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RESEARCH PAPER

Effect of Primary School Teachers' Classroom Assessment Literacy on Students' Academic Performance

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ABSTRACT

A causal-comparative research design was employed to determine the effect of teachers' assessment knowledge on students' academic achievement in Science, Mathematics, and English. A sample of 3347 students was selected using the multi-stage random sampling technique. The selection of primary school teachers was made using the purposive sampling technique. A total of 127 teachers participated in the study and provided information on the Teachers' Assessment Literacy test. The instrument was validated by experts in the field of education. The reliability of the adapted instrument was .76, based on 51 questions. Three standardized achievement tests were used to collect data from students. The data was analyzed using inferential statistics and arithmetic mean. The findings revealed that teachers' assessment literacy significantly affects student academic performance.

KEYWORDS Academic Performance, Classroom Assessment Literacy (CAL), School Teachers

Introduction

Assessment is a critical component in determining students' progress at the primary level. It is an essential tool that will produce a progress report and a recapitulation of the topics and knowledge given to the students (Weeden et al., 2002). A class teacher can know the level of understanding of the students eloquently through an assessment (Hamm & Adams, 2013). Assessment phenomena aid in motivating students by assessing their grasp of the subject as well as their level of cognition. Adequate knowledge of assessment techniques benefits both students and teachers because the course of assessment reveals the teacher's strengths and weaknesses (Mctighe & Connor, 2005).

Classroom assessment literacy is defined by Chappuis et al. (2012) as the knowledge required for gathering evidence about students' academic performance. An effective and well-planned assessment process is necessary to bring positive change in student learning. The following are essential components of high-quality classroom assessments: 1) "developing the assessment to meet the specific needs of data users; 2) basing the assessment on concrete and appropriate achievement goals; 3) accurately determining students' achievement; 4) producing assessment outcomes that effectively communicate to users; and 5) involving student participation in self-assessment, goal setting, monitoring, reflection, and sharing of learning among students" (Yamtim & Wongwanich, 2013, p. 2999).

The literature highlights three major objectives of educational assessment: assessment for learning, assessment of learning, and assessment as learning. The term "assessment for learning" refers to the formative assessment carried out by teachers who continuously monitor the success levels of students based on learning objectives" (Stiggins, 2008). They scaffold pupils' learning by giving descriptive feedback regarding their areas of strength and support to help them overcome their areas of weakness. The assessment of learning is more focused on students' level of proficiency and knowledge of a specific content. Both have their own pros and cons. The formative assessments show to what extent the instruction was successful in meeting the curriculum goals. Seven standards were formulated to assess teachers' competency in the area of educational assessment. This significant work was initiated by the American Federation of Teachers, the National Council on Measurement in Education, and the National Education Association in 1990. They endorse that knowledge of professional standards and effective instruction is impossible without accurate assessment techniques, and judgmental testing should be avoided. These standards cover teachers' roles and responsibilities for student assessment: 1) the first is associated with the selection of an appropriate assessment method for instructional decisions.

Second is the ability to identify assessment techniques. The techniques should be appropriate, useful, well designed and easy to administer. Technical soundness and fairness of assessment tasks are another critical aspect of consideration. These are required for the further use of data to support instructional decision-making. Students certainly have different levels of knowledge and skills but teachers can bring out hidden talents using innovative assessment approaches. Selection of suitable assessment technique is a basic part of lesson plan for two- way feedback. This two-way feedback serves teachers instructional purposes and develops a learning environment.

Hamm and Adams (2013) mentioned that "it is up to the teacher to create an active classroom environment that optimizes learning for students with quite different abilities and interests" (p. 9). Another important standard is the knowledge of data analysis to score and interpret assessment results. Volante and Fazio (2007) assessed the assessment knowledge of newly recruited teachers. The novice teachers had little experience of teaching in concurrent programmes. According to the findings, teachers require a mentor to help them improve their self-efficacy and literacy for student assessment. Hussain (2017) also investigated teachers' assessment literacy in teacher education programmes in Pakhtunkhwa and Punjab, Pakistan. Proportionate random sampling techniques were used to select 411 teacher educators. According to the findings, teachers should revise their assessment frameworks, assessment tools, and grading practices.

Yamtim and Wongwanich (2013) assessed the level of assessment literacy of 19 school teachers in Thailand. The questionnaires were completed by 19 teachers, and eight teachers participated in focus group discussions. The assessment literacy test consisted of seven standards divided into three levels: poor assessment literacy (less than 60%), fair assessment literacy (between 60% and 79%), and good assessment literacy (80% or higher). The findings indicated a low level of assessment literacy, regarded as essential knowledge for teachers. By contrasting the ideologies and concepts surrounding assessment, Siegel and Wissehr (2011) looked at pre-service teachers' understanding and literacy approach. Nearly 11 students who were enrolled in a regular pre-service programme at a U.S. university and taking a science methods course provided the information. The findings demonstrated that pre-service teachers are aware of various assessment methods that should be used to assess student learning.

Similarly, DeLuca and Klinger (2010) assessed understanding of assessment concepts of 200 and 88 trainee teachers in Canada. The results showed that there were discrepancies in the teachers' levels of confidence in their summative assessment methods. Some teachers were discovered to have low confidence and understanding, while others had higher confidence and understanding. Keaikitse (2012) examined the cases of 691 teachers from Botswana-based primary and secondary schools. The findings showed that there exist significant differences between how teachers perceive their assessment practices and skills.

Perry (2013) looked into the assessment literacy of 32 school principals and heads. The classroom assessment literacy inventory was used to collect data from a sample of 14 high school teachers at the University of Montana. According to the findings, school administrators (59%) had less knowledge of assessment than teachers (63%) did. The fact that the scores teachers received on the assessment literacy inventory had not changed over the previous two decades was a crucial finding. A baseline investigation was proposed by the researcher to look into this phenomenon. Similar to this, Prizovskaya (2018) evaluated the assessment knowledge of New Jersey teachers. Using a survey assessment literacy inventory by Mertler and Campbell, online data were collected via email from 798 teachers. The scores on the primary standard"skill of selecting appropriate assessment method" received the highest score, 61%.

Based on the relationship between teachers' proficiency in assessment practices and students' academic achievement, the researcher suggested further research. Fulcher (2012) emphasized that language teachers expressed concerns about the content created for the growth of teachers' assessment literacy. A large historical, economic, regional, social, and legal context should be used in the design and presentation of the assessment material for knowledge and skills, and an electronic resource may be linked to it. Similar to this, Tayyebi et al. (2020) evaluated Iranian language teachers' writing assessment knowledge in 2022. The study's findings showed that although language teachers are aware of the value of various formative assessment techniques, they lack the knowledge to put those techniques into practise in the classroom.

Stiggins (1999) carried out a study to determine the efficacy of programmes in producing assessment-literate teachers who ought to be capable of handling the difficulties of new classrooms. The researcher came to the conclusion by suggesting that self-evaluation questions could aid students in determining whether their academic work, teaching experiences, and professional practises have adequately prepared them to meet assessment competency standards. In a different study, Stiggins (1999) offered a different perspective on the applications of assessment. The researcher skillfully explained that students who experience repeated failures, confidence loss, and a sense of futility in state-wide testing should pay close attention. The researcher made the astounding claim that even a minor triumph in a real classroom assessment can spark a spark of confidence and, in turn, inspire students who have given up trying. The researcher found a need for teacher educators' professional growth and acquisition of assessment skills in order to take into account readily available financial options for the benefit of alternative learners. The researcher advised teachers to take on joint responsibility for the growth and improvement of their knowledge, skills, and judgement in order to properly use assessment in order to increase their own capacity to use assessment.

The idea behind formative assessment is to measure teachers' instruction, learners' accomplishments, and opportunities to enhance instruction and learning through effective classroom practises that are integrated into goal achievement. Teachers conduct SWOT analyses through assignments and practise in order to maximise results

by strengthening their pedagogical competencies (Black & Wiliam, 2006). Though MCQs are a short assessment method, a teacher can easily reckon the progress of the desired class students at primary level because MCQs are that short assessment method that can be easily designed and checked to determine the class progress and cognitive skills in short assessment pattern. Usually teachers always use a multiple choice method to increase and improve the understanding level of students for general science.

Despite the fact that most schools benefit more from having modern, updated educational technology. This could be set up to educate the instructors so they can implement classroom assessment for efficient instruction overall (Malki & Weir, 2014). A teacher can easily gauge the progress of the desired class of students at the primary level using the short question assessment technique because it is a medium-level assessment technique that can be easily designed and checked to ascertain the class understanding level and cognition level in me. Primary level students are assessed in order to enhance and improve their understanding of science. Students in the first grade are typically curious. Primary science instruction should encourage this interest, allow students to ask questions, and develop the skills necessary to respond to those questions (Kozulin et al., 2003). It is important to understand scientific problems, how science works, and why science matters globally. There is a growing need of the importance of development of young children's scientific and reasoning skills.

Science plays a particularly important role in strengthening the foundation for future logical reasoning. Therefore, science teachers should try innovative ways of assessment to maintain students' interest by ensuring assessment oriented culture in the classroom. It puts forth four key ideas: children's interest in the surrounding is a tremendous drive for their actions and play. With the right formative assessments, this curiosity and desire to understand the world can become the foundation. This foundation begins the skills of inquiry. The child investigates fundamental wonders and materials of the world encompassing him. This culture helps in the development of other important skills, such as teamwork, self- control, confidence and language.

The diversity and breadth of content and skill sets found in the academic subjects show how important it is for Science teachers to be proficient in classroom assessment (Birenbaum et al., 2015). Review suggests that teachers' expertise in the field of assessment can have a major impact on their students' academic performance. Therefore, a proper mentoring programme at the school level can improve the low level of assessment knowledge that Volutae and Fazio found in teachers in 2007. This knowledge is crucial for a positive learning environment. In a similar vein, Hussain (2017) discovered inadequate assessment knowledge and special attention among Pakistani primary level teachers.

Siegel and Wissehr (2011) examined the assessment literacy of pre-service teachers at a U.S. university and discovered that they were aware of various assessment practises that should be used to improve students' academic achievement. To gather empirical data, researchers tried to ascertain how TAL and TCAPs affected students' academic performance. The impact of formative assessment techniques in the classroom was investigated by Yin et al. (2008), but they found no appreciable differences in the academic performance of science students. When he correlated teachers' assessment literacy, classroom assessment practises, and students' academic achievement, Sajiad (2017) narrated almost similar research findings.

Similar to Galloway (2016), who used a causal-comparative research design to ascertain the impact on students' learning but found no differences in their performance in the science subject, there was no difference in their performance. A study was carried

out by Kültür & Kutlu (2021) to look into the impact of FAPs on students' academic performance in science. Nineth grade students made up one experimental group and two controls. Formative assessments narrow the achievement gap between low- and high-achieving students, according to a comparison of end-of-year mean scores. Numerous elements linked to teachers have been found to influence student learning.

The assessment literacy of teachers is currently receiving more attention. It is presumable that teachers' assessment knowledge and abilities can significantly influence both the effectiveness of classroom assessment procedures and students' academic performance. There hasn't been much systematic research done yet on how TAL affects students' learning. Some researchers looked into how TAL affected students' writing, geometry, and algebra skills. The results of the studies varied, however, with some demonstrating a positive impact of TAL on students' academic achievement and others demonstrating no impact on their learning. Future studies are urgently needed to link teachers' assessment literacy, classroom assessment procedures, and students' science learning. This study is important for PSTs because it will inform them of the possibility that students with superficial knowledge may be produced in the current competitive environment by teachers with poor assessment literacy and haphazard assessment practices.

Literature Review Must be in separate headings

Research Hypothesis

$H_0$1: There is no statistically significant effect of teachers' classroom assessment literacy on students' academic performance in Science.

$H_0$2: There is no statistically significant effect of teachers' classroom assessment literacy on students' academic performance in Mathematics.

$H_0$3: There is no statistically significant effect of teachers' classroom assessment literacy on students' academic performance in English.

Material and Method

Design of the study

A causal comparative research design was used to gather relevant information. The study was quantitative in nature. This design helped in identifying cause and effect relationships.

Population of the study

All the male and female primary grade teachers in the public schools were study population. All the primary, elementary, secondary and higher public schools were included in the study in the province of Punjab Pakistan. Moreover, all the grade 4 male and female students were also included in the population.

Sample of the study

The sample of the study was selected using stratified sampling method. A total of 09 districts were selected for the purpose of data collection among the 36 districts of Punjab. The sample was selected on three levels. First selection was based on rural and urban, second stratum was based on primary, elementary, secondary and higher secondary and lastly male and female schools. A total of 3347 students were selected for

data collection from 100 schools. In the second phase: only those teachers were selected who were teaching primary grade students.

Table 1
Sample Details

Sr. No.	Sample	Frequency	Percent
1	Students	3347	96.4
2	Teachers	126	3.6
	Total	3473	100.0

Instrumentation, Validation and Data Collection

The researcher used four instruments for the collection of data.

Teachers Assessment Literacy test

The instrument was based on seven factors and 31 items. The instrument was adapted to meet the needs of the current situation. The Teachers classroom assessment literacy test was validated from experts' in the field of education. Changes were made in the light of experts' suggestions and opinions to ensure the content validity. The reliability value of TALT (Teachers Assessment Literacy Test) was .7. The data were collected using online questionnaires. The researcher contacted telephonically to the school heads and education authorities for the collection of data.

Achievement Tests

In this study three achievement tests (English, Mathematics and Science) were used. The reliability of the tests was ensured after pilot testing on a sample of 500 students. The psychometric properties of questions were checked using ITEMAN software. A total of 50 questions were selected for each test having acceptable discrimination and difficulty level. The validity was ensured from three experts.

Data Analysis and Interpretation

Table 2
Demographic Profile of Students

Sr. No.	Gender	Frequency	%
1	Boys	1868	53
	Girls	1605	47

The Table 2 displayed that boys (N= 1868, 53 %) were larger in number than girls (N= 1605, 47 %). A total of 3471 students participated in the study.

Table 3
Training in Educational Testing

	Frequency	Percent
Received training	96	75.6
Didn't receive	31	24.4
Total	127	100.0

The Table 3 showed that 96% (*N*= 127) school teachers stated they received training in the subject of educational testing and evaluation. Whereas, only 24% (*N*= 31) teachers mentioned that they attend training in educational assessment.

Table 4
Factor Wise Teachers' Level of AL

Factors of ALT	Minimum	Maximum	Mean	Std. Deviation
factor1	1.00	3.00	1.97	.760
factor2	4.00	11.00	7.81	2.39
factor3	1.00	6.00	2.76	1.47
factor4	.00	4.00	1.60	.960
factor5	1.00	9.00	4.37	2.24
factor6	.00	6.00	3.37	1.33
factor7	.00	5.00	2.94	1.86

N= 127

The Table 4 showed that there scores of teachers on seven factors in the assessment literacy test. There were total 61 questions. The minimum score was 0 on the items of standard 4, 6 and 7. The maximum score was 7.81 in the test items of standard 2 out of 11.

Table 5
Scores in Teachers' Classroom Assessment Literacy Test

TALT	N	No. of items	Minimum	Maximum	*M*	*SD*
Total score	127	61	10.00	42.00	24.85	8.836

Table 5 showed scores of teachers in assessment literacy test. It depicts the possession of assessment knowledge as mentioned in seven standards. There were sixty one questions in the test. The results showed that most of the teachers got 24 marks out of 61.

Table 6
Difference in students' Academic Performance in Science

Groups	Groups	*N*	*M*	*SD*	df	t-value	*P*
1	Poor	2807	22.20	12.215	3471	-8.601	< .001
2	Moderate	666	26.78	12.932			

***P <.001.

The above Table 6 showed difference in the two groups of students. The groups were established on the basis of teachers' assessment literacy scores. The group 1 is comprised of students of those teachers who scored poor marks. The group 2 is comprised of students of those teachers who scored average scores in the test. The mean values of group 2 (M= 26.78, SD= 12.932) was higher than first group (M=22.20, SD=12.215). It also indicated that there is statistically significant difference in students' Science academic performance, where t (3471) =-8.601, p < .001.

Table 7
Difference in students' Academic Performance in English

Groups	*N*	*M*	*SD*	*df*	*T*	*P*
Low	2807	23.78	12.341	3471	-8.853	< .001
Moderate	666	28.49	12.462			

***P <.001.

The Table 7 showed difference in the two groups of students. The groups were established on the basis of teachers' assessment literacy scores. The group 1 is comprised

of students of those teachers who scored poor marks. The group 2 is comprised of students of those teachers who scored average scores in the test. The mean values of group 2 (M= 28.49, SD= 12.462) was higher than first group (M=23.78, SD=12.341). It indicated that there was a statistically significant difference in students' academic performance with respect to their teachers' level of assessment literacy, where t (3471) =-8.853, p <. 001.

Table 8
Difference in students' Academic Performance in Mathematics

Groups	*n*	*M*	*SD*	*df*	*t-value*	*P*
Low	2807	19.66	10.27	3471	-7.222	<.001
Moderate	666	22.82	9.75			

***P <.001.

The Table 8 showed difference in the two groups of students. The groups were established on the basis of teachers' assessment literacy scores. The group 1 is comprised of students of those teachers who scored poor marks. The group 2 is comprised of students of those teachers who scored average scores in the test. The mean values of group 2 (M= 22.82, SD= 9.75) was higher than first group (M=19.66, SD=10.27).It indicated that there is statistically significant difference, where t (3471) =-7.222, p< .001.

Discussion

The findings revealed that teachers' assessment literacy had a significant impact on students' academic achievement. This finding is consistent with previous research (Doran, 2017; Kline, 2013; Yin et al., 2008). The impact of teachers' classroom assessment literacy, on the other hand, was statistically significant.

The findings revealed that assessment literacy is a necessary skill for teachers. The findings revealed that teachers' assessment literacy influenced their classroom assessment practices as well as their students' learning. Similarly, teachers' assessment practices in the classroom influenced students' learning. The primary reason is that a teacher who is assessment literate will have greater self-efficacy and a more positive outlook on how to conduct assessment practices in the classroom. Although many factors in the school environment have an impact on teachers' classroom assessment practices. However, assessment literacy boosts a teacher's self-confidence. The research shows a strong link between teachers' assessment literacy and methods used in the classroom. The research also suggests that students' higher order thinking skills are developed in response to teachers' effective feedback and formative assessments.

Considering the aforementioned information, it is important to note that assessments of English, Science, and Mathematics at the primary level, which comprise the formative years of a student's life, are crucial to improving learning experiences. It is concluded that a range of educational assessment strategies contribute to students' learning and achievement of learning objectives. There is a distinct difference between classroom assessment methods that assess students' knowledge at the end of a term and those that track students' development throughout the course to look for improvements. But it all depends on a teacher's level of familiarity with testing and measurement in the classroom. It is well known that educational testing has undergone numerous changes over the years and uses a variety of techniques. Additionally, due to the need for appropriate training and assessment literacy, educational assessment and measurement is a technical field. Otherwise, no test or assessment will yield useful and trustworthy results.

Conclusion

A key component of teaching at the primary level is teachers having a solid understanding of assessment concepts. Every subject teacher should have assessment concepts that are as clear as their subject matter expertise. It is concluded that teachers' assessment literacy is less than moderate level, demonstrating the need for them to be familiar with classroom assessment.

It is also concluded that only a very small percentage of primary school teachers received training in educational assessment as part of their initial orientation. It is further concluded that students' academic achievement in Science, Mathematics, and English is significantly impacted by teachers' assessment literacy. This indicates that well planned and designed classroom assessment procedures are necessary for students learning and understanding.

Recommendations

1. Teachers should receive in-service training on topics related to classroom assessment.
2. Senior teachers or mentors should explain the goal and create affordable, realistic, and context-based formative assessment tools for PSTs.
3. The importance and function of teachers' classroom assessments for students' academic performance must be made clear to school administrators.
4. Teachers' gatherings can be planned by school administrators to discuss assessment-related information and different classroom assessment strategies. Teachers with weak or average assessment literacy will benefit from the regular meetings.

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