



ANALYSIS OF CURRENT ASSESSMENT PRACTICES IN MATHEMATICS

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ABSTRACT

The purpose of the paper is to analyze existing assessment practices in mathematics assessment as stipulated in the mathematics curriculum for the 10th class, formulated in 2006 by the Ministry of Education in to identify issues and problems while implementing the objectives of the Curriculum concerning mathematical assessment. The study was conducted in the district minister of cirrhosis, and an assembly of trained teachers was selected by the purposive sampling techniques. The sample represented rural, Urban, and male and female Primary school teachers. Focus Group Discussion was used as a Data Collection technique. The data suggest that mathematics teachers perceive assessment as a classroom test that teachers administer a students at specified date intervals. The teacher indicates that they were not provided any opportunity to refresh their skills in teaching and assessing mathematics. Teachers think that the mathematics textbooks are developed in such a way that they do not contain various types of tests for children. The majority of teachers use textbooks as teaching resources. Teachers preferred assessment techniques as paper-and-pencil tests. The study recommends that teacher who has a mathematical background, qualification, and interest may be provided the opportunity for teaching mathematics. Secondary school teachers should be provided opportunities for professional development in mathematics. The content of the professional development program should be designed taking into view the mathematical needs of teachers, and the district education department may ensure the proper implementation of this curriculum.

Keywords: Mathematics Assessment, Conceptual understanding

Introduction:

Mathematics assessment is universally seen as a foundation for the improvement of students' learning results and teaching quality. It gives useful information on students' conceptual knowledge, critical thinking, and problem-solving capabilities, as well as informs teachers on how to develop their pedagogical approaches. Recent literature emphasizes the use of a combination of formative and summative assessments to achieve a balance between measurement and support for learning in mathematics classes (Alawamleh & Aldalalah, 2023). In the context of South Asia, especially Pakistan, studies show that conventional exam-centered assessment practices normally dominate over innovative strategies, thus limiting prospects for effective learning opportunities (Khan & Shah, 2023).

Learning mathematics also includes developing a positive attitude towards mathematics.



The assessment of students' attitude requires information about he/ his thinking and action in a wide variety of situations. A student's attitudes are reflected in how he/she ask and answer questions, work on problems, and approach new mathematical concepts and ideas. Observations, homework assignments, Journals, and oral presentations are excellent ways to assess students' mathematical attitude. Student self-assessment can also be used to provide information regarding a student's attitudes towards mathematics, as well as information that informs the teacher's insights into a student's understanding of content.

The assessment of students' mathematical knowledge must address students' ability to solve problems, to use the language of mathematics to reason and analyze, to comprehend the key concepts and procedures, and to think and act in a positive way. Assessment should also examine the extent to which students have integrated and made sense of mathematical concepts, and can apply understanding to situations that require creative and critical thinking.

Rather than relying on approaches that provide assessment solely for grading and ranking in credentialing, assessment practices are needed that integrate with learning activities, that support students' construction of knowledge, and that reflect the diversity found in the curriculum and the learners themselves.

The study critically looked at exciting assessment, a practice that teachers employ to achieve the objectives of the national curriculum and to highlight problems and issues in assessing learning mathematical ability.

Research Questions

1. How do teachers perceive the assessment in mathematics at the secondary level?
2. How can prevailing assessment practices in mathematics be improved?

Review of literature

An overseas research by Palmberg et al. (2024) analyzed the application of multi-approach formative assessment in Grade 7 math classes. Research indicated that using questioning, peer/self-assessment, feedback, and learning targets together increased students' motivation and problem-solving ability substantially.

Likewise, Moed-Abu Raya and Olsher (2024) explored the application of learning analytics visualizations in mathematics testing. According to their work, dashboards facilitated teachers to better understand students' mathematical thinking and reformulate classroom debates based on evidence.

Hackling & Rennie (2001) have asserted that assessment is a key component of the teaching and learning process, and teachers tend to utilize a very narrow range of assessment strategies on which to base feedback to parents and students. In practice, there is little evidence that teachers use diagnostic or formative assessment strategies to inform planning and teaching (Randor, 1996). This could be due to teachers feeling that they need to "sacrifice learning with understanding for the goal of drilling students in the things for which they will be held accountable" (Hobden, 1998, p. 221).

Studies by Ma (1999), Skemp (1976) Halai (1998) indicate various initiatives in mathematics education focusing on a learner-centered approach, problem solving, and conceptual understanding. They are about the teaching and learning of mathematics based on learners as the constructors of knowledge and the teacher as the facilitator of the learning process. The teaching of mathematics should involve both procedural as well as conceptual knowledge. The process is the most important, and therefore assessment procedure has to focus on the processes as well. This also calls for a major reform in mathematical assessment procedures to avoid what has been described by many studies as an examination-driven teaching process. (Clarke, D. 1996, cited in Hattori, K.& Wangeleja, 2007).



In the Pakistani educational context, Asim (2024) carried out a research study in private secondary schools and revealed that formative practices of assessment had a positive effect on students' mathematics achievement, although their implementation necessitated rigorous teacher training.

Similarly, Sahito et al. (2024) investigated the perceptions of assessment for learning held by elementary mathematics teachers in Sindh, Pakistan. Findings showed that teachers identified AfL as helpful, but its effective application was restricted by factors such as a large number of students, limited time, and availability of resources.

Based on research with teachers, Barksdale-Ladd and Thomas (2000) identified five best practices in assessment.

Providing feedback to help students improve their learning.

Conceptualizing assessment as a part of a student's work, which can go into a working portfolio;

Providing flexibility so that assessment does not dominate the curriculum;

Ensuring the assessment informs instructions to help teachers improve their teaching, thereby ensuring student learning; and

Using more than one measuring stick to assess students' learning.

Koul, Darrel, and Earnest (2000) state that an affective assessment process should involve a two-way communication system between teachers and their students. Historically, teachers have used teaching instruments to transmit to student and their parents what is important for them to know and do. While this reporting tends to be in the form of a grade, the form and design of the assessment can send subtle messages on what is on what is important. There has been a substantial amount of research into types of assessment, but very little research into students' perceptions of assessment. (Cited in Black & William, 1998; Crooks, 1998; Plake, 1993; Popham, 1997).

RESEARCH METHODOLOGY

The present study is qualitative. The purposive sampling design was used. All public secondary schools of the city of Naushehro Feroz comprise the population of the study. The sample is derived from the population. A group of 10 (5 male + 5 female) teachers was selected to conduct the study. Out of 10 teachers, 2 were found to have been trained in the assessment system.

A focus group discussion was arranged, which was participated in by teachers, head teachers, and experts. The purpose of this discussion was to elicit the views of all concerned about current assessment practices in mathematics. The guiding questions for the focus group are placed in the analysis section. The respondents were involved in a 50-60-minute discussion. Their responses were recorded initially. Later on, the responses were tabulated, and lastly, they were transcribed in narrative modes.

ANALYSIS OF FOCUS GROUP DISCUSSION

The purpose of the focus group discussion was to get an idea of all participants about prevailing assessment practices in mathematics, to identify issues and challenges that come across teachers in implementing assessment activities in the classroom, while assessing the performance of students. The following question guided the focus group:

How do you define assessment concerning mathematics?

How do you assess your learners in mathematics?

Do you believe your existing assessment helps you to achieve the objectives of the mathematics curriculum?

What is the role of manipulatives in mathematics assessment?

What are the factors to prevent you from assessing the mathematical ability of your learners in light of the curriculum?

How can we make the assessment of mathematics more effective?

The majority of teachers believe that assessment is an important process that helps them to investigate the performance of their students. It is test-taking process. The assessment in mathematics means your learners are memorizing counting, tables, and other geometrical definitions. Some teachers were of the view that assessment helps you to categorize your learners' performance.

Concerning the question of assessing your learning in math, teachers responded that they use a textbook, select items from the textbook book and for classes I and II, we verbally ask certain questions, which are mathematics textbook-based. Some items we use an abacus for teaching counting, and use stones for counting. We develop oral and written tests. These tests are also textbook-based. It is difficult for teachers to locate examples from daily life and relate them to mathematics.

Teachers were sure that their existing assessment practices matched the objectives of the curriculum. Teachers thought that what they had assessed was taken from the textbooks. Some of the teachers believe the purpose of the mathematics curriculum is to improve the reasoning ability of learners in mathematics.

Teachers believe that manipulatives create interest among students. The majority of teachers disclosed that it is difficult for them to use manipulatives in the classroom.

Teachers further responded that it is difficult for them to teach every topic from the mathematics textbook. Some topics, such as geometrical concepts, have been given less weightage in the textbook. We do not have enough resources to prepare teaching aids for assessing our learners. The teacher pointed their existing knowledge about some topics in the textbook is very limited. We have never been provided the opportunity to discuss the curriculum in any training program. According to the majority of teachers, their understanding of innovative methods of teaching and assessment in mathematics needs to be improved.

Some of the teachers disclosed that in the majority of training programs, we were not told about how to assess different kinds of learners in the mathematics classroom. The majority of master trainers do not have a specific qualification in mathematics.

There is a lack of professional support in mathematics from SPEs and ADOEs, because their understanding of certain mathematical concepts is not so broad.

Discussion on Findings:

The findings of this study indicate that primary classroom teachers believe that the use of concrete materials to explain mathematical concepts and the connection between conceptual understanding and abstract knowledge are important, as well as recognizing that conceptual knowledge is very important in mathematics education. In the Constructivist classrooms, students learn through action, discovery-oriented activities, and guided questions and discussions (DeVries & Kohlberg, 1987).

When teachers were asked to mention how they assess the children in mathematics, this implies that high school teachers use traditional assessment approaches in their actual classrooms that focus on relational understanding rather than conceptual understanding of children. The majority of teachers use only textbooks while teaching mathematical concepts, which indicates their inclination towards traditional approaches. As it has been mentioned in several places in the literature about the ineffectiveness of traditional approaches. While the classroom is dominated by teacher talk (Goodlad, 1984), and the teachers rely heavily on textbooks, drills, and worksheets (Ben-Peretz, 1990). Teachers try to discover whether students



know the right answers (Brooks & Brooks, 1993). The instructional emphasis lies in the outward production of responses.

A study conducted by Shuhua (2000) reported that teachers' pedagogical beliefs about mathematics play a significant role in shaping their instructional practice, but the majority of primary school teachers did not seem to practice Constructivist methods in their teaching practice.

The data indicates that the majority of teachers in District Naushero Feroz hardly use concrete materials or manipulatives during assessing the students. It has been found that the majority of teachers implement paper-and-pencil tests. Sherman and Richardson (1995) studied elementary school teachers' beliefs and practices related to teaching mathematics with manipulatives. They reported that teachers tended to choose a traditionalist approach due to concerns about discipline and classroom management issues. If teachers have students who represent a wide range of mathematics abilities, teachers spend more time controlling the class than practicing their effective instructional methods.

Data further indicated that teachers' existing knowledge about modern assessment techniques is limited. There are so many reasons; one reason might be teachers' hollow understanding of 'How Children Learn Mathematics and How to Assess Diverse Learners in Mathematics?'

Teachers are central to reform in mathematics education (Battista, 1994), particularly at the primary level, where all teachers are required to teach mathematics. However, Battista (1994) has asserted that most teachers are ill-prepared for the task as they have not acquired a deep understanding of mathematics (Gregg, 1995), as they are themselves products of the traditional mathematics-as-computation view of teaching in which mathematics was regarded as a set of transmitted facts and procedures. Teachers' lack of advanced conceptual knowledge in mathematics has proved to be problematic for professional developers in several studies (Akers, Berle-Carman, Douglas, Economopoulos & Nemirousky, 1997; Barrett, Jones, Mooney, Thornton, Cady, Guinee & Olson, 2002; cohen, 1990; Olson & Barrett, 2004; Simon, Tzur, Heints, Smith & Kinzel, 1999).

The findings of the study reveal that the majority of teachers had rare opportunities for professional development in mathematics, especially in assessment. HATTORI, K. & Saba, A.N. (2008). This calls for mathematics teachers to be trained to teach important mathematics and use strategies consistent with the current vision of assessment to obtain relevant inferences of students' mathematics learning. However, teacher professional Development (PD) must focus not only on subject matter knowledge (Loucks-Horsley, Love, Stiles, Mundry & Hewson, 2003) but also on pedagogical content knowledge (Schulman, 1987; Cited in Yates, 2005).

The data indicated that teachers hardly use mathematical discourse while assessing the students in mathematics classrooms. Research conducted by Battista (1999) verifies that in a mathematical classroom, students must be able to read, write, and discuss mathematics, use demonstrations, drawings, and real-world objects, and participate in formal mathematical and logical arguments.

RECOMMENDATIONS

The following recommendations are proposed for mathematics curriculum developers, teacher educators, the district education department, and primary school teachers:

- Mathematics textbooks should be developed in such a way that they contain a fair number of examples that are related to students' daily lives.



- At the secondary level, not every teacher should be allowed to teach mathematics; those teachers who have a mathematical background, qualification, and interest may be provided opportunities for teaching mathematics.
- Teachers may be provided opportunities for professional development in mathematics. The content of professional development programs should be designed to take into consideration the mathematical needs of teachers.
- The district education department may ensure the availability of the Mathematics curriculum at schools and ensure the proper implementation of this curriculum.
- Teachers may be provided opportunities to visit private schools to critically look at their current assessment practices in mathematics and to adopt these practices into their teaching.
- Teachers need to stimulate children's initiatives in learning by providing ample opportunities for children to participate and acquire widespread experiences in mathematical activities, and help children genuinely understand basic concepts.
- There is a need to establish an assessment system with multiple ways and objectives of evaluation. Not only learning outcomes, but also processes are emphasized in the evaluation of mathematics learning.

Conclusion

Assessment is one area of education that continues to generate discussions in professional and research cycles, both from the perspectives of philosophy and practice. Assessment has become an instrument of change (Ruthven, 1994), a means of quality control, and an instrument of educational reform (Stakes, 1998). Education agencies and professionals have contributed to the pool of information, all with the one aim of reaching an assessment ideal which so far seems elusive in most educational systems. Gipps (1994) acknowledges that assessment has taken on a broader definition and purpose and gone through a "paradigm Shift From psychometrics."

Theoretical and empirical literature support the current assessment paradigm, which calls for mathematics assessment matched to what is considered important content, integrates assessment in instruction, promotes equity, and involves teachers, equipped with the expertise, to obtain valid and reliable inferences of students' learning. The implication is for needed changes in what mathematics is taught, the way it is taught, and how its learning is assessed to ensure all students learn what they should.

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