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## Examining Formative Assessment Practices in Mathematics in Primary Schools: China and Tanzania Comparative Review

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### ABSTRACT

Evaluation plays an enormous role in the teaching and learning process. Being aware of this, both China and Tanzania use formative assessment to meet the requirements of competence-based curricula especially in mathematics at primary school level. Therefore, the purpose of this study was to look into the formative assessment practices, nature, challenges in mathematics used by Chinese and Tanzanian primary schools. This report used documentary analysis to consult articles, dissertations, and books found in different electronic journals such as ERIC and Science Direct and deem them to have suitable information for the study. The report found that evaluation methods such as test, assignments, homework, and projects are common in both countries. Moreover, some dissimilar is some form of assessment including terminal test and monthly test which are common in Tanzania. Furthermore, bustling classes, heavy teaching loads, and a lack of clarity on the formative assessment implementation strategies have similarly contributed to the ineffective formative assessment in both countries. Further, the researcher recommends the recruitment of mathematics teachers and the provision of in-service and pre-service training to the teachers to reduce ineffectiveness in the implementation of formative assessment in Chinese and Tanzanian primary schools.

**Keywords:** *Assessment; Competence-Based Curriculum; Formative Assessment; Mathematics*

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### INTRODUCTION

In teaching and learning activities, assessment is an important aspect which involves evaluating the effectiveness of teaching and students understanding. In education sectors, assessment is categorized in two main forms such as summative and formative assessment. According to Black and Wiliam (1998) refers formative assessment as kind of evaluation which conducted by the teachers in the process of teaching and learning where teachers and learners undertake to get information that can be used to evaluate whether teaching and learning are effective. The formative assessment can be of different forms including teacher observation, classroom engagement, and judgment of student tasks such as tests and homework. The

information and feedback from the formative assessment mostly used to modify teaching and learning to confront student needs and improve student learning (Sawyer, Graham, and Harris, 1992). In this regard, among other roles, formative assessment has been introduced in different education system to improve performance of students and to effect teaching and learning activities.

Similarly, summative assessment involves judging the students understanding at the end of the course or program or level of education. Mostly the summative assessment used to evaluate the students understanding for the purpose of judging the whole course of study or level of education and help in making decision for allowing the students to go to next higher level of education or graduate (Cowie and Bell, 1999). Examples of summative assessment that are common in Tanzania are the ones provided by the National Examination Council of Tanzania (NECTA) at the primary level and secondary levels. However, the examination is regarded as important part of formative assessment (TIE, 2013). Similarly, examinations done at school level at the end of semester at all levels of education is regarded as summative assessment. In China examination such as national entrance examination (GAOKAO) and other exams done by the end of semester is considered as summative assessment.

Summative and formative assessment are necessary in different level of education, subjects and countries education sector for judging the quality of the students, improving the teaching practice and making different decisions. The practice is necessary for improving the teaching in different subjects including mathematics subject. According to Black and Wiliam (1998) identified essential elements of formative assessment including identifying the gap, feedback, learning progressions, and student involvement which is crucial for effective teaching of mathematics subject. The assessment provides crucial information to mathematics teachers that direct their actions. This information is crucial to teachers as it will enlighten them with the effectiveness or weakness of teaching and learning activities they employ in their classroom, whilst to students will enable them to find the gap they have towards their goal of better performance in mathematics (Heritage, 2007). To maintain the concept of spiral, effective mathematics teaching and learning processes requires information which indicates the gap between the concept which students has understood and those which are still difficult.

The implementation of formative assessment in different levels of education including secondary level is the one of the main strategies of assessing learners as well as to strengthen learner academic performance and achievement in broader (Hattie, 2009). However, assessment strategies, particularly formative assessment, differ from one country to another. The different is contributed by different factors including the philosophy of education, cultural reasons, a set of teacher philosophies of teaching, and teacher's personal preferences. With the assumptions on the different in formative assessment among different countries education system, this report intends to discuss the nature of formative assessment in mathematics between China and Tanzania at primary school level. The report intended at understanding the nature, similarities, and differences on mathematics formative assessment in Chinese and Tanzanian primary schools. Furthermore, the important points will be discussed for recommendations.

## LITERATURE REVIEW

### Formative Assessment Comprehension

Formative assessment is related to helping learners to enhance their learning and facilitating their success (Crooks, 2001; Aydeniz, 2009). Also, Cowie and Bell (1999) referred to formative assessment as the bidirectional technique between teachers and learners to improve, comprehend and acknowledge the learning. It is a dynamic process in which supportive teachers or classmates help students move from what they already know to what they can do next, using their zone of proximal development (Shepherd, 2005). Schools and teachers that use formative assessment effectively shows not only widespread increases in academic achievement but also extremely high gains for recently underachieving students.

In their study, Black and Wiliam (1998) identified essential elements of formative assessment which including identifying the gap, feedback, learning progressions, and student involvement. According to their findings, identifying gap involve a process of making clear the difference between what students know and what they need to know. While feedback which defined as information about the existing gap between actual level and the reference level of performance (Ramprasad,1983). The study findings stressing that formative assessment information was the only feedback that can be used to fill the gap exist to student's knowledge. Furthermore, student's involvement element considered involvement of students in their own learning and in self-assessment. This involves reflection on the pace they learn, to choose kind of assessment they prefer, among others (Teal, 2010). Lastly, learning progressions involve breaking down of learning objectives into smaller achievable learning goals. Teachers and students have to work in a collaborative way to break learning objective into learning goals and assessment should be according to the identified learning objectives (Teal, 2010).

## METHOD

Given that the study aims to explore formative assessment practices, nature, and challenges in mathematics used by Chinese and Tanzanian primary schools, a comparative case study design would be suitable. This design allows for a thorough examination of similarities and differences between the two countries. Documentary Analysis was used to collect relevant data from articles, dissertations, and books from electronic journals such as ERIC and Science Direct that provide insights into formative assessment practices in Chinese and Tanzanian primary schools. This information will serve as the basis for understanding the current landscape of formative assessment in both countries.

## FINDINGS

### Formative Assessment in Tanzania

As in other countries, Tanzania education system includes summative and formative assessment as the means of evaluating students learning in schools and colleges. In 2015, the Tanzania education system adapted to competence based curriculum which forced some changes in mode of assessment. To align with competence based curriculum needs, the Tanzania Institute of Education (TIE) introduced a new form of assessment with two main components including continuous assessment and a final examination (TIE, 2013). The introduction of continuous

assessment methods was meant to replace old methods of assessing students. The assessments were mandated for teachers to better scaffold student learning, engage students in competency development processes, and enable students to reflect upon and regulate their learning (Kahembe and Jackson, 2020).

The continuous assessment is the new form of formative assessment even though it does not completely remove the elements of formative assessment (TIE, 2013). In continuous assessment, the teachers still have the chance to provide small activities to students including individual assignments, groups work, exercises and homework's. Generally, in this regard, Mathematics formative assessment in Tanzania, commonly used formative assessment includes regular monthly test, terminal, and annual testing (Kyaruzi et al., 2018). The continuous assessment current is common among all schools in Tanzania even though the nature of items and time of doing the assessment is different. Paul and Tilya (2014) study report on the inconsistency of mathematics formative assessment used in primary schools in schools.

Basically, the shift to formative kind of assessment is in line with the Tanzania Development Vision OF 2025 (Kaaya, 2012) which states that Tanzania should:

*“be a nation with a high level of education at all levels; a nation which produces the quantity and quality of educated people sufficiently equipped with the requisite knowledge to solve the society's problems, meet the challenges of development and attain competitiveness at regional and global level (URT, 1999)”*.

From the quotation above, the government of Tanzania intended to strengthen education sector of its country by considering quality and quantity, implying that the country intends to have huge number of competent educated citizen, as a result the Tanzanian government deliberately decided to move to competence based curriculum as the way to enable Tanzania attain excellent education standards the government of Tanzania stressed the need to integrate assessment activities with everyday instruction using authentic approaches such as practical tasks, project work, portfolios and verbal questioning (Ministry of Education and Vocational Training (MoEVT), 2007).

Moreover, in Tanzania, teachers are urged to use authentic assessment methods such as portfolios, classroom or field observation, projects, oral presentations, self-assessment, interviews, and peer-assessment (Kitta and Tilya, 2010). However, the research findings show that teachers are still using traditional methods of teaching, which led to the ineffective use of formative assessment. The implementation of formative assessment particularly in most schools in Tanzania, remain indefinable (Mosha, 2012). This is due to the fact that the primary teacher is still implementing traditional methods of assessing students (Vavrus, 2009). Moreover, the results from the interview show that the burst of students limits the implementation of formative assessment in most primary schools in Tanzania. In his study Elibariki (2017) found that the overpopulation of some classes, comprising between 100 and 120 students, was a hindrance to teaching and learning activities in most schools in Tanzania.

### **Formative Assessment in China**

China has a long history of examination-oriented education with several reforms in basic education assessment. The reform in assessment took part as well in 2001 when the China ministry of education made curriculum reforms. The reform aimed at improving the assessment practice at primary level including in mathematics teaching and learning process. In his study Tu (2009) emphasized reforms where necessary for improving assessment practice in mathematics subject in Chinese schools. Zhao et al.

(2017) study has claimed that mathematics formative assessment particularly in Chinese primary schools has been of significant as it enables the students to understand and build sufficient mathematical skills.

In China is not much different from other countries as the main assessment methods in mathematics subject are school-based assessment, selection-aimed promotion assessment, and competition-based assistant assessment. Work-based assessments include routine assessments, period assessments, and concluding assessments (Ghaicha, 2016). Routine assessment, period assessment, and final assessment are all part of school-based assessment. These assessments mainly take the form of closed-book tests and closed-book examinations (Tu, 2009). Classroom assessment includes all teacher activities meant to collect information about their students' understanding of a particular topic (Zhao et al., 2016).

Furthermore, classroom assessment technique (CAT's) is common assessment technique in China. Classroom assessment technique involves the assessment in the hands of the teachers that is interwoven with instruction and integrated in daily teaching practice. It can inform teachers of where their students are and as such enable them to adapt their further instruction to their students' needs (Zhao et al., 2017).

Formative assessment in China considered to be not well practiced. Different reasons are considered by researchers in which poor know-how of formative assessment on various levels and heavy workloads of formative assessment on teachers is considered as the main cause (Li, 2008; Li, 2012; Zhao et al., 2016). Furthermore, the ineffective formative assessment implementation in China is heavily influenced by the teaching methods used by teachers during the session. The teaching methods are not well supportive the formative assessment as the teacher takes more charge in teaching and learning process (Li, 2008).

## DISCUSSION

### China and Tanzania Formative Assessment

The nature of mathematics formative assessment; In Chinese primary schools and Tanzanian primary schools the nature of formative assessment seems to be similar and some differences among some aspects. Different studies showed how the formative assessment are conducted in both countries and seemed in class activities such as test, homework's and individual assignments are common. As the form of assessment are supported by Kitta and Tilya (2010) and Tu (2009) as they claimed in their studies that test and assignments were mostly used by teachers in evaluating the students understanding during class hours. Furthermore, there has been inconsistency in using formative assessment among the two nations. The difference can be reflected in different aspects associated with implementation of formative assessment in mathematics, particularly at the primary level. From the findings indicate that, in Tanzanian primary school's teachers use midterm, terminal and final examination as a way of assessing students formatively. This finding concurred by Kyaruzi et al. (2018) study which stipulated that, formative assessment in Tanzanian primary schools often means regular monthly, terminal, and annual testing to reduce overdependence on the single final examination that students sit at the end of each primary education level.

In contrary, formative assessment to Chinese primary schools often means, the effective use classroom assessment techniques. The finding is supported by Zhao et al. (2017) study which claims the technique inform teachers of where their students are and



as such enable them to adapt and further their instruction towards students' needs. Furthermore, work-based assessment, selection-aimed promotion assessment, and competition-based assessment are common used in China.

Even though there some similarities among the assessment in mathematics subject in Tanzania and China, the findings showed some difference too. The difference is supported by studies such as that of Li (2008), Li (2012), and Vavrus (2009). The studies repeated the inconsistency of implementation of formative assessment in Chinese primary schools, to some extent the implementation strategies used in Chinese primary schools to implement formative assessment has been helpful while the implementation strategies used in Tanzanian primary school which are always reported ineffective. In the case of Tanzania, one of the key factors limiting effective formative assessment implementation is number of students in the classes. But the case of China is a bit contributed by workload. Furthermore, this indicates that both Chinese and Tanzanian mathematics teachers are facing a heavy teaching load, which limits their ability to provide effective feedback and follow-up, hence ineffective implementation of formative assessment.

## CONCLUSION

The study reviewed the nature, similarities and difference in formative assessment in mathematics at primary school between China and Tanzania. The study finds similarities in the nature of the formative assessment including test, homework and assignments which are common between the two countries. Furthermore, there some differences in the nature of assessment including in Tanzania having terminal and monthly examination as the continuous assessments which is different from China systems of formative assessments. Moreover, the study found the challenges like in effective provision of feedback to students, lack of clarity in assessing strategies and heavy workload which cause ineffectiveness in formative assessment to be the similar challenges facing implementation of formative assessment in primary schools of the two countries. However, china has, achieved effortful implementation of formative assessment as compared to Tanzania. Therefore, Tanzanian educationist, policy makers, and curriculum developers and implementers have something to learn from Chinese strategies in implementing effective formative assessment.

Likewise, the reports recommend on the effective provision of regular in service and pre service training to the primary teachers of China and Tanzania to build sufficient ability and confidence of teachers in implementing formative assessment in mathematics at primary level of education. the educational authorities and ministry have something to do with reducing the teaching loads to the teachers. Recruitment of sufficient number of teachers will probably decrease teaching loads to the existing teachers. This will accelerate the implementation of formative assessment hence improving academic performance of the student in primary schools especially in mathematics subject.

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