in rural and urban high schools significantly differ in English and Mathematics?

Research Methodology

A survey method was employed in this causal-comparative study. All male and female SSTs of public schools from district Sahiwal were the population of the study and all 2009 students of

10th grade from 40 public high schools (20 girls and 20 boys) were selected by employing the multistage technique of sampling.

Instrumentation

A STEQ was employed as an instrument for data collection, developed and validated by Akram (2018). The STEQ consist of 26 items with 5 factors which were scaled as 1) Not Effective, 2) Less Effective, 3) Much Effective, 4) More Effective, and 5) Most Effective. The content validity of the

instrument was confirmed through the opinions of practitioners and experts (Akram, 2018). The reliability of the tool was found higher ($\alpha=.88$).

Data Collection

The data were collected by using STEQ. The researcher visited personally 40 high schools of district Sahiwal. After getting consent from head teachers, the questionnaires were distributed among students. Overall, the researchers obtained 2009 questionnaires for Mathematics and English from students of 40 high schools. Scores on student achievement were obtained in these subjects on the Board of BISE exams 2020 from the concerned schools. All ethical issues such as the safety of data and confidentiality were also ensured properly.

Data Analysis

To make the data analysis, the data were entered into SPSS version 20 in this quantitative study. The detail of the data analysis is provided in the following.

Table 1

Gender-Based Comparison about Teacher Effectiveness Indicators (English).

Indicators	Gender	N	Mean	S.D.	df	t	P
Subject Matter Knowledge	Male	1196	19.86	3.408	2007	2.587	.000
	Female	813	21.95	3.704			
Instructional Planning and Strategies	Male	1196	19.12	3.209	2007	3.035	.002
	Female	813	20.17	3.322			
Assessment	Male	1196	16.81	3.442	2007	-	.000
	Female	813	18.08	3.580			
Learning Environment	Male	1196	23.46	4.257	2007	-	.005
	Female	813	24.93	4.741			
Effective Communication	Male	1196	15.14	3.389	2007	2.171	.001
	Female	813	16.41	3.577			

Table 1 shows the significant difference between their perceptions of English subjects on quality factors: subject matter knowledge, $t(2007)=2.587$, $p=.000$, instructional planning and strategies $t(2007)=3.035$, $p=.002$, assessment $t(2007)=1.044$, $p=.000$, learning

environment $t(2007)=-2.291$, $p=.005$, and effective communication $t(2007)=2.171$, $p=.001$. Overall, female teachers were perceived as significantly more effective than male teachers in English subjects by their students.

Table 2

Gender-Based Comparison about Teacher Effectiveness Indicators (Mathematics).

Indicators	Gender	N	Mean	S.D.	df	T	p
Subject Matter Knowledge	Male	1196	19.70	3.558	2007	2.315	.004
	Female	813	21.65	3.619			
Instructional Planning and Strategies	Male	1196	18.29	3.265	2007	2.579	.010
	Female	813	20.91	3.214			
Assessment	Male	1195	17.64	3.565	2007	1.952	.051
	Female	813	18.30	3.479			
Learning Environment	Male	1196	24.33	4.867	2007	2.151	.041
	Female	813	25.36	4.730			
Effective Communication	Male	1196	15.98	3.567	2007	3.530	.002
	Female	813	17.09	3.653			

Table 2 showed that in Mathematics, there was a significant difference between students' perceptions of males and females on teachers' effectiveness indicators: subject matter knowledge, $t(2007)=2.135$, $p=.004$, instructional planning and strategies, $t(2007)=2.579$, $p=.010$, assessment,

$t(2007)=1.952$, $p=.05$, learning environment $t(2007)=2.151$, $p=.04$, and effective communication $t(2007)=3.530$, $p=.002$. Overall, female teachers were perceived as significantly more effective than male teachers in Mathematics subject by their students.

Table 3

Location-Based Comparison of Teacher Effectiveness Indicators (English).

Indicators	Location	N	Mean	S.D.	df	t	P
Subject Matter Knowledge	Urban	996	21.73	3.695	2007	-2.129	.033
	Rural	1013	19.07	3.524			
Instructional Planning & Strategies	Urban	996	21.32	3.376	2007	-1.635	.002
	Rural	1013	19.56	3.183			
Assessment	Urban	996	18.69	3.649	2007	-2.332	.002
	Rural	1013	17.87	3.226			
Learning Environment	Urban	996	25.39	4.657	2007	-2.528	.012
	Rural	1013	24.91	4.113			
Effective Communication	Urban	996	17.87	3.506	2007	3.189	.001
	Rural	1012	15.38	3.441			

Table 3 showed that in English subject, there was a significant difference between urban and rural students' perceptions of teachers' effectiveness indicators: subject matter knowledge, $t(2007)=-2.129$, $p=.033$, instructional planning and strategies, $t(2007)=-1.635$, $p=.002$, assessment,

$t(2007)=-2.332$, $p=.002$, learning environment, $t(2007)=-2.528$, $p=.012$ and effective communication, $t(2007)=3.189$, $p=.001$. Overall, urban teachers were perceived as significantly more effective than rural teachers in English subjects by their students.

Table 4*Location-Based Comparison of Teacher Effectiveness Indicators (Mathematics).*

Indicators	Location	N	Mean	S.D.	df	t	P
Subject Knowledge	Urban	996	20.79	3.718	2007	1.355	.175
	Rural	1013	20.57	3.689			
Instructional Planning and Strategies	Urban	996	20.33	3.422	2007	2.050	.002
	Rural	1013	18.14	3.215			
Assessment	Urban	996	18.67	3.756	2007	2.269	.023
	Rural	1012	16.31	3.102			
Learning Environment	Urban	996	25.51	5.112	2007	1.600	.007
	Rural	1013	23.17	4.762			
Effective Communication	Urban	996	17.86	3.711	2007	3.238	.000
	Rural	1013	15.02	3.459			

Table 4 showed that in Mathematics subject, there was a significant difference between urban and rural students' perceptions of teachers' effectiveness indicators: instructional planning and strategies, $t(2007)=2.050$, $p=.002$, assessment, $t(2007)=2.269$, $p=.02$, learning

environment, $t(2007)=1.600$, $p=.007$, and effective communication, $t(2007)=3.328$, $p=.000$. In overall, urban teachers were perceived significantly more effective than rural teachers in Mathematics subject by their students.

Table 5*Gender-Based Comparison of Student Achievement in English Subject.*

	Gender	N	Mean	St. Deviation	Df	T	P
English	Male	1196	29.12	12.098	2007	-1.348	.002
	Female	813	32.91	15.563			

Student achievement of female and male high schools was compared in English subjects. Table 5 showed that female students showed a higher mean score ($M=32.91$, $S.D. =15.563$) than male students ($M=29.12$, $S.D. =12.098$), $t(2007) = -$

1.348 , $p=.002$. It is, therefore, concluded that student achievement in female schools was found better than in male schools regarding English subjects.

Table 6*Gender-Based Comparison of Student Achievement in Mathematics Subject.*

	Gender	N	Mean	St. Deviation	Df	T	P
Mathematics	Male	1196	28.45	13.642	2007	-3.118	.000
	Female	813	32.53	16.276			

Student achievement of female and male high schools was compared in Mathematics subjects. Table 6 showed that female students showed higher mean scores ($M=32.53$, $S.D. =16.276$) than male students ($M=28.45$, $S.D. =13.642$),

$t(2007)=-3.118$, $p=.000$. It is therefore, concluded that student achievement in female schools was found better than male schools in Mathematics subject.

Table 7*Location-Based Comparison of Student Achievement in English Subject.*

	Location	N	Mean	St. Deviation	Df	T	P
English	Urban	1196	30.16	14.825	2007	-.986	.003
	Rural	813	27.72	12.950			

Student achievement in urban and rural high schools was compared in English subjects. Table 7 showed that students of urban high schools showed higher mean scores ($M=30.16$, $S.D.=14.825$) than students of rural high schools

($M=27.72$, $S.D.=12.950$), $t(2007)=-.986$, $p=.003$. It is, therefore, concluded that student achievement in urban schools was found better than in rural schools in English subjects.

Table 8

Location-Based Comparison of Student Achievement in Mathematics Subject.

	Location	N	Mean	St. Deviation	Df	T	P
Mathematics	Urban	1196	33.42	14.906	2007	5.984	.000
	Rural	813	29.58	13.813			

Student achievement in urban and rural high schools was compared in Mathematics subject. Table 8 showed that students of urban schools showed higher mean scores ($M=33.42$, $S.D.=14.906$) than students of rural high schools ($M=29.58$, $S.D.=13.813$), $t(2007)=5.984$, $p=.000$. It is therefore, concluded that student achievement in urban schools was found better than rural schools in Mathematics subject.

Discussion

The study was designed to examine the effectiveness of teachers through students' ratings and compare the gender-based and school-location-based teachers' effectiveness and their student achievement. The study revealed that overall female teachers were perceived as more effective rather than male teachers by their students in Mathematics and English subjects and their student achievement was also found to differ accordingly in these subjects. The study also found that urban teachers were perceived as more effective rather than rural teachers by their students in Mathematics and English subjects and their student achievement was also found to differ accordingly in these subjects as well. The results of the given study were in line with multiple previous studies (Akram, 2018; Mathus, 2017; Siddiqui, 2010) which provided evidence that more effective teachers produce more effective and sustainable results and improve student achievement as well rather than less effective teachers. Aziz (2010) found that if teachers are effective on quality indicators (instructional planning, evaluating techniques, and classroom management), they are to improve student achievement effectively. Siddiqui (2010) also evaluated teacher effectiveness on some quality

indicators and found a strong relationship between teacher effectiveness and student performance. Delvaux (2013) found that an effective evaluation system based on quality indicators is essential for the student achievement and effectiveness of teachers.

Bichi (2017) examined teachers' performance through a valid evaluation system based on the qualities of effective teachers involving students' ratings, supervisors' ratings, and self-evaluation and found valid information on teacher effectiveness that improves the quality of education and student learning as well. Mathus (2017) revealed that an effective evaluation system is essential for teacher performance and student outcomes. Darling-Hammond (2015) also found similar findings that the quality of teachers strongly correlates with student achievement. Most importantly, Akram (2018, 2019) conducted studies by taking national professional standards for teachers through developing valid and reliable tools based on quality indicators of an effective teacher and found that an effective teacher is most required for quality instruction, quality education, and student achievement which is consistent with the present study. In this study, female teachers were perceived as more effective having better student achievement than male teachers. Similarly, urban teachers were perceived as more effective having better student achievement than rural teachers. The present study supported the idea that if teachers are implementing quality indicators in the classroom effectively, can produce the most required or sustainable results and improve student results on a continuous basis.

Conclusion

School Teacher Effectiveness Questionnaire (STEQ) based result showed that female teachers were more effective with better student achievement than male teachers, while urban teachers were found more effective with better student achievement as compared to rural teachers. The study confirmed that evaluating the effectiveness of teachers based on the quality factors correlated with the achievement of students positively. The study findings provided evidence that quality indicators of an effective teacher are required to evaluate their effectiveness to enhance student performance and overall school effectiveness.

Recommendations

The provincial and federal government might ask policymakers to implement these quality standards to evaluate the teachers' effectiveness rather than PER which is a problematic measure

to evaluate the effectiveness of teachers in Pakistan because it consists of the personal characteristics only that are not relevant to their effectiveness. The STEQ provides a new lens to examine the effectiveness of teachers because STEQ is based on research-based quality indicators of an effective teacher. STEQ might be used to evaluate the teachers as an alternative to PER in another way to make a valid decision. Further, male teachers and rural area teachers are behind in their effectiveness and their student outcomes, therefore, district authorities should conduct the training of both male and rural teachers in these national professional standards for teachers to make them more effective than defiantly influencing the student outcomes positively. The study at hand used a smaller sample size, a larger sample size might be involved to conduct studies in future to get a vivid picture of teachers' effectiveness.

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