



RESEARCH PAPER**Primary School Teachers' Knowledge of Assessment and their Achievement: An Experimental Study**

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ABSTRACT

The study used one group pre-test and post-test experimental design to find out the effect of teachers' Content Knowledge of assessment techniques on their performance on assessment related test at primary school level. The study sampled 140 primary school teachers grouped into 5 clusters in rural areas of a district in Punjab province. Assessment strategies related training module was developed and the second author conducted intervention of the study. The teachers took the pre-tests and post-tests on assessment related content knowledge. The paired samples t-test and descriptive statistics were employed to analyze the data. The study found that achievement scores of the teachers in post-test were better than pre-test in the area of assessment. The study revealed that there was significant difference in the achievement scores which demonstrated the effect of professional development training on the teachers' knowledge about assessment techniques at primary school level. The study recommended to conduct the professional development trainings of primary school teachers on the regular basis to improve the content knowledge about assessment techniques in Pakistan.

KEYWORDS Assessment Techniques, Professional Development Training, Quality Education, Teachers' Knowledge

Introduction

Primary education which have great value in education system is essential for child development and obtaining the required skills, therefore governments of Pakistan have been striving for providing quality education to primary school students and assisting them to achieve quality education. There are various efforts which have been made such as increasing enrollment number, budget allocation, number of teachers, and various other basic needs to improve the primary education. The government of Punjab allowed Punjab Education Foundation (PEF) to start Public and private partnership to play their role for improving quality standard and student success rate in grade 5 and 8 exams conducted by the Punjab Examination Commission (PEC) which is an autonomous body set up by the Government of the Punjab to assess and examine the students each year.

A public university in the Punjab province adopted 44 primary schools located in rural area of a district in Punjab province under Public School Support Program (PSSP), appointed 170 teachers of varying age and qualification, with 1-35 teacher-student ratio, and set up a monitoring mechanism for their continuous supervision. A majority of these newly appointed teachers was less qualified, inexperienced and, most importantly, were

lacked in using the assessment techniques effectively to assess learners, and needed professional development training to maintain minimum quality standards and enhance their assessment skills.

Assessment is an important factor in our education system but it also contributes to high rates of dropout. Good assessment techniques can assist in identifying and addressing the elements—such as learning challenges, decreased engagement, or insufficient support—that contribute to dropout rates. Through assessment, educational institutions can gain insight into the learning needs and improvement of their learners. This allows them to provide tailored support and timely interventions to improve retention rates, which in turn ensures the success of their all students. Educational institutions can ensure the success of all students by improving retention rates through timely interventions and individualized assistance based on assessment results that reveal students' learning requirements and progress. according to the constructivist approach to assessment" Learners are the constructors of their knowledge,". It encourages student initiative, self-control, and decision-making. Additionally, it promotes student participation and ensure the provision to students lots of chances to demonstrate what they have learned through particular assessment approaches. Respondent instruction is necessary for alternative assessments, which enable teachers to the strengths students' capabilities to raise the standard of learning process (Gaikwad et al., 2023).

In education, assessment plays a crucial role that helps teachers with reflective instruction while also measuring students' competence and learning in terms of their scores and grades. Within an official learner-centric education system, students are more affected by evaluation than they are by the instructor or the organization. The results of assessments may be impacted by a number of things. According to the learners, they could include psychological variables, memory, interest, and unique learning methods. From an institutional perspective, variables may comprise the following: subject, kind of assessment, classroom setting, teaching style, instructors' assessment literacy, and assessment instruments (DeLuca et al., 2019). However, it is undeniable that one important component in influencing the validity of assessment is teachers' assessment knowledge. The study used an experimental approach to find out the effect of professional development training in the assessment skills of teachers on their performance in assessment related tests.

Research Hypothesis

The study included the following null hypothesis

1. There is no significant difference in teachers' achievement scores in pretests and posttests in assessment techniques?

Conceptual Framework

Theory of adult learning provided by Knowles (1984) were used to theorize the given study which suppose that adult must know the logic of concepts and motivate to learn in the entire service to enhance the professional approach (Borg, 1998). The study based on experimental research which, may, further assist teachers and head teachers for improving and refining their approach. The study used the following conceptual framework in this study.

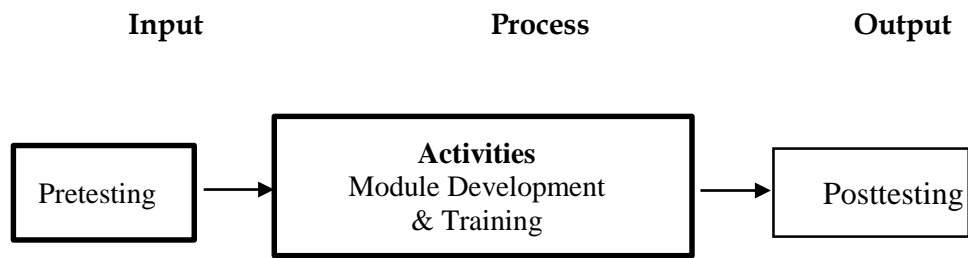


Figure 1: Conceptual framework of the study

Literature Review

Professional development Training and Assessment skills of Teachers

There are various issues involved in the failure of primary schools such as less qualified teachers, poor content knowledge, use of poor teaching methods and assessment techniques, and lack of professional development training (Kouser et al., 2011). In another study, Memon (2007) criticized the low teaching quality and poor use of student assessment techniques as two wide-ranging problems of declining student performance. Ministry of Education (2009) endorsed that the modern assessment techniques have not ever been used to measure the students' achievement. The previous literature further also tells that the teachers generally use outdated teaching methods, the assessment takes place is sporadic and subjective, policy implementation is not successful and it provides little feedback to children for improvement (Ministry of Education, 2009; Muhammad & Iqbal, 2015).

In Pakistan, Akram and Butt (2021) found that the various of reasons of failure for primary education system include memory-based assessment rather than testing analytical ability, endemic administrative issues in the conduct of examinations, and low teacher quality. Another study found that lack of financial resources, insufficient teaching staff and ineffective use of assessment techniques are the important indicators of low-quality teaching in Pakistan at primary level (Ahmad et al., 2013).

It was concluded that, in overall, there were three wide-ranging problems of poor student performance that needed to be resolved immediately such as poor subject matter knowledge of teachers, poor use of student assessment techniques, and poor use of the teaching strategies. In certain situation, when the primary schools were failing and the Punjab government was paying billions of rupees to the caretakers of these failing schools, it was high time to provide trainings where possible, and suggest remedial actions so that the system could work effectively. This research was initiated to address these challenges properly and find out the proper solutions to effective assessment skills and educational improvement of schools.

There are various studies which confirmed the importance of professional development training to enhance the assessment skills of teachers and overall instructional process in education system. Christoforidou and Kyriakides (2021) conducted the study on developing teacher assessment skills through their professional development training which revealed that these types of trainings had great impact on both teachers' assessment skills and student learning.

Similarly, Sato et al. (2008) examined the effect of professional development on the enhancement of assessment skills of teachers through using longitudinal approach. The study revealed that teachers were proficient in using different assessment techniques gradually through arranging the training on different occasions. In another study,

Caingcoy (2022) investigated how much professional development contributes to make the teacher competent and revealed that through providing opportunities of professional development for primary school teachers, competencies in content knowledge and pedagogy, and assessment and reporting can be maximized which further leads towards quality education.

Randel et al. (2016) examined the professional development of teachers in upgrading the understanding of assessment techniques and found that teachers who have the quality knowledge about different assessment techniques put significant impact on the student achievement at school level. El Afi (2019) further investigated professional development increased the teachers' performance and revealed that through making professional development of teachers, teachers' performance involving lesson planning, methods, and assessment techniques might be improved which further assisted to achieve the targets. Gubbins and Hayden (2021) also emphasized to develop skills of teachers that how to assess their learners effectively through using different assessment techniques which might be possible through providing the opportunities of professional development on regular basis.

Material and Methods

The study selected 140 primary school teachers from 5 clusters in rural areas of a district in Punjab province. A pretest was developed by the first author to measure the teachers' knowledge in using assessment techniques during instruction. A training module was developed and 40 hours intervention was provided to the teachers. The training was delivered by highly qualified teacher of education faculty of a public university. After the training, teachers' posttests were conducted and the difference between their scores in the pretests and posttests was calculated to measure the effect of the training. Later, planned and unplanned classroom observations were conducted by the research assistants to ensure the successful implementation of the skills the teachers.

Threats and Control

There are many biases that cause the threats to pre-experimental research design that sometimes known as "pre- and post-test" experimental design. This particular design consists of different steps such as: selection of participants, pre-testing, interventions and post testing (Marsden & Torgerson, 2012). Typically, in this design possible threats are history, instrumentation, maturation and testing (Creswell, 2007). For the valid results of experiment researchers control all mentioned threats. The threats of history involve in different events that may happen during the pretest and posttest that effect the findings of experiments. Second threat related to the maturation that associated with respondents age, grown up, intelligent and more experienced that may lead changes in experiment results. In this experimental study, training time was one week that reduce the threat of maturation. Third threat is testing because after pretesting participants remember the responses of test that effect the results of post testing. To avoid testing threat researchers conducted the test carefully and did not inform about posttest. To minimize the threats of instrumentation researchers used the valid and reliable instrument.

Table 1
Cluster-Wise Sample Distribution

S. No.	Name of Cluster	Participants (f)
1	Cluster 1	30
2	Cluster 2	27
3	Cluster 3	30

4	Cluster 4	30
5	Cluster 5	23
	Total	140

Intervention

The major segment of the study was testing teachers' current knowledge in Assessment. To serve this purpose, the researchers developed the test of Assessment from the content of Bachelor of Education (B.Ed.) syllabus approved by the Higher Education Commission (HEC). The test of *Assessment* comprised 80 marks and included knowledge level questions related to difference among aims, goals, and objectives, types of assessment, cognitive domain of Bloom Taxonomy, Table of Specification, validity and reliability, calculating central tendency (mean, mode, median) and objective and subjective types of questions along with their characteristics and limitations. These tests comprised both objective and subjective type questions. The objective type part included fill in the blanks and short questions, while extended-response essay type questions were also included. Multiple Choice questions were not included in the test to minimize the guessing chance.

Five content experts with the background in teaching Assessment were requested to validate the content of the test. Their comments in terms of language clarity, avoidance in redundancy of the questions, and minor typographical mistakes were incorporated accordingly. As a result of the two-day training, the trainees were able to discuss various concepts related to assessment, measurement, and Evaluation. The whole training comprised 8 hours, 4 hours for each day. After two days, the training moved to another cluster with the same routines, trainer, and methodology. Combining to this, 140 teachers grouped into 5 clusters were given training in 10 days. After the training, the teachers were post tested.

Testing Conditions

The sampled teachers were pretested and proper seating arrangements were made for this purpose. Strict invigilation was ensured and the tests were marked by the researchers. The rubrics were developed for extended-response questions and marking was made accordingly.

Developing Module for Training

The module for Assessment was developed based on the content taught to teacher education students (Bachelor of Education). A faculty member of a public university in Lahore was selected, who had background in assessment techniques, for training purpose.

Intervention

The training related to *Assessment* teaching was conducted by the first author. In the area of *Assessment*, on the first day, the trainer at Cluster 1 discussed introductory concepts of assessment that included definitions such as difference between aims, goals, and objectives, use of different terms related to assessment such as assessment, measurement, and evaluation. The concepts of specific assessment techniques such as written test, oral test, presentation, lab work, and portfolio were introduced. The trainees were also able to understand and differentiate between placement, formative, diagnostic, and summative assessment. Later, the trainees were taught about Cognitive Domain of Bloom's Taxonomy which included detailed description of each of the six stages such as Knowledge, Comprehension, Application, Analysis, Synthesis, and Evaluation.

The second day included hands-on activities on developing the understanding of the concepts described above along with developing items according to the cognitive domain keeping in view the table of specification. The trainees were taught about selecting relevant objective, and developing items or question according to the levels of Bloom's taxonomy. This part included selecting appropriate action verbs for designing items of different levels ranging from knowledge to evaluation. Besides, the trainees also learned about objective type (MCQs, true false, matching) and subjective type questions (short questions, restricted response and extend response) along with their advantages and limitations. As a result of the two-day training, the trainees were able to discuss various concepts related to assessment, measurement, and Evaluation. The whole training comprised 8 hours, 4 hours for each day. After 2 days, the intervention moved to the second cluster with same spirit, and methodology and continued shifting up to 5th cluster center and ended the training after 10 days, with 2 days training at each of the five cluster.

Post-Testing

The examinees were post-tested within the gap of one week. The seating plans was carefully designed. The process of the posttest was same as of the pretest. The posttest was conducted parallel at the five clusters and the same question papers were conducted on all exam centers on the same day and time. The posttest papers were marked by the researchers according to the keys and rubrics. The scores of each examinee were entered into SPSS for conducting relevant analyses. Data were cleaned before running analysis.

Results and Discussion

Data were analyzed through using SPSS involving descriptive statistics (Mean & SD) and Paired sample t-test in the given study.

Table 2
Descriptive Statistics-----Pre-Test and Post-Test Achievement Scores in Assessment

Subject		N	Mean	SD
Assessment	Pre-test	140	02.86	03.955
	Post-test	140	33.87	12.537

Table 2 revealed that student achievement scores in post-test for the area of assessment (M=33.87, SD=12.537) was found better as compared to student achievement scores in pre-test for the area of assessment (M=02.86, SD=03.955).

Table 3
Paired Samples t-test Comparison in Assessment Achievement

Subject		M	SD	t	df	Sig	Effect Size
Assessment	Pretest	02.86	03.955	28.813	139	.000	3.336
	Posttest	33.87	12.537				

Paired samples t-test was used to compare mean score of the trainees in pretest and posttest. According to Table 7, there was statistically significant mean difference in trainees score in pretest (M=02.86, SD=03.955) and posttest (M=33.87, SD=12.537), $t(139)=28.813$, $p=.000$. The effect size ($d=3.336$) was very high that shows that training significantly affected trainees' performance in Assessment in the posttest. The null hypothesis was rejected, meaning that there was a significant effect of training on teachers' achievement in assessment.

Discussion

The study used an experimental approach to find out the effect of professional development training on the teachers' assessment skills. The study revealed the difference in the achievement scores in pre-test and post-test for the assessment techniques which confirmed that professional development training significantly affected the assessment skills of teachers. The results of the study are similar with various of previous research, theories and models that skills of teachers about assessment techniques might be improved through professional development trainings (Caingcoy, 2022; Christoforidou & Kyriakides, 2021; El Afi, 2019; Gubbins & Hayden, 2021; Randel et al., 2016; Sato et al., 2008).

There are various studies which confirmed the importance of professional development training to enhance the assessment skills of teachers and overall instructional process in education system. Christoforidou and Kyriakides (2021) revealed the similar result that professional development trainings had great impact on both teachers' assessment skills and student learning. Similarly, Sato et al. (2008) also revealed that teachers were being proficient in using different assessment techniques gradually through arranging the professional development trainings on different occasions. In another study, Caingcoy (2022) also found that through providing opportunities of professional development for teachers, competencies in assessment and reporting can be maximized which further leads towards quality education. All the provided studies are in line with the given study which confirmed the idea that both these variables which have great importance in education system are interlinked with each other.

Randel et al. (2016) found that teachers who have the quality knowledge about different assessment techniques put significant impact on the student achievement at school level. El Afi (2019) also revealed that through making professional development of teachers, teachers' performance involving lesson planning, methods, and assessment techniques might be improved which further assisted to achieve the targets. Gubbins and Hayden (2021) emphasized to develop skills of teachers that how to assess their learners effectively through using different assessment techniques which might be possible through providing the opportunities of professional development on regular basis. All the provided studies are also in line and confirmed about the substantial role of professional development trainings to maximize the teachers' assessment techniques skills at primary school level in Pakistan.

This study was particularly related to training teachers and testing them on assessment related content knowledge. The training left its effect on their content knowledge of assessment. Later, they used their knowledge of assessment during their instruction. Although there is no evidence of the true effect of the training on the achievement scores of their students, however, there is evidence that the results of their students were much better on the PEC exams in the coming exams as compared to the previous years' results. According to the PEC exams 2017, the overall results of these schools were poor and ranged between zero to 25 percent; however, in 2018, the passing percentage of the same schools was above than 80. Though other extraneous variable such as administrative and mentoring services might have contributed to the student achievement, still it shows the teachers' knowledge of assessment have contributed to the students' overall performance.

Conclusion

The study used an experimental approach to find the effect of professional development training on the teachers' assessment skills. The study revealed that achievement scores in post-test were better than pre-test for the knowledge about assessment techniques and significant difference in achievement scores of pretest and posttest for *assessment* was also found which confirmed that professional development training affected the assessment skills of teachers.

Recommendations

1. The study found the difference in achievement scores of teachers in the pre-test and post-test in the assessment, therefore the researchers recommend to conduct professional development trainings for primary school teachers on regular basis to enhance and update the skills about assessment techniques that are most required to achieve the targets about the provision of quality education.
2. Furthermore, the researchers suggest to the policymakers and district authorities to decide for these trainings to the development of teachers' abilities about assessment techniques at primary school level.

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