Research Article

Melaku Takele Abate*, Abbi Lemma Wedajo, Adula Bekele Hunde

Transformative Assessment Practices in Mathematics Classes: Lesson from Schools in Jimma, Ethiopia

https://doi.org/10.1515/edu-2022-0206
received August 16, 2023; accepted October 20, 2023

Abstract: Transformative assessment is a classroom assessment aimed at changing both how teachers teach and students learn a lesson. Nowadays, this kind of assessment needs to be practiced to encourage teachers to be creative and flexible when designing their assessments and for students to be reflective and take responsibility for their learning. Hence, this qualitative study aimed to examine mathematics teachers' practices of transformative assessment and the associated challenges. Data collected from eight teachers using semi-structured interviews and lesson observations were analysed thematically. It was found that teachers did, in fact, not provide evidence of practicing transformative assessment in their teaching. There was an attempt to align assessment to learning outcomes even though the assessment practice utilized remained traditional. Teachers' assessment practices focused on fast-learners while leaving behind the majority, lacking balance and equity. Teacher, student, and school-related factors were the main challenges facing the teachers during assessment practices. The study presents possible strategies by which transformative assessment practices in mathematics teaching can be developed, implemented, and sustained to improve students' learning.

Keywords: transformative assessment, qualitative inquiry, math teachers, challenges, Ethiopia

*** Corresponding author: Melaku Takele Abate**, Department of Mathematics Education, Jimma College of Teachers' Education, P.O. Box 95, Jimma, Ethiopia; Department of Teacher Education and Curriculum Studies, Jimma University, P.O. Box 378, Jimma, Ethiopia, e-mail: mku2001@gmail.com
Abbi Lemma Wedajo: Department of Teacher Education and Curriculum Studies, Jimma University, P.O. Box 378, Jimma, Ethiopia
Adula Bekele Hunde: Department of Curriculum and Instructional Sciences, Kotebe University of Education, P.O. Box 31245, Addis Ababa, Ethiopia

1 Introduction

1.1 Background of the Study

Classroom assessment is a crucial aspect of effective teaching and learning processes, and therefore, educational researchers have proactively engaged in researching its concepts and practices (Andersson & Palm, 2018; Brookhart & McMillan, 2020; Monteiro, Mata, & Santos, 2021). For the same reason, various authors consider classroom assessment as part and parcel of the teaching and learning process (Black & Wiliam, 1998; Brookhart & McMillan, 2020). Classroom assessment must, thus, be viewed and practiced by teachers in an integrative manner at every stage of the teaching-learning process.

Black and Wiliam (1998) regard the general term assessment to include all those activities undertaken by teachers and their students to provide information as feedback to modify teaching and learning activities. Additionally, Brookhart and McMillan (2020) expressed classroom assessment as a process that students and teachers engage in by collecting, evaluating, and using evidence of student learning for different purposes, including diagnosing student strengths and weaknesses, monitoring students' progress toward meeting desired levels of proficiency, providing feedback to students and parents, and enhancing students' learning and motivation. As a result, students and teachers play an active role in selecting and constructing opportunities for assessment practices.

In today's information-explosion society, there is a need to change how assessments are done (Olele, 2012). With the emergence of new technologies and digital platforms, traditional assessment methods, such as paper and pencil tests, may not be adequate and should be complemented with other alternative forms such as e-portfolios, projects, and problem-solving tasks (Meletiadou, 2021). Alternative approaches such as online tests and quizzes also need to be introduced to assess students' skills and knowledge. Additionally, methods that involve more interactive and

creative tasks should also be considered. Creating instructional videos in mixed-ability pairs, modelling, and explaining their thinking while solving equations, for example, is a multimodal digital classroom assessment that complements conventional (traditional) assessment practices in mathematics (Fjørtoft, 2020).

The changing nature of knowledge and the demands of the modern curriculum also suggest that traditional approaches to assessment need to be supplemented by alternative forms of assessment practices that reflect these changes and transform the instructional process (Libman, 2010). Transformative assessment, therefore, goes beyond traditional psychometrically driven testing. Such alternative assessments help to assess learning tasks that stimulate twenty-first-century skills such as critical thinking, problem-solving, and creativity and require students to demonstrate knowledge rather than simply recall information provided to them by others (Stiggins & Chappuis, 2005).

Classroom assessment is conducted in a transformative way if intended to transform the way teachers teach fundamentally and students learn a lesson (Popham, 2011). Hence, transformative assessment is a strategic approach to assessment that advances vital features including being appropriate, meaningful, sustainable, flexible, and continuous (Benson & Dresdow, 2014). This changes the assessment orientation from summative to a combination of formative and summative. These qualities also differentiate transformative from traditional assessment plans which tend to satisfy short-term and periodic accountability demands. A climate that invites the progressive use of new teaching and learning methods is important. It is necessary for teachers to move beyond reacting to the need for accountability towards using assessment to continually describe, improve, predict, and ultimately, explain the complex construct of student learning and development.

Transformative assessment is also used to minimize the problem of inequity in classrooms where students face discrimination on any basis including, but not limited to, disability, gender, age, or any other characteristics related to their backgrounds (Mertens, 2009). It helps teachers to identify, support, inspire, and improve the learning of students who are lagging (Creswell, 2013). Moreover, since it is aligned with the intended learning outcomes of the topic, it brings a significant change in students' learning. In this way, the "voice" of the students gets heard throughout the teaching-learning process (Creswell, 2013).

Classroom assessment that transforms instruction is, therefore, part of the teaching-learning process which includes all assessment activities conducted within the classrooms, and it also helps teachers make sound decisions on the students' progress and improve instruction (Benson & Dresdow, 2014; Brown, 2018). These practices can be fixed on the purposes of classroom assessment of whether to gauge how much students have learned or whether an assessment is done to measure effective classroom instruction regarding a specific subject such as mathematics (Lamichhane, 2018; Rivera-lacia, 2019). Thus, assessment in mathematics classes should be integrated into instruction and incorporates a variety of assessment approaches in order to get valid and reliable inferences about students' learning (Hattori & Saba, 2008; Nortvedt & Buchholtz, 2018).

Furthermore, Junpeng (2012) emphasized that classroom assessment in mathematics is the most effective activity for improving students' performance, when properly designed and implemented. Mathematics teachers must, therefore, design quality classroom assessment activities aligned with learning outcomes to implement them properly and transform the instructional process. The main essence of the transformative assessment system in mathematics is to develop creative, critical, and reflective thinking among all the students by allowing them to perform and demonstrate their mathematical knowledge, skills, concepts, theorems, and techniques through engagement in the assessment process (Popham, 2011). This powerful and insightful view can bring about a change in perspective in the practice of mathematics education and assessment that makes mathematics more meaningful, practical and interesting and, further, impacts the learning of all students (Lamichhane, 2018).

The other way of understanding transformative assessment in the context of facilitating mathematics learning is to view assessment as a continuous and student-participatory activity and, then, practice it accordingly (Benson & Dresdow, 2014). Besides this, transformative assessment requires providing good feedback to students, using assessment data to improve instruction, and using diverse assessment techniques to transform the teaching-learning process (Butler & McMunn, 2006; MoE, 2012).

Ideally, transformative assessments should provide students with the appropriate opportunity to demonstrate their mathematical skills (Lamichhane, 2018; Leung et al., 2014). In practice, however, many teachers tend to use traditional assessment forms such as objective-type tests, due to teachers' perceptions and large class sizes (Okyere & Larbi, 2019), for example. If teachers assess students primarily by tests, students will quickly decide that the other learning activities in the class are rather meaningless (Shinidler, 2010). Teachers must, furthermore, consider the students' level when assigning activities so that the students can develop and exercise their capacities. Therefore, efforts to give students a fair chance and to improve equity are the key areas needing mathematics teachers' attention

(Siarova, Sternadel, & Mašidlauskaitė, 2017). Giving students fair chances is fundamental to the education process, classroom assessment, and the students' sense of being treated equitably (Herman & Cook, 2020). Equity within mathematics assessment means that all students in the class should be given the opportunity to demonstrate their knowledge and be supported to achieve expected levels (Nortvedt & Buchholtz, 2018). To ensure equity, classroom assessment needs to incorporate a variety of assessment approaches, both in terms of design and functions (Siarova et al., 2017).

1.2 Statement of the Problem

Classroom assessment in sub-Saharan Africa is still largely traditional, focusing on the assessment of learning rather than a transformative assessment that constitutes both summative and formative aspects (Akayuure, 2021; Ivan, 2021). In Ethiopia, education has undergone a radical change in its curricula. Despite the curricula's progressive nature, the shift to quality classroom assessment remains in policy for most classrooms and has not yet been transformed into practice (MoE, 2021). Teachers play a major role in this process and, for this reason, their competencies in transformative assessment practices are crucial (Hunsader, Zorin, & Thompson, 2015).

Literature regarding teachers' assessment practices in secondary school mathematics classes based on National Professional Standards is also limited in the Ethiopian context. Some of the few studies conducted on teachers assessment knowledge, skills, and practices have focused on primary schools (Bezabih, Yigzaw, & Garad, 2019; Bihonegn, 2018; Sintayehu, 2016). Again, these studies adopted descriptive surveys and quantitative approaches; however, this present study utilized a qualitative approach.

Furthermore, if the teaching-learning process in the classroom is not practice-oriented, it becomes boring and uninteresting as reflected in secondary schools in Ethiopia (Teferra et al., 2017). This is because teachers may give minimal attention to the quality of instructional activities and, hence, also to the practice of transformative assessments. Ethiopia's education development roadmap also indicates serious challenges exist in relation to student learning outcomes in secondary education (Teferra et al., 2017).

It is, therefore, very pertinent to examine the current classroom assessment practices of secondary school mathematics teachers in line with the standards set at the national level in order to identify challenges associated with them and propose and conduct interventions. Besides this, the study of teachers' practices of assessment is a critical issue in the field of assessment research at all levels and has wide-ranging implications for policy and practice in education.

1.3 Purpose of the Study

This study was designed to examine mathematics teachers' current state of classroom assessment practices and challenges in line with the National Professional Standards. Focusing on these standards, the researchers examined how assessment was conducted in the classrooms and the challenges associated with it. The findings of this study will also be used to establish the foundation for a larger study that will focus on improving mathematics teachers' classroom assessment practices through school-based professional development interventions.

1.4 Research Questions

This study tried to answer the following research questions:

1. How do mathematics teachers assess students in their classes?
2. What challenges prevent mathematics teachers from implementing transformative assessment methods?

2 Conceptual Framework

The framework of this study is adapted from the Ethiopian Ministry of Education document called *Professional Standards for Ethiopian School Teachers* (MoE, 2012). As part of professional practice, this standard provides teachers with guidance on classroom assessment practices during teaching-learning. It consists of broad categories of assessment knowledge and skills that are to be practiced by teachers of all grade levels in Ethiopia: *assessing students' learning, providing feedback to students, interpreting students' assessment data, and making consistent judgments* (MoE, 2012).

These constructs reflect the features common to transformative assessment practices of teachers as described in a variety of literature (Benson & Dresdow, 2014; Butler & McMunn, 2006; MoE, 2018; Popham, 2011). Each category includes indicators (Figure 1) that further describe and conceptualize how that activity is realized in a teaching-learning process.

3 Methods

We used a descriptive qualitative research methodology (Denzin & Lincoln, 2018) because we need a detailed understanding of the issue (teachers' classroom assessment practices) by talking directly with participants and observing their practices in their classrooms (Creswell, 2013) so as to design an intervention program to improve their practices.

3.1 Sample and Sampling Techniques

This study was conducted in some secondary schools found in Jimma City because of the proximity of the area to the researchers which would ease the frequent visits to the schools during the subsequent intervention. Besides this, Jimma is one of the most populous cities in southwest Ethiopia and, therefore, provides a large pool from which to recruit schools. Among the seven public secondary schools (Grade 9–Grade 12) during the 2021/2022 academic year, we selected three schools with a large number of mathematics teachers. From the 18 mathematics teachers in the three schools, we selected eight teachers purposefully based on their qualifications, experience in teaching mathematics, as well as their willingness to participate in the study. Other criteria for selecting the eight teachers included department heads and teachers who teach mathematics at least at two grade levels. Teachers who only teach at one grade level were not included because we needed the overview of assessment practices across all grade levels in order to pave the way for the later intervention.

Of the eight teachers, two had 11–15 years of teaching experience, two had 16–20 years of experience, and the remaining four had been teaching mathematics for over 20 years. Furthermore, four of the teachers have a Bachelor of Education degree and four have a Master's degree in mathematics.

3.2 Data Collection Instruments

Data for this study were collected through classroom observations first and then semi-structured interviews. Each classroom observation and interview was done in pairs with continual briefing and debriefing.

All observations were transcribed by hand using the Qualitative Observation form created by the researchers. The criteria for observing assessment practices in the lessons were based on the national professional standards described in the conceptual framework (Figure 1). Lesson observations helped the researchers gather accurate information about teachers' classroom assessment practices. During the observations, the observers sat at the back of the classrooms and observed the whole lesson of teachers who participated in this study (one teacher was observed twice).

The interviews were conducted in the two local languages, Afan Oromo and Amharic, which all the researchers,

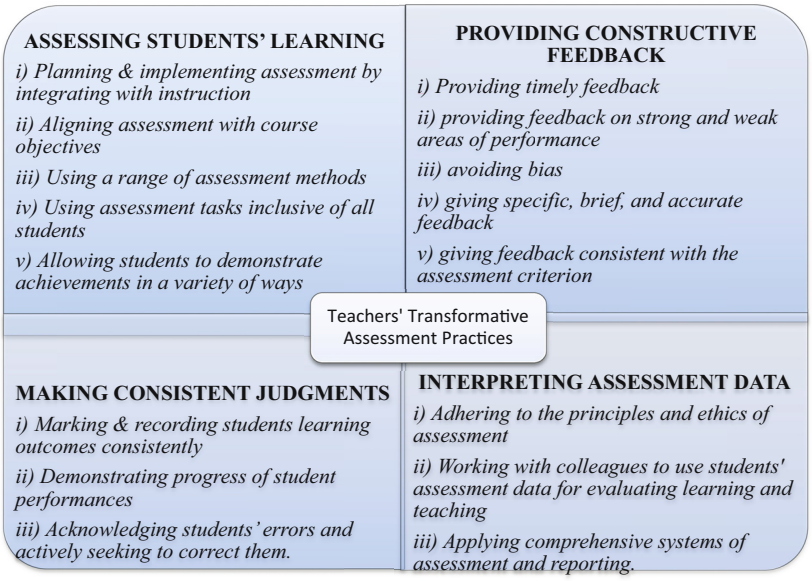

Figure 1: Four dimensions of transformative assessment practices (Adapted from MoE, 2012).

data collectors, and participants in the study spoke fluently. The interview questions the teachers asked were included: How do you assess your students? Do you involve all your students in classroom assessment activities? How do you provide feedback to your students? What basic principles and ethics of assessment do you choose to respect? What challenges do you encounter when conducting assessments in your mathematics classrooms? The interview sessions with the participants lasted on average 90 min. Several visits were made regarding some participants for clarification and to obtain additional information. The interviews were recorded on smart mobile phones and detailed note-taking was also carried out by the interviewers.

Both interviews and lesson observation data were collected by the principal researcher and five other Doctor of Education in Mathematics students who were taking the Advanced Qualitative Research Methods course. These five doctoral students were required to work with the researchers to gather and analyse both lesson observation and interview data for the requirements of their course completion to be submitted and presented during the time of this study. The involvement of these candidates improved the quality of the collected data and its analysis as there were a series of debriefing sessions regarding each step of data collection and analysis linked to the delivery of the corresponding parts of the course.

3.3 Data Analysis Methods

The collection and analysis of data passed through rigorous procedures. The first recorded interview audio file was transferred to a computer, transcribed, and translated to English, and debriefings were done on the process with the intention of getting insights about what is to be improved in the subsequent interviews and related processes. It was noticed, for instance, that limitations in the first interview such as brief interview duration, lack of probing in detail about certain issues, and establishing genuine rapport with the interviewee were agreed to be dealt with within the next interview. After that, other interviews were conducted, and audio data were recorded using smartmobile phones. Participants were given codes in such a way that their personal identity was not revealed. Next, all the interview data were transcribed, translated into English, and prepared in tables for initial coding (Kvale & Brinkmann, 2009). The translation was done sentence-by-sentence for each interview transcript and given to language instructors for review. Initial recordings and transcriptions were exchanged for review between the authors. Participants also had the opportunity to go over the transcripts and respective coded summaries to ensure the accuracy of the information (Groenewald, 2004).

After coding the first interview data, we constructed a master list (first-level codebook). As we proceeded with coding for the next transcript, codes were pulled from the master list if applicable, or new codes were created and added to the master list. Codes were re-coded at different levels based on the comments raised between the researchers and data collectors during debriefing sessions. Codes were, then, placed in a logical category or a word or phrase describing some segment of the data that is explicit, and hence, we did a second-level coding so that primary codes emerged into sub-themes. The second-level code book contains codes linked to the indicators of sub-categories regarding the framework of this study. Categories reflect themes that have become apparent and represent the major findings of the study (Braun & Clarke, 2006).

Data collected by lesson observations were also analysed thematically by the two observers immediately after the lesson. Accordingly, the collected text file data were prepared and coded (Creswell, 2012) using codebooks prepared for the same purpose. The coding process was the same as that for interview transcripts.

Generally, 63 (17 from lesson observations and 46 from interviews) and 23 (11 from lesson observations and 12 from interviews) codes emerged respectively from first- and second-level coding. This process provided an opportunity for data verification similar to inter-rater reliability (Constas, 1992). We kept a research notebook largely to ensure our data's trustworthiness. We also documented our inquiry process and the methods we used to collect and analyse data. Finally, we limited our findings to the data we collected and analysed. We analysed both observation and interview data manually because the database was manageable and easily kept track of files and locate text passages and wanted to be close to the data and have a hands-on feel for it (Creswell, 2012). We analysed text data involved using color-coding to mark parts of the text. The process is also inductive, going from the coding of descriptive text to the sub-themes and core themes (Creswell, 2012). Sample quotes from participants were used to support descriptions of the themes. By doing this, ethical issues were taken into serious account at every step of the study process. The objectives of the study were explained to the participants and their informed consent was obtained verbally. In order to maintain anonymity, teachers are also represented by pseudonyms such as T_11, T_12, T_21, and T_33, where T_12 represents teacher 2 from school 1 for instance.

4 Results

The results of this study are presented in this section. It was found that participants assessed their students by using different traditional forms of assessment techniques and aligning these techniques with learning objectives, however, the majority of their practices lacked equity. They also encouraged their students by advising them and practicing timely feedback even though it was not constructive. The teachers, moreover, discussed with their colleagues how to interpret assessment data for evaluating their students based on mainly summative assessments. Teacher, student, and school-related factors were the main challenges facing the teachers during assessment practices. The following sections provide detailed results of the study.

4.1 Assessing Students' Learning

Three themes emerged from the analysis of interviews and classroom observation as the current practices in relation to assessing students' learning: utilizing *traditional forms* of assessment, *aligning* assessment practices with learning outcomes, and *inequity* in assessing students' learning.

4.1.1 Utilizing Traditional Forms of Assessment

The result indicates that teachers assessed their students using traditional forms of assessment methods. *Traditional forms* of assessment methods are conventional methods of assessments that have been used for a long time and are simple approaches that generally utilize pen and paper tests. They are teacher-focused assessment activities; lower in complexities of the tasks assessed but require little time to administer and score (Waugh & Gronlund, 2013). These forms of assessments are practiced by all the teachers who participated in this study. One interviewed teacher expressed his practice as:

> *Mathematics is a suitable subject to assess. I assess students before, during, or after a lesson to know the extent to which students understood the lesson. I assess by giving objective-type tests, classwork, homework, midterm, and final exams. I also give group work and assignments to increase students' achievement. Many students do not achieve pass marks unless we provide them group work and assignments [T_12: 17/05/2022].*

These types of assessments may not be the most effective because the teacher focused on using assessment methods that help students achieve a pass mark rather than improve instruction and may not measure individual students' higher order thinking skills and knowledge accurately. The respondents also indicated that they followed the few fast learners' responses to the given assessment activities. They leave the rest behind and move forward to cover the portion. One teacher stated:

> *Most of the time, I give classwork to assess my students. Besides this, I use group work and also observe fast students' work to give feedback. Many students do not want to try their best to do the activities. They wait for me to do the questions and explain everything in class. So, to save time I sometimes check the response of a few students and continue the lesson to cover the portion [T_22: 07/06/2022].*

This kind of assessment practice leads to a decrease in the overall success and performance of many students in the classroom. It is critical to ensure that all students understand all the mathematical concepts presented to maximize their success. The teachers' practices of classroom assessment do not indicate they use alternative forms. Alternative forms of assessments require teachers to use their students' judgements, understand how to incorporate feedback into the classroom process, and determine how to meet the diverse learning needs of students (Hargreaves, Earl, & Schmidt, 2002; Monteiro et al., 2021).

It was also found that all the teachers observed used classwork and oral questioning throughout their lessons to assess their students. Nevertheless, only a few students try to answer the questions and many of them are passive learners. The following excerpt is additional evidence found from one teacher's lesson observation:

> *The teacher wrote three questions on the chalkboard which were about finding some missing elements in solving triangles and parallelograms. He allowed the students to do the questions in five minutes. After observing the solutions of three students who did the first two questions within the given time, he did all the questions on the blackboard by explaining the procedures and linking the concepts with the topic of the lessons taught previously. He then concluded the day's lesson by giving homework questions [T_21: 07/06/2022].*

The teachers also checked at the beginning of their lesson whether the students did homework. However, only a few students did their homework to some extent and some students did not even have exercise or notebooks. The teachers also did not take any action or push their students to do their best, but they needed to design mechanisms for engaging all students to do their classwork and homework. Hence, instead of focusing on a few students and rushing to the next lesson, teachers should provide constructive comments about classwork and homework to all students equitably.

4.1.2 Aligning Assessment Activities with Learning Objectives

In their interviews, many teachers stated that they usually plan assessment activities to use in their classes. They plan these depending on the objectives of the corresponding lesson. The *alignment* of the assessment to the curriculum confirms that the content of an assessment is coherent with a learning area and matches what will be taught in a classroom (Brown, 2018). Though the teachers aligned their classroom assessment activities with lesson objectives, they could not implement all the planned assessment methods in their classrooms. One teacher interviewed explained:

> *Yes, I plan my lesson. I plan the types of activities to be done based on the topic of the lesson. However, it is difficult to implement as planned because of a shortage of time. Also, when I implement the planned assessment, only a few students wanted to participate and the majority of them were careless [T_22: 17/05/2022].*

Data obtained from lesson observations also confirmed that teachers were not implementing the assessment methods they planned to use. Furthermore, they did not plan their daily lessons, but used weekly and annual lesson plans. Their weekly lesson plans lacked detailed assessment activities to be used for each daily lesson and their weekly planned assessment activities were also not implemented properly. Two of the teachers observed had no weekly lesson plan and had not planned any assessment activities to use in their classrooms. Yet they usually assessed their students by asking questions randomly, observing and monitoring students' attention to their explanations, and giving homework questions from the students' textbooks at the end of the lesson. The following paragraph is evidence from lesson observation:

> *There was no lesson plan prepared for this lesson. The teacher did not verbally explain the objectives of the lesson as well. Moreover, the teacher did not assess the students adequately apart from asking oral questions and many students did not participated in answering the questions. He explained, however, how to find the trigonometric values of special and obtuse angles [T_12: 17/05/2022].*

It was revealed by the study participants that, despite their efforts to plan for assessment targeting the intended learning outcomes, they were unable to implement their plan due to several problems. Some of them also did not have a plan for assessment from the beginning and, therefore, were doing anything that occurred to them in class.

4.1.3 Inequity in Assessing Students' Learning

The other very important feature of classroom assessment is *equity* which means the involvement of all students in different forms, content, and modes of assessment approaches (Gipps, 1995; Nortvedt & Buchholtz, 2018). It implies that assessment practice and interpretation of results are fair to all groups of students (females and males, slow, medium, and fast learners), as we use the concept. As a result of this broadening of the approach, students will have alternative opportunities to demonstrate achievement if they are disadvantaged by any particular assessment. All teachers who participated in this study, however, failed to ensure equity in their classroom assessment practices due to the large class size and students' low interest in attending mathematics classes. The following is an example of data obtained from one teacher we interviewed:

> *Since mathematics needs hard work, we assess how much our students have done and understand, what we have taught them. But, because of large class size, we only assessed a few students (about 25%). The majority, about 75% of the students, do not even want to participate in classroom assessments. Regarding tests and exams, all of them are involved though many try to copy from one another [T_33: 17/05/2022].*

The following paragraph is further data obtained from one of the teachers observed:

> *The teacher did not check properly that all students had understood the lesson. He only gave one group work in the last ten minutes and did not even wait until all the students finished it. He only discussed with the fast learners and then proceeded to conclude the day's lesson [T_22: 21/05/2022].*

Generally, these show that teachers had not practiced classroom assessments inclusive of all students. Though the teachers do not plan daily lessons and assessment activities properly, there are indicators for the experiences of aligning assessment activities with intended learning outcomes. Alternative forms of assessment methods were also not practiced by the teachers who rely more on traditional forms of assessment methods to measure their students' learning. As a result, learning assessment practices exercised by teachers do not pave the ways for transforming mathematics learning.

4.2 Providing Feedback

Effective assessment involves feedback to students that stresses both strengths of performance and weaknesses to be corrected (Waugh & Gronlund, 2013). All the teachers involved in this study communicated with their students about how they performed in their assessments. The themes that emerged under this construct include *showing assessment results* to the students on time and *praising* students

who tried to do the assessment given. The teachers did not provide feedback on their students' strong and weak areas.

4.2.1 Showing Assessment Results

The most common feedback given by the teachers is showing assessment results on time by giving correct answers to students' tests or exam papers. The following excerpt is evidence of this type of feedback practiced by one of the teachers interviewed:

> *...I show students assessment results immediately after marking their work. I also explain any questions students ask me, but the majority of students do not want to ask questions and are careless about taking correction and learning from their errors. Moreover, I provide feedback on students' exam papers by writing the answer on the papers if they missed the items. I also work out solutions for the test questions I give them in class [T_32: 17/05/2022].*

This quote illustrates how our participants intuitively understand feedback. Information communicated (e.g., grades and scores) is typical verification feedback which describes whether or not results are correct and carries no additional information about the task. Written feedback based on students' assessment results should, however, be constructive enough for each student to indicate where to go next (Hattie, 2012). Additionally, teachers should consider error correction as a social activity that involves the student's participation and meaningful interactions (Nassaji & Swain, 2000).

4.2.2 Praising Students

Praise is actually teachers' sincere approval or admiration of students who have performed well in their assessment activities. Praise is another most common type of feedback often practiced by the teachers as the following paragraph indicates.

> *...I praise students who try the given assessment task in class. However, I cannot go further to provide feedback for each individual student because of my workload and large class size [T_33: 17/05/2022].*

Praise given in a general or indiscriminate manner is not helpful and as praise rarely contains information related to the task, it is unlikely to result in increased engagement, commitment to learning goals, self-efficacy, or understanding (Gan, An, & Liu, 2021).

The data obtained from lessons observed in the classrooms are also not far from that which teachers described using interviews. It was found that all the teachers observed reacted to students' questions by explaining the concept but they did not give feedback to each individual student on the given classwork and other assessment activities they used as the following excerpt indicates:

> *The teacher gave oral feedback on the questions after students tried to do them. He also motivated the students by giving marks for some students who had done the classwork correctly and clapped his hands for three students who got a chance to explain their solutions on the chalkboard even though he didn't explain procedures and solutions correctly [T_11: 17/05/2022].*

However, if teachers are constantly telling their students that they are doing a good job, this becomes meaningless over time. They should praise students when they go above and beyond as this will also help to motivate them to try harder. Acknowledging the efforts of students can help to influence them positively and encourage them to carry out their assessments to a higher standard. Some teachers, however, did not provide adequate feedback to their students' questions. Not all the teachers provided adequate feedback to slow learners and many female students were also disadvantaged in this regard. The following lesson observation data indicates this issue:

> *Feedback was not provided to many students sufficiently. Off-task students were not motivated to participate especially when answers to classwork questions were explained. The needs of individual students, mainly slow learners and females, were not properly addressed [T_21: 07/06/2022].*

In a nutshell, the results of this study revealed that respondent teachers practiced *timely feedback* by highlighting what students did during their assessment activities. They did not, however, provide specific feedback for each individual student other than motivating all the students who tried to respond to the assessment activities given in the classroom.

4.3 Interpreting Students' Assessment Data

Assessment data can be interpreted in terms of the task to be performed (criterion reference) or the relative position held in some reference group (norm reference). Good-quality interpretations rely on good-quality assessment processes (Brown, 2018). The respondents of this study said that in order to interpret assessment data, they used standard-based or criterion references in their schools. They indicated that students' scores must meet the standard i.e., all students need to score 50 marks out of 100 to pass the subject. The two themes that emerged in this regard are *using non-achievement factors* and *discussing with colleagues*.

4.3.1 Using Non-Achievement Factors

Using non-achievement factors to interpret students' assessment results in this study includes students' effort, motivation, and attendance. The following interview excerpt indicates that teachers are giving marks to their students based on non-achievement factors such as class attendances by mentioning various reasons:

> *Generally, there is a problem in this area. Nowadays, students are focusing on Facebook and other social media, and these taking their time. Many students do not study hard and do not even do their homework. Due to this, many students fail in assessment and, thus, I give value for students' attendance, conduct, and class activities to help them get a passing mark in my subject [T_21: 17/05/2022].*

When interpreting assessment results, it is paramount to adhere to the principles and ethics of assessment by relying on academic factors that include student performance and achievement (Areekkuzhiyil, 2021; Yesbeck, 2011).

4.3.2 Discussing with Colleagues

All the teachers interviewed said that they *work with colleagues* (other mathematics teachers) on many aspects but not on how to use assessment data for evaluating students' performances. Instead, they discuss with each other to determine the number and types of questions to be included in a test or exam and how to manage students' conduct. The following is an example:

> *Yes, we have a formal departmental meeting and discuss how to cover the portion, what types of tests or exams we prepare and administer in class, we discuss students' conduct, and we meet many times to discuss many issues [T_33: 17/05/2022].*

However, a lack of genuine discussion on students' assessment results affects students' learning achievement. Discussing the assessment results of their students can help teachers modify their assessment practices in such a way as to serve the purpose of knowing the weaknesses and strengths of their students and modifying their teaching.

4.4 Making Judgements

This is a process for ensuring that marks and/or grades are given appropriately and consistently. Teachers have to make judgements about the qualities of the students' performance. It was found that teachers judge their students' performance through *marking and recording*, as well as by *reviewing their assessment results*.

4.4.1 Marking and Recording

Marking means checking and giving value to students' assessment work while recording involves keeping students' results in a mark list for the purpose of making judgements. Respondents of this study described that they mark and record all tests and exams after showing the results to their students. For example, one teacher said that:

> *... I mark the results of tests, assignments, and exams and record them on mark sheets. I mark and record them after showing the results to my students. Because of a shortage of time and resources, even though I have planned this, I couldn't mark and record class/homework and other daily assessment tasks [T_33: 17/05/22].*

As the excerpt indicates, teachers don't mark and record their continuous assessment activities in the classroom. Potentially, this could lead to inaccurate grading and incomplete assessment records. It is important for teachers to ensure that they are recording all planned assessment activities properly to ensure a fair and accurate evaluation of student performance.

4.4.2 Reviewing Students' Assessment Results

Teachers should review assessments to make sure they serve a purpose whether formative or summative. Formative assessments provide feedback to students to help them improve their understanding while summative assessments are used to measure mastery and assess learning. Both are important and should be used in the classroom. Teachers used student performance assessment results to support students in recognizing their misconceptions and inspire them to improve their learning. For example:

> *I review students' assessment results to see how students performed the activities or to see the wrong answers they gave to the questions and help them learn from this. Additionally, I acknowledge students' mistakes and advise them on how they can improve [T_21: 17/05/2022].*

There are also teachers who used classwork to judge the students' development of specific skills such as writing formulas and sketching graphs or geometrical figures in a way to attract and sustain the attention of students on a lesson. Here is the evidence:

> *Sometimes I also give a value (out of 5) to classwork as well as mark and record for those students who finish the task within the given time. This helps me to identify the students writing skills of mathematical symbols, formulae and figures, help students pay attention to the lesson, and also identify them gradually [T_11: 17/05/2022].*

On the other hand, judgements conducted by some teachers are not reliable and do not represent the actual level of students' performance. In these situations, teachers let all students pass the subject without necessarily identifying and measuring the students' learning progress. The following is an example:

> *Currently, all students' achievement results are inflated. It is difficult to accurately assess and interpret results of such large class sizes. As a result, the majority of the student score high results and can easily advance from one grade to the other [T_31: 17/05/2022].*

Generally, respondents of this study undertake judgements of their students' performances based mainly on tests and exams and, furthermore, sometimes by discussing with their colleagues. The discussion, however, was not based on individual student performance. The results indicate that *consistent judgements* of students' learning outcomes are rarely conducted. This lack of consistency can lead to inaccurate assessments of student performance which results in unfair grading and, ultimately, a lower quality of education. Furthermore, it can create an atmosphere of mistrust between students and teachers.

4.5 Challenges to Classroom Assessment Practices

With regard to the challenges mathematics teachers faced during the practices of classroom assessments, the teachers mentioned several factors. Based on the themes that emerged from the result of this study under this topic, these factors can be categorized as *teacher, student, and/or school-related factors*.

4.5.1 Teacher-Related Factors

Teacher-related factors include teachers' personal and professional values that affect their assessment practices in the teaching-learning process. These values can change from one teacher to another and include but are not restricted to their perception, skill, and knowledge of using transformative assessment techniques in their classes (Izci, 2016). The result of this study elucidated that teachers perceive assessment as testing and measuring students' performance and learning objectives. One of the participants explained that he practiced classroom assessment because he was required to do so. He further explained:

> *For me, classroom assessment is giving exams, homework, and tests to a class to know whether the objective of the content is achieved or not. If the objective is not achieved, I may revise the content or re-exam students because school leaders push us to let all students pass at the end of the semester or the year. For students, classroom assessment is also useful to get good marks and for the increment of their transcript results [T_31: 17/05/2022].*

From the above excerpt, we understand that the respondent teacher perceived classroom assessments as testing and measuring learning objectives which are practiced for accountability purposes. These perceptions of classroom assessment may, therefore, influence teachers to practice traditional forms of assessment rather than transformative ones.

4.5.2 Student and School-Related Factors

Other challenges of transformative assessment found in this study are *student and school-related factors*. The *student-related factors* found here are obstacles to classroom assessments such as students' discipline that includes copying from one another in tests, quizzes, and assignments, student absenteeism, coming late, students' lack of interest to study hard and their negative attitude towards mathematics. *School-related factors* relevant here include hindrances to classroom assessments such as workload, lack of resources, and carelessness about cheating in exams by some school officials. One teacher described this issue as follows:

> *Students' lack of interest to do their part is a great challenge. One reason is that school directors are careless in taking action on students' cheating in final and national exams. These problems cause students not to study hard because they think they can pass the exams easily. Students' lack of discipline is also a big challenge we are facing now. They cheat using their mobile phones and they get answers from outside the class such as through their group channels. To overcome this problem, we are giving them workout questions but the present situation defeats us [T_21: 17/05/2022].*

Classroom observation data also shows that numerous challenges exist in classroom assessment practices. The following challenges were observed from the two schools:

> *A large number of students in the classroom, some students enter from outside while the teacher is teaching, off-task students during group work, teachers' low ability to manage the class, and lack of using different classroom assessment techniques were observed [T_32: 18/05/2022] and [T_12: 17/05/2022].*

Respondent teachers were also asked about the way these challenges can be minimized. Teachers recommended various things including better student monitoring, reforming mathematics curriculums, and hiring more teachers.

Teachers moreover emphasized the importance of in-service training to update their teaching-learning activities, especially practical training that helps them update and transform their classroom assessment practices. For example, one teacher stated:

> *Training is essential. There is a gap between teachers in the same department because some of us graduated many years ago and some are medium and relatively young. It is, therefore, necessary to take training and improve our skills by sharing experiences. We need to get additional knowledge and skills on assessment practices so we need some training to update our classroom practices [T_22: 19/05/2022].*

The following teacher also added the importance of training by indicating a change to the system of assessment and students' attitudes is urgently needed.

> *The current assessment system in our school should be changed. Training that can help us change students' attitudes towards mathematics is also critical. Our current assessment practices are not on the right track. Teachers' opinions on classroom assessment and overall quality education should also be changed and go in the right direction. I think our system of assessment and overall system of education are also not in a good stake. Researchers, therefore, need to conduct a study on this issue and come up with solution ideas [T_32: 18/05/2022].*

This study generally clarifies that there are many challenges which inhibit the practices of quality classroom assessments that could transform mathematics education. Teachers' perception towards classroom assessment, large class sizes, students' cheating on assessments, and their lack of interest in studying hard are the major challenges that must be solved promptly through strong, practical intervention strategies as the respondents of this study suggested.

5 Discussions

This study investigated current practices and challenges of transformative assessment practices in mathematics classes of secondary schools in the city of Jimma. Concerning the use of different assessment methods, it was found that teachers used traditional forms of assessment techniques as also found in other studies (Dandis, 2013; Davis & Neitzel, 2011). Current thinking regarding classroom assessment, however, shows that mixed and a diversity of assessment approaches need to be used in the classroom as learning is multidimensional and cannot be adequately measured by one instrument (Brown, 2018; Monteiro et al., 2021; Veldhuis, Van Den Heuvel-Panhuizen, Vermeulen, & Eggen, 2013). While some believe traditional assessment methods are more effective, others think that alternative assessment tools are superior in transforming the teaching-learning process. Traditional assessment, generally called testing, measures what students can do at a particular time and often focuses on learners' ability to memorize and recall, both of which are lower levels of cognition skills (Dikli, 2003; Nabie, Akayuure, & Sofo, 2013). In addition to this, traditional forms of assessment methods facilitate cheating (Mehrens & Lehmann, 1991), which is highly prevalent in the secondary schools of this study area.

Alternative assessments, on the other hand, assess higher-order thinking skills. Students actually have the opportunity to demonstrate what they learn (Brown, 2018). This type of assessment tool focuses on the growth and performance of the student (Dikli, 2003) and, hence, has the power to transform mathematics instruction. If a student performs a given task at a particular time, she/he still has the opportunity to demonstrate her/his ability at a different time and in a different situation. Since alternative assessment is developed in context and over time, the teacher has a chance to measure the student's strengths and weaknesses in a variety of areas and situations.

Integrating different approaches to assessment can, therefore, allow for finding a balanced and consistent practice for assessing students effectively in order to ensure meaningful and inclusive learning for all of them (Siarova et al., 2017). A balanced approach to assessments is, therefore, critical and can transform mathematics instruction if the assessment framework described in the National Professional Standards document is to be implemented appropriately.

Classroom assessments that are meant to serve multiple purposes must, of course, be carefully planned. A single assessment, even if serving multiple purposes, cannot accomplish everything: assessments that monitor students' performance, for example, are less effective at instructing students, and vice versa (Chattergoon & Marion, 2016). Since the support of student learning is a key purpose of classroom assessment, it is necessary to plan assessments and use students' results to inform instruction. Having a specific, measurable, attainable, and time-bounded (smart) lesson plan can help teachers implement the lesson more easily and manage it in their classes.

For assessment practices in mathematics education, efforts to improve ethicality and equity also constitute another key area that needs teachers' consideration. The result of this study reveals that teachers included non-achievement factors when assessing their students. This kind of assessment practice results in misinterpreting the students' performance. Furthermore, teachers' reluctance

to include all types of students (e.g. slow learners, females, and others such as students who are less interested in learning mathematics) in classroom assessment activities causes the majority of students to be left behind even though the teachers have the responsibility to motivate all of their students to do their best in any assessment and learning activities (Mertler, 2017). Teachers have various responsibilities regarding fair and equitable assessment such as using different, balanced assessment approaches to assess students equitably and deepen their understanding of mathematics.

Observation of all students' work, performance tasks, projects, presentations, and self-assessments is, therefore, crucial to ensuring equity and transforming mathematics education (Suurtamm, Koch, & Arden, 2010; Wiliam, 2007). By using rubrics, exit cards, and oral questioning, teachers can better motivate students to learn and also provide more immediate and tailored feedback (MoE, 2018; Sinay & Nahornick, 2016). After the assessment, teachers are required to provide feedback on students' assessment performances because this increases students' motivation and confidence to learn and can better the quality of their work (Jarrett, 2016; Subheesh & Sethy, 2020).

Feedback is considered as a teacher's response to a student's performance (Subheesh & Sethy, 2020) rather than as a mere explanation of the answers to the questions given in assessments. Although showing students the results of their assessments, praising them, and advising them to work hard is important in motivating students, good feedback must be specific, immediate, linked to competencies, actionable, concise, use the right language, and be timely (Bahat, Tedre, Fors, & Mukama, 2016; Nicol & MacFarlane-Dick, 2006).

However, merely giving timely feedback by highlighting what students did in their assessment activities and communicating with them about how they performed in their assessment is sometimes not enough. The students may not quite understand where they are coming from and what they need to do in order to improve. The rationale for providing feedback is to help students use feedback comments and suggestions to enhance their learning (Subheesh & Sethy, 2020). Assessment feedback guides students about where and how they ought to be able to go next (Hattie, 2012). Acknowledging our students' efforts can also help positively influence them and help them carry out their assessments to a higher standard. Yet teachers need to get the balance right; letting the students know how they need to improve whilst providing them with motivation and support. Further, since learning is a result of teachers' interaction with their students within the zone of proximal development (Vygotsky, 1978), teachers must provide constructive feedback to support each student's mathematical development (Walshaw, 2017) based on their assessment results.

Assessing student learning also gives teachers a chance to see what students are learning (Hattie, 2012). The assessment gives teachers feedback on the instructional design of the subject while assessing students' responses (Hattie, 2012; Subheesh & Sethy, 2020) as practiced by a few of the mathematics teachers who participated in this study. Assessment is considered a powerful tool for judging a teacher's teaching effectiveness (Hattie, 2012). While assessing students' responses, teachers can identify the causes of students' good or bad learning performances. Thus, teachers like students, need to debate and agree about where they are going and how they are going (Hattie, 2012). Assessment is, of course, about the student but the power of interpretation and the consequences of assessment are more in the hands of the teachers.

Teachers are required to follow ethics and the principles of assessment in order to interpret students' assessment data fairly. They also need to discuss with their colleagues and ensure interpretation accuracy. Besides this, teachers should communicate with their students and consider how their interpretation may affect students and their learning. Most teachers did not use the results of the assessment data for any purpose other than assigning marks. Yet, they should interpret and use student assessment data to diagnose learning barriers and encourage students to improve their performance (MoE, 2012). Assessment data help teachers choose instructional methods for teaching students with different academic strengths and needs (Sigman & Mancuso, 2017).

From the results of this study, we can infer that mathematics teachers in the study area do not practice classroom assessment as effectively as is expected of them. The reasons they mentioned as challenges mainly involve large class sizes, shortage of time, lack of teaching and learning facilities such as computers, internet access, printers, papers, and students' lack of interest as cited in other studies (Asare & Afriyie, 2023; Azuka, 2014; Izci, 2016; Tebeje & Abiyu, 2015). Concerning time, inadequate professional development time is, of course, the most prevalent obstacle regarding getting teachers to use alternative assessments (Popham, 2011). Teachers did not feel they had the time they needed to consider procedures and issues associated with alternative assessments (Popham, 2011). They can, however, plan carefully to use different assessment techniques by integrating them with the planned lesson to be taught at a given time (Crichton & McDaid, 2016). It is also beneficial for them to use technologies which support their assessment practices.

Assessment also has the potential to enhance students' interest in learning mathematics (Bosse, 1995; Brown,

2018). As also found in various other studies (e.g., Okyere & Larbi, 2019; Susuwele-Banda, 2005), teachers' perception of assessment as a means of testing is another contributing factor to their unbalanced classroom assessment practices.

Additional challenges of classroom assessment practices found in this study include the fact that students copy from one another on exams, tests, quizzes, and assignments. One of the reasons teachers mentioned this is that school officials were willing to let all students pass final and national exams and, therefore, even tolerating cheating. This worsens the situation which risks getting out of control. As a result, many students might not study hard and wait for answers from others during class tests, regional, and national exams. In spite of this, teachers must discourage cheating by having students remove unnecessary material from their tables and closely monitoring students during exams or tests to ensure that all the students have an equal opportunity to perform well (Mertler, 2017).

6 Conclusions and Implications

This study is designed to examine secondary school mathematics teachers' practices and challenges regarding transformative assessment methods. The framework adopted for the study provided a conceptual lens through which to examine teachers' practices of transformative assessments. The study shows that teachers assessed their students mainly by using traditional forms of assessment methods such as oral questions, exams, classwork, assignments, homework, and tests by aligning these methods with instruction and learning objectives. Nevertheless, the majority of their practices were based on fast learners and thus lacked balance and equity. This caused the majority of students to not work hard and became one of the reasons for the prevailing academic dishonesty.

Teachers need to practice giving constructive feedback in order to provide ways for students to improve their learning by highlighting what students do well and what they need to work on according to assessments. Teachers' discussion with their colleagues regarding interpreting assessment data is also one of the very important activities practiced by too few respondents in this study. The teachers' interpretation was not fair enough and is sometimes, not based on ethics and principles of classroom assessments that help to make consistent judgements. The teachers' judgement of students' performance based on marking, recording, and reviewing students' tests and exams was unreliable because they mainly relied on summative assessment methods.

The challenges teachers are facing regarding assessing students contributed a lot to the failure of quality assessment practices that transform the teaching-learning of mathematics in the study area. These findings provide insights for stakeholders seeking to understand teachers' practices of transformative assessment based on the given framework. Indeed, a transformative assessment system is, in fact, one of the most important qualities to encourage students to take responsibility for what they have learned and develop a culture of respect which may nurture the younger generation of the present century. Since transformative assessment has a powerful effect on classroom behaviour as well as the learning process (Shinidler, 2010), it will moreover be a remedy for some of the challenges found in this study but teachers must develop the necessary knowledge and skills to use it effectively.

It is, therefore, important to note for stakeholders, particularly teachers and school leaders, that bettering students' learning through improved and transformative assessment practices must be a high priority in order to ensure quality education and cultivate responsible citizens. Teachers should, thus, undergo extensive training in the use of transformative assessment systems. As also suggested by the respondents of this study, the training should be practical and needs to focus on the skills and ways in which teachers can use alternative forms of assessment methods in large classes, practice constructive feedback, engage all students in assessment, and follow assessment ethics and principles so as to interpret assessment data and make consistent judgements regarding students' performance. Support for teachers to internalize and implement these assessment practices is most likely successful in the context of professional development programs.

Acknowledgements: We extend our sincere gratitude to our data collectors and the respondent teachers for their willingness to work with us during the study. Finally, our thanks go to Angela Clair Roberts (ELIC volunteer) for proofreading and editing language rules that greatly improved the manuscript.

Funding information: This research received no specific grant from any funding agency, commercial or non-profit sectors.

Conflict of interest: The authors state no conflict of interest.

References

Akayuure, P. (2021). Classroom assessment literacy levels of mathematics teachers in Ghanaian senior high schools. *Contemporary Mathematics and Science Education*, *2*(2), 1–9.

Areekkuzhiyil, S. (2021). Issues and concerns in classroom assessment practices. *Edutracks*, *20*(8), 20–23.

Asare, E., & Afriyie, E. (2023). Barriers to basic school teachers' implementation of formative assessment in the cape coast metropolis of ghana. *Open education studies*, *5*(1), 1–10. doi: 10.1515/edu-2022-0193.

Azuka, B. (2014). Assessment in primary school mathematics classrooms in Nigeria. *International journal of education learning and development*, *2*(2), 50–58.

Bahat, B., Tedre, M., Fors, U., & Mukama, E. (2016). Exploring feedback practices in formative assessment in Rwandan higher education: A multifaceted approach is needed. *International Journal of Teaching & Education*, *4*(2), 1–22. doi: 10.20472/te.2016.4.2.001.

Benson, J., & Dresdow, S. (2014). Design thinking: A fresh approach for transformative assessment practice. *Journal of Management Education*, *38*(3), 436–461. doi: 10.1177/1052562913507571.

Bezabih, B. M., Yigzaw, Y. H., & Garad, A. A. (2019). Knowledge, perception, practices and challenges of assessment for learning (AfL) among first cycle primary school teachers in Somali Regional State. *IOSR Journal of Humanities And Social Science (IOSR-JHSS)*, *24*(1), 21–33. doi: 10.9790/0837-2401062133.

Bihonegn, D. (2018). *Practices and Challenges of Implementing Continuous Assessment in Primary School Cluster Centers of Assosa Wereda, Benishangul Gumuz Regional State Addis Ababa, Ethiopia*. (MA thesis). Addis Ababa: Addis Ababa University.

Black, P., & Wiliam, D. (1998). Inside the black box: Raising standards through classroom assessment. *Phi Delta Kappan*, *80*(2), 1–13. doi: 10.1177/003172171009200119.

Bosse, M. J. (1995). The NCTM standards in light of the new math movement: A warning! *The Journal of Mathematical Behavior*, *14*(2), 171–201.

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, *3*, 77–101. doi: 10.1191/1478088706qp063oa.

Brookhart S. M., & McMillan J. H. (2020). Introduction. In S. M. Brookhart & J. H. McMillan (Eds.), *Classroom Assessment and Educational Measurement* (pp. 1–9). New York and London: Routledge, Taylor & Francis Group. doi: 10.4324/9780429507533-5.

Brown, G. (2018). *Assessment of student achievement*. New York and London: Routledge, Taylor & Francis. doi: 10.4324/9781315162058.

Butler, S. M., & McMunn, N. D. (2006). *A teacher's guid to classroom assessment: Understanding and using assessment to improve student learning* (pp. 94103–1741). San Francisco, CA: Jossey-Bass, A Wiley Imprint.

Chattergoon, R., & Marion, S. (2016). Not as easy as it sounds: Designing a balanced assessment system. *State education standard*, *16*(1), 6-9.

Constas, M. A. (1992). Qualitative analysis as a public event: The documentation of category development procedures. *American Educational Research Journal*, *29*(2), 253–266.

Creswell, J. W. (2012). *Educational research: Planning, conducting, and evaluating quantitative and qualitative research* (4th ed.). Boston: Pearson.

Creswell, J. W. (2013). *Qualitative inquiry and research design: Choosing among five approaches* (3rd ed.). Thousand Oaks, California: SAGE Publications, Inc.

Crichton, H., & McDaid, A. (2016). Learning intentions and success criteria: Learners' and teachers' views. *Curriculum Journal*, *27*(2), 190–203. doi: 10.1080/09585176.2015.1103278.

Dandis, M. A. (2013). The assessment methods that are used in a secondary mathematics class. *Journal for Educators, Teachers and Trainers*, *4*(2), 133–143.

Davis, D. S., & Neitzel, C. (2011). A self-regulated learning perspective on middle grades classroom assessment. *Journal of Educational Research*, *104*(3), 202–215. doi: 10.1080/00220671003690148.

Denzin, N. K., & Lincoln, Y. S. (2018). Introduction: The discipline and practice of qualitative research. In N. K. Denzin & Y. S. Lincoln (Eds.), *The SAGE handbook of qualitative research* (5th ed., pp. 29–86). Thousand Oaks, California: SAGE Publications, Inc.

Dikli, S. (2003). Assessment at a distance: Traditional vs alternative assessments. *The Turkish Online Journal of Education Technology*, *2*(3), 13–19. http://www.tojet.net/articles/v2i3/232.pdf.

Fjørtoft, H. (2020). Multimodal digital classroom assessments. *Computers and Education*, *152*(April), 1–11. doi: 10.1016/j.compedu.2020.103892.

Gan, Z., An, Z., & Liu, F. (2021). Teacher feedback practices, student feedback motivation, and feedback behavior: How are they associated with learning outcomes? *Frontiers in Psychology*, *12*(June), 1–14. doi: 10.3389/fpsyg.2021.697045.

Gipps, C. (1995). What do we mean by equity in relation to assessment? *Assessment in Education: Principles, Policy & Practice*, *2*(3), 271–281. doi: 10.1080/0969595950020303.

Groenewald, T. (2004). A phenomenological research design illustrated. *International Journal of Qualitative Methods*, *3*(1), 42–55. doi: 10.1177/160940690400300104.

Hargreaves, A., Earl, L., & Schmidt, M. (2002). Perspectives on alternative assessment reform. *American Educational Research Journal*, *39*(1), 69–95. doi: 10.3102/00028312039001069.

Hattie, J. (2012). *Visible learning for teachers: Maximizing impact on learning*. London and New York: Routledge, Taylor & Francis Group.

Hattori, K., & Saba, A. N. (2008). Comparison of classroom assessment practices: A case of selected Ghanaian. *NUE Journal of International Educational Cooperation*, *3*, 95–105.

Herman, J., & Cook, L. (2020). Fairness in classroom assessment. In S. M. Brookhart & J. H. McMillan (Eds.), *Classroom assessment and educational measurement*. New York and London: Taylor & Francis Group. doi: 10.4324/9780429507533-5.

Hunsader, P. D., Zorin, B., & Thompson, D. R. (2015). Enhancing teachers' assessment of mathematical processes through test analysis in university courses. *Mathematics Teacher Educator*, *4*(1), 71–92.

Ivan, C. W. (2021). Assessing the quality assessment practices on students' effort and achievement in Some Government Secondary Schools in Mfoundi Division, Yaounde, Cameroon. *European Journal2017of Education Studies*, *8*(4), 277–290. doi: 10.46827/ejes.v8i4.3697.

Izci, K. (2016). Internal and external factors affecting teachers' adoption of formative assessment to support learning. *Tojet – The Turkish Online Journal of Educational Technology*, *10*(8), 2541–2548.

Jarrett, M. G. (2016). *Teachers' perceptions of assessment practices in mathematics: Comparing rural And urban secondary schools in England*. Lynchburg, Virginia: Liberty University.

Junpeng, P. (2012). The development of classroom assessment system in Mathematics for basic education of Thailand. *Procedia - Social and Behavioral Sciences*, *69*(Iceepsy), 1965–1972. doi: 10.1016/j.sbspro.2012.12.152.

Kvale, S., & Brinkmann, S. (2009). *InterViews: Learning the craft of qualitative research interviewing Book Reference details* (pp. 1–2). Thousand Oaks, California: SAGE Publications, Inc.

Lamichhane, B. R. (2018). Assessment practices in mathematics: Local to global contexts. *Saptagandaki Journal*, *9*(February), 1–16. doi: 10.3126/sj.v9i0.20876.

Leung, K., Leung, F. K. S., & Zuo, H. (2014). A study of the alignment of learning targets and assessment to generic skills in the new senior

secondary mathematics curriculum in Hong Kong. *Studies in educational evaluation*, *43*, 115–132. doi: 10.1016/j.stueduc.2014.09.002.

Libman, Z. (2010). Alternative assessment in higher education: An experience in descriptive statistics. *Studies in Educational Evaluation*, *36*(2010), 62–68. doi: 10.1016/j.stueduc.2010.01.002.

Mehrens, W. A., & Lehmann, I. J. (1991). *Measurement and evaluation in education and psychology* (4th ed.). Belmont, CA, USA: Ted Buchholz.

Meletiadou, E. (2021). Using padlets as e-portfolios to enhance undergraduate students' writing skills and motivation. *IAFOR Journal of Education*, *9*(5), 67–83. doi: 10.22492/ije.9.5.04.

Mertens, D. M. (2009). *Transformative research and evaluation*. New York: The Guilford Press.

Mertler, C. A. (2017). *Classroom assessment: A practical guide for educators*. London and New York: Routledge, Taylor & Francis Group.

MoE. (2012). *Professional standard for Ethiopian school teachers*. Addis Ababa: Ministry of Education of Ethiopia.

MoE. (2018). *Mathematics Continuous Classroom Assessment Handbook Training Manual for Grade 7 and Grade 8* (Issue May). Adama Ethiopia: Ministry of Education of Ethiopia.

MoE. (2021). *Education Sector Development Programme VI (ESDP VI)*. Ministry of Education of Ethiopia, Addis Ababa.

Monteiro, V., Mata, L., & Santos, N. N. (2021). Assessment conceptions and practices: Perspectives of primary school teachers and students. *Frontiers in Education*, *6*(April), 1–15. doi: 10.3389/feduc.2021.631185.

Nabie, M. J., Akayuure, P., & Sofo, S. (2013). Integrating problem solving and investigations in mathematics: Ghanaian teachers' assessment practices. *International Journal of Humanities and Social Science*, *3*(15), 46–56. http://www.ijhssnet.com/journals/Vol_3_No_15_August_2013/6.pdf.

Nassaji, H., & Swain, M. (2000). A Vygotskian perspective on corrective feedback in L2: The effect of random versus negotiated help on the learning of English articles. *Language Awareness*, *9*(1), 34–51. doi: 10.1080/09658410008667135.

Nicol, D., & MacFarlane-Dick, D. (2006). Formative assessment and self-regulated learning: A model and seven principles of good feedback practice. *Studies in Higher Education*, *31*(2), 199–218. https://www.reap.ac.uk/reap/public/Papers/DN_SHE_Final.pdf.

Nortvedt, G. A., & Buchholtz, N. (2018). Assessment in mathematics education: Responding to issues regarding methodology, policy, and equity. *ZDM*, *50*(4), 555–570. doi: 10.1007/s11858-018-0963-z.

Okyere, M., & Larbi, E. (2019). Senior high school mathematics teachers' perception and use of assessment in the classroom. *African Journal of Educational Studies in Mathematics and Sciences*, *15*(2), 43–54. doi: 10.4314/ajesms.v15i2.4.

Olele, C. (2012). Alternative assessment: Emerging trends of classroom assessment in digital era. *Academic Research Journal*, *3*(1), 42–49. http://www.savap.org.pk/journals/ARInt./Vol.3(1)/2012(3.1-05).pdf.

Popham, J. (2011). *Transformative Assessment in Action: An inside look at applying the process*. Virginia USA: ASCD Alexandria.

Rivera-lacia, M. (2019). *Classroom practices in mathematics: Effects on elementary and secondary school students' achievement in mathematics in Region XII, Philippines*. (PhD dissertation). Australia: The University of Adelaide.

Shinidler, J. (2010). *Transformative Classroom Management: Positive strategies to engage all students and promote psychology of success*. San Francisco, CA: Jossey-Bass.

Siarova, H., Sternadel, D., & Mašidlauskaitė, R. (2017). *Assessment practices for 21 st century learning: Review of evidence*. NESET II report, Luxembourg: Publications Office of the European Union. doi: 10.2766/71491.

Sigman, D., & Mancuso, M. (2017). *Designing a comprehensive assessment system*. USA, San Francisco, CA: WestEd. https://www.wested.org/wp-content/uploads/2017/03/resource-designing-a-comprehensive-assessment-system.pdf.

Sinay, E., & Nahornick, A. (2016). *Teaching and learning mathematics research Series I: Effective instructional strategies*. Canada: Toronto District School Board.

Sintayehu, B. A. (2016). The practice of continuous assessment in primary schools: The case of Changi, Ethopia. *Journal of Education and Practice*, *7*(31), 24–30.

Stiggins, R., & Chappuis, J. (2005). Using student-involved classroom assessment to close achievement gaps. *Theory into Practice*, *44*(1), 11–18. doi: 10.1207/s15430421tip4401_3.

Subheesh, N. P., & Sethy, S. S. (2020). Learning through assessment and feedback practices: A critical review of engineering education settings. *Eurasia Journal of Mathematics, Science and Technology Education*, *16*(3), 1–18. doi: 10.29333/ejmste/114157.

Susuwele-Banda, W. J. (2005). *Classroom assessment in Malawi: Teachers' perceptions and pratices in mathematics*. (PhD dissertation). Blacksburg, Virginia: Virginia Polytechnic Institute and State University.

Suurtamm, C., Koch, M., & Arden, A. (2010). Teachers' assessment practices in mathematics: Classrooms in the context of reform. *Assessment in Education: Principles, Policy and Practice*, *17*(4), 399–417. doi: 10.1080/0969594X.2010.497469.

Tebeje, M., & Abiyu, A. (2015). Improving implementation of formative continuous assessment at college of agriculture, Wolaita Sodo University, Ethiopia. *Journal of Education and Practice*, *6*(19), 110–116.

Teferra, T., Asgedom, A., Oumer, J., W/hanna, T., Dalelo, A., & Assefa, B. (2017). *Ethiopian Education Development Roadmap (2017-30): An integrated Executive Summary.* Ministry of Education; Education Strategy Center (ESC); Addis Ababa.

Veldhuis, M., Van Den Heuvel-Panhuizen, M., Vermeulen, J. A., & Eggen, T. J. H. M. (2013). Teachers' use of classroom assessment in primary school mathematics education in the Netherlands. *Cadmo*, *21*(2), 35–53. doi: 10.3280/cad2013-002004.

Vygotsky, L. (1978). *Mind in society: The development of higher psychological processes*. Cambridge: Harvard University Press.

Walshaw, M. (2017). Understanding mathematical development through Vygotsky. *Research in Mathematics Education*, *19*(3), 293–309. doi: 10.1080/14794802.2017.1379728.

Waugh, C. K., & Gronlund, N. E. (2013). *Assessment of student achievement* (10th ed.). USA: Pearson Education.

Wiliam, D. (2007). Changing classroom practice. *Educational Leadership*, *65*(4), 36–42. doi: 10.4324/9780203392713-15.

Yesbeck, D. M. (2011). Grading practices: Teachers' considerations of academic and non-academic factors. In *VCU Scholars Compass Theses*. Virginia: Virginia Commonwealth University.