

## **Classroom-Based Formative Assessment Mirroring 21st-century Skills: Experiences from Secondary School Teachers in Dodoma, Tanzania**

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### ***Abstract***

*Rapid changes in science and technological advancement have made it necessary for teachers to align their pedagogical approaches and assessment activities to help the students master the required skills. However, there is limited proof from literatures suggesting teachers' understanding and competence in fostering the 21st-century skills to their students. Against this rarity in knowledge, the present study examined whether teachers have the requisite understanding of the 21st-century skills and whether they are skilled in shaping teaching and assessment practices that inculcate students' 21st-century skills. Guided by a phenomenological research design, this study was accomplished through classroom observation and focus group discussions with 28 secondary school teachers who were purposively selected. Deductive Thematic Analysis of the generated data revealed that teachers had a limited understanding of the 21st-century skills and their objectives. It was also revealed that teachers' formative assessment activities fall short of the 21st-century skills. It was observed that the majority of teachers' assessment activities reflect a phased-out content-based curriculum that perpetuates memorization of facts rather than problem-solving and critical thinking; the assessment activities adopted by teachers did not foster students' mastery of the 21st-century skills. The study found that teachers were not well prepared to design assessments that foster mastery of the 21st-century skills. It is therefore recommended that regular training for in-service teachers should be conducted in order to enable them acquire up-to-date teaching and assessment skills as required by the changes introduced in the school curricula.*

**Keywords:** *21st-century Skills, Assessment, Formative Assessment.*

### **Introduction**

The past two decades have as a wake-up call for educational planners and policymakers worldwide to reassess how education systems can best prepare young people to meet the demands of a contemporary competitive world.

Different countries have developed various models of competencies and skills that are referred to as 21st-century skills (Siarova, et al., 2017). This paradigm shift is a call for our education and the classroom teaching and learning processes to change accordingly. Teachers must adapt their pedagogy and assessment of learning by integrating competence-based assessment, which emphasises non-cognitive learning outcomes (Abdullateef, 2021; Siarova, et al., 2017). Other non-cognitive learning outcomes such as teamwork, honesty, hobby, tenacity and tolerance which were forgotten have to be considered during classroom assessment. These are important to motivate students and discover all potentialities and interests (Shute & Becker, 2010).

In the 21st-century, students are expected to be provided with the knowledge, skills and abilities they need to compete and thrive in the day-to-day ever-changing world (Erdem, et al., 2019). Collaboration, communication, problem solving, critical thinking and creativity are the most required skills (Chu, et al., 2016). These skills make learners productive and proactive with an inquisitive mind towards job market and in bringing positive change in society. Despite the advancements made by the government, a majority of assessment strategies have not changed much in the 21st-century. Traditional paper-and-pencil methods are still preferred by teachers because they are simple to administer and grade. As students transition to secondary school, there are higher expectations for change across various domains, including knowledge acquisition, socio-emotional development, and behavioral adjustments. Teachers play a crucial role in ensuring that students' aspirations are met, as secondary education is a critical pathway to their future careers. Therefore, teachers must go above and beyond to meet students' needs and develop the necessary 21st-century skills. This study determined whether formative assessment in Tanzania secondary schools is consistent with these 21st-century skills.

### **21<sup>st</sup>-Century Skills**

The 21st-century skills are essential for an individual's holistic development. They enable individuals to contribute to the progress and development of society, nation, and the world (Central Board of Secondary Education, 2020). This holistic development encompasses social, emotional, physical, mental, and intellectual growth. According to Erdem et al. (2019), these skills have emerged in the 21st-century following rapid changes in science and technological advancements. Additionally, they describe them as a paradigm shift from material to immaterial labour, emphasizing weightless production that requires processing-oriented skills such as teamwork and problem-solving abilities in the current generation. The development of these skills

necessitates educational reforms to cultivate skilled individuals who can tackle postmodern challenges. In the context of educational reforms, secondary school students need these 21st-century skills to thrive in their future and adapt to changes. The knowledge and skills acquired should be applied and demonstrated using advanced technology in a competitive global economy (Suto, 2013). Therefore, teachers should align their teaching and learning activities with the current paradigm shift from content-based to competence-based assessment. This study considers the following five key 21st-century skills.

### **Collaboration Skills**

Collaboration is a "mutual engagement of participants in a coordinated effort to solve a problem together" (Lai, 2011, p. 2). It involves shared goals, a symmetrical structure, and a high level of negotiation, interactivity, and interdependence. Collaboration skills refer to abilities that facilitate learning mechanisms (Hunter, 2006). Some scholars describe collaboration skills as interpersonal arrangement skills that extend beyond mere cooperation (Davidsen, et al., 2020). In cooperation, tasks are divided among individuals who then work separately and submit individual contributions for assembly at the end (Lai, 2011). However, in collaboration, each individual's effort is acknowledged and incorporated. There is a sense of unity, and coordination of activities is maintained throughout the process. In collaboration, every individual has an equal opportunity to participate, leading to a better overall output.

Research indicates that collaboration is fostered through group work and constructive learning (Chu, et al. 2016), where active, social, contextual, engaging, and student-driven learning experiences result in deeper understanding (Kuhn, 2015; Lai, 2011; Omari, 2006). By promoting collaborative learning, secondary school students can benefit in various ways. They include enhanced cognition and knowledge acquisition, development of higher-order thinking skills, improved oral communication, better self-management, leadership, negotiation, and conflict resolution skills, increased social interdependence and ability to share resources and cooperate with peers and others (Hidayati, 2019; Rannikmäe, 2016).

### **Communication Skills**

Exchange of ideas between individuals holds significant importance in student learning. It is a two-way process involving a sender, message, channel, and receiver for effective conversation. According to Komba (2015), communication entails the exchange of thoughts, feelings, or ideas toward a mutually agreed-upon goal. Students must effectively articulate their thoughts

and ideas using oral and written communication skills in various forms and contexts (Partnership for 21st-century Skills, 2010). Besides, students communicate and present their group's ideas to the class as a whole during group discussions and presentations (Lai & Viering, 2012). It is anticipated that enhanced communication abilities will also improve other abilities. The use of body language, facial expressions, and other non-verbal communication cues should be emphasized in classroom teaching. Teachers' use of verbal and non-verbal communication can enhance students' understanding of learned concepts (Johnson & Smith, 2007; Fawcett & Garton, 2005). This approach can also benefit students with special needs, such as those with hearing impairments, as they can observe classroom interactions.

Additionally, students' listening, reading, discussion, and writing skills should be developed through communication (Alhaddad et al., 2015). This will foster strong classroom interaction and, ultimately, improve their performance. Therefore, communication skills should be nurtured in students to create a safe learning environment with supportive relationships. Teachers should be highly skilled in both verbal and non-verbal communication to ensure smooth teaching and learning processes (Suto, 2013). Furthermore, during instruction, assessment activities should be clearly stated and understood by students (Lai, 2011).

### **Problem Solving Skills**

This skill is the most intricate, encompassing critical thinking, creativity, decision-making, and transformation skills (Pande & Bharathi, 2020). Secondary school teachers should motivate students to cultivate problem-solving skills. This can be achieved through hands-on activities, where projects and self- and peer-assessment can be utilized to gauge the level of competency.

### **Critical Thinking Skills**

Critical thinking involves the ability to interpret, analyze facts, evaluate, and make informed decisions. In essence, it is thinking about thinking itself, focusing on metacognition. Due to innovations and technological advancements, developing critical thinking skills is essential for secondary school students. This enables them to apply these skills to solve social and economic problems more effectively and efficiently (Pande & Bharathi, 2020). In the 21st-century, assessment activities are expected to be structured to develop critical thinking skills. Teachers should employ various teaching and learning approaches, provide a variety of assessment tasks, encourage

students to ask questions and emphasize the practice of active learning strategies (Lai & Viering, 2012).

### **Creativity and Innovative Skills**

The skill of creativity is essential for expanding our perspectives, enabling individuals to view the world from a broader standpoint (Partnership for 21st-century Skills, 2010). Therefore, secondary school students need creativity and innovation skills to generate new knowledge and ideas and to implement these ideas to address day-to-day socio-economic issues. In the classroom, teachers should promote creativity skills by employing various strategies. These include starting lessons with a question posed by the teacher, selecting a student to ask a question, asking students to exchange notes from the previous day's class to compare understanding, and occasionally conducting a "traffic light" exercise (Lai, 2011). By performing these activities in the classroom situation, there is a likelihood of promoting students' creativity and innovation skills.

### **Classroom-Based Assessment Practices**

Teaching and assessment are interconnected aspects of the education process, with the learning outcomes/objectives serving as the link between them. Teachers focus on teaching based on the stated objectives to be achieved. Subsequently, they assess the activities taught in the classroom, primarily focusing on the reflection of these objectives. Assessment is essential for determining the level of performance in the teaching and learning process, and providing effective feedback (Sanga, 2016). Assessment of students' tasks has always been central to the teaching and learning process, driving school attainment, student performance, and educational reforms worldwide. Assessment, defined as a systematic, continuous process, monitors various learning components to evaluate student achievement and instructional effectiveness (Ogula, 2009). Continuous monitoring is required in the teaching and learning process, with assessment being crucial for tracking student progress (Walde, 2016). Assessment serves several purposes, including helping teachers determine the effectiveness of their teaching techniques and learning materials. It allows teachers to refine and redefine learning outcomes based on assessment feedback. Assessment also helps determine the general trend in the development of the teaching/learning process.

Furthermore, it enables teachers to assess students' understanding and correct any misconceptions. Assessment results inform policymakers and other educational stakeholders about whether the knowledge imparted to students meets the current demands of the job market (Partnership for 21st-century

Skills, 2010). Assessment is commonly conducted in two ways: formative and summative. Formative assessment is a frequent, interactive assessment of student progress and understanding to identify learning needs and adjust teaching methods accordingly (Organization for Economic Co-operation and Development, 2008). It is a range of formal assessments conducted during the learning process to modify teaching and learning activities and improve student attainment (Omari, 2011; Popham, 2008). The goal is to determine whether students can do what they were previously unable to do. Summative assessment, on the other hand, is a formal assessment conducted at the end of an educational activity to provide feedback that summarizes the teaching and learning process at a particular level (Gronlund & Waugh, 2009). Classroom-Based Assessment (CBA), a form of formative assessment, plays a significant role in students' performance. CBA consists of day-to-day activities offered to students to evaluate the effectiveness of the teaching and learning process (Popham, 2008). Davison and Leung (2009) suggest that CBA operates in two ways: for informing and for forming. The former focuses on feedback, while the latter emphasizes monitoring day-to-day learning activities for effective learning. The primary role of CBA is to improve teaching and learning rather than generalizing students' results (Abeywickrama, 2012).

The effectiveness and efficiency of CBA depend on how 21st-century skills are promoted. Secondary school students should be taught these skills so they can work in teams, compete in the global economy, use technology for development, and come up with creative and original solutions to societal issues (URT, 2019; Shumba & Naong, 2012). However, studies by Walde (2016), Sanga (2016), and Lai (2011) reveal challenges in promoting 21st-century skills, particularly in terms of teaching and assessment. These challenges stem from the educational setup, curriculum design, available resources (human and material), students' abilities and attitudes, teachers' interests, abilities and expectations, budget allocation, cultural and ideological perspectives, as well as the willingness to change.

### **Rationale**

The Tanzanian academics deserve great recognition for their efforts in researching this topic (see Kangalawe et al., 2019; Mkimbili & Kitta, 2019; Senjiro & Lupeja, 2023; Saimon et al., 2023). For example, Kangalawe et al. (2019) explored the implementation of a Competency-Based Curriculum (CBC) based on the experiences of secondary schools in Temeke District, Tanzania. Categorically, their study sought to understand the assessment modes used in the implementation of CBC in secondary schools and the availability of the desired resources for the assessment of the implementation

of CBC. Others are to understand teachers' skills and competency in assessing CBC implementation in secondary schools, and teachers use of the assessment feedback to improve practical skills in secondary schools. The study involved 391 students, 115 teachers, 7 headmasters/mistresses, 4 students finished in those schools, 1 District education office, 1 director of NECTA, and 1 Director from TIE. Data were collected through questionnaires and interview guides. Generally, the findings exposed that the mode of assessment used in schools remains pen and paper, which does not align with CBC requirements. Judging from the study objectives and its overall conclusion, the study was useful for understanding the assessment practices currently employed by teachers for CBC implementation. Still, their study was not free from faults.

From their study, it appears difficult to understand what CBC components were more focused on. Similarly, the 21st-century skills are hardly visible from their study. Based on the previous studies, it is evident that a few research attempts were made to investigate teachers' assessment of 21st-century skills, hence making the conduct of this study necessary. Specifically, the present study had two major objectives: to explore secondary school teachers' awareness of emerging 21st-century skills and to determine teachers' preparedness to use formative assessment tools for assessing 21st-century skills. It is assumed that unless secondary school teachers are competent in assessing teaching and learning activities that reflect 21st-century skills, they cannot implement classroom-based formative assessment to assess teaching and learning processes.

### **Methodology**

The study utilized a qualitative approach informed by a phenomenological research design, employing classroom observation and focus group discussions. Twenty-eight secondary school teachers were purposively selected as key informants due to their relevant experiences in teaching and assessing secondary school students. Among these teachers, 12 participated in focus group discussions (FGDs), while 16 were observed in the classroom. The selection was based on convenience and availability. The study employed deductive thematic analysis, wherein data were transcribed, organized into themes aligned with the research objectives, and reported in a narrative format.

Trustworthiness was ensured through credibility, dependability, confirmability, and transferability. Triangulation, member checking, comparison of interpretations with raw data, and prolonged engagement in the field were conducted to enhance credibility. Additionally, participatory and collaborative research methods, such as searching for discrepancies and

expert reviews, were employed to ensure that participant's views and opinions were accurately reflected. The study-maintained records and reviewed them during data presentation and analysis for consistency. Field notes were recorded and transcribed to allow readers to assess the findings through ongoing reflection. Confidentiality and anonymity of respondents were ensured by obtaining informed consent, enabling respondents to participate freely and voluntarily in the study.

### Findings and Discussion

The data obtained from the focus group discussion and classroom observation guide were triangulated in order to maintain coherence and consistency in reporting the findings. The findings were based on data obtained from each objective. The following are the findings and discussion of the findings as follows;

#### Secondary School Teachers' Awareness of the Emerging 21st-century Skills

The first objective of this study was to delve into secondary school teachers' awareness of emerging 21st-century skills. Under this objective, researchers aimed to understand how teachers perceive 21st-century skills and their objectives, providing a clear direction for the study.

**Table 1:** Teachers Understanding of 21st-century Skills and their Objectives

Theme	Sub-theme	Responses
Teachers' understanding of 21st-century skills and their objective	<ul style="list-style-type: none"> <li>Teachers' conception of 21st-century skills.</li> <li>General knowledge on 21st-century skills.</li> </ul>	<p><i>Positive conception</i></p> <p><b>Reason:</b> <i>They have been trained through SEQUIPT programs whereby the cascade model is used. The capacity building program is known as Continuous Professional development for in-service teachers.</i></p> <ul style="list-style-type: none"> <li><i>Acquisition of different skills from the teaching and learning process which help learners to use them in solving various problems in society.</i></li> <li><i>Are highly regarded as cognitive skills which enable the students to be able to survive in the labour market.</i></li> <li><i>Are teaching and learning ways.</i></li> <li><i>Skills based on discussion.</i></li> <li><i>Used to solve day to day problems.</i></li> <li><i>Most preferred skills to be used in classroom assessment.</i></li> <li><i>Help teachers to cope with changes in science and technology.</i></li> <li><i>Knowledge acquired by students to fit in the world of science and technology.</i></li> </ul>



From Table 1, the findings reveal mixed feelings/concepts on teachers' understanding about 21st-century skills although they claimed to be aware because of attending seminars and workshops that were offered under Tanzania Secondary Education Quality Improvement Project (SEQUIPT). While some informants regard 21st-century skills as cognitive skills, other regards them as teaching methods or ways that teachers use to facilitate teaching and learning. Furthermore, some informants mixed up the skills with assessment methods. With regard to these findings, teachers' understanding and awareness on the emerging skills is still low, as supported by Senjiro and Lupeja, (2023) in their study which examined teachers' competence in developing 21st-century skills in teaching and learning processes. From these findings, one underscores the need for deliberate efforts to be taken by the MOEST in collaboration with TIE to continue providing professional development for secondary school teachers on emerging 21st-century skills.

### **Teachers' Preparedness to use Formative Assessment Tools for Assessing 21st-century Skills**

The second objective of this study was to determine teachers' preparedness to use formative assessment tools to assess 21st-century skills. On this objective, researchers sought to find the level of knowledge and skills secondary school teachers have towards authentic formative assessment and how they put into practice in classroom situations towards assessing 21st-century skills.

**Table 2: Teachers’ Preparedness for using Formative Assessment Tools for Assessing 21st-century Skills**

<b>Theme</b>	<b>Subtheme</b>	<b>Responses</b>
Teachers’ preparedness to use formative assessment for assessing 21st-century skills	<ul style="list-style-type: none"> <li>Teachers’ knowledge about classroom formative assessment.</li> </ul>	<p><i>-Classroom-based assessment conducted during the process of teaching and learning.</i></p> <ul style="list-style-type: none"> <li><i>It is conducted after every session to measure the level of understanding.</i></li> <li><i>type of assessment used in the process of teaching and learning</i></li> </ul>
	<ul style="list-style-type: none"> <li>Examples of classroom-based formative assessment tools that promote 21st-century skills.</li> </ul>	<p><i>Tests, quizzes, examinations, practical, group discussions, presentations and dictation.</i></p>
	<ul style="list-style-type: none"> <li>21st-century skills teachers assess during or upon completion of instructional session.</li> </ul>	<p><i>example of the skills that teachers assess are communication, reading, writing, listening, problem solving, collaboration, critical thinking, independent learning, personal, social and computer literacy.</i></p>
	<ul style="list-style-type: none"> <li>Classroom-based formative assessment strategies used to assess 21st-century skills.</li> </ul>	<p><i>Collaboration is assessed through group discussion; problem solving is assessed through quizzes and focus group; communication is assessed through question and answer, self-assessment, peer group and portfolio; creativity is assessed through assignment, and question and answer.</i></p>

The findings presented in Table 2 indicate that the informants had a conceptual understanding of classroom-based assessment. However, when it came to identifying the components of classroom-based formative assessment that promote 21st-century skills, there were multiple variations in responses. Some informants demonstrated a thorough understanding, while others mixed it with teaching and learning methods. The classroom assessment tools mentioned in the focus group discussions (FGDs) and observed during classroom practice primarily measured content, as revealed in the FGDs and the classroom observation guide. During classroom observations, teachers predominantly emphasized formative assessment methods that measured content rather than competence.

This contradicts the formative assessment methods outlined in the National Curriculum Framework (URT, 2019), which emphasizes the integration of various assessment methods to promote students' acquisition of knowledge, skills, values, and attitudes for solving day-to-day problems (URT, 2014). A study by Paul and Tilya (2014) also noted similar findings, indicating that secondary school teachers in Tanzania lacked the skills to use formative assessment effectively for promoting knowledge acquisition. However, Mkimbili and Kitta (2019, p. 68) argued in their review that the rationale for continuous assessment for developing competencies in the Tanzanian secondary school context is not sufficiently practiced. These scholars further stated that insufficient practices result from teachers' struggles to cover the content and use assessments to prepare students for final examinations. Researchers also observed similar cases during the assessment of pre-service students, whereby the majority of in-service teachers (local teachers) had already covered the syllabus by June, while some were still striving to cover it in early July. This situation raises questions about whether students are able to acquire the necessary skills as stipulated in our education curriculum (URT, 2019). In such a scenario, the implementation of classroom-based formative assessment that reflects 21st-century skills cannot be fully realized, and meeting the expected objectives will remain challenging unless deliberate efforts are made to address this issue.

### **Application of Classroom-based Formative Assessment Strategies to Promote 21st-century Skills during Teaching and Learning**

The study sought to understand the implementation of different classroom-based formative assessment that enhances 21st-century skills. Table 3 provides the findings as follows;

**Table 3: Observed Teachers’ Application of Classroom-based formative Assessment Strategies that enhances 21st-century Skills during teaching and Learning Processes**

S/N	Classroom formative assessment	Degree of adopted formative assessment method
1.	The teacher uses assessment methods that suit the topic/content.	±
2.	The teacher uses more than two assessment methods during the assessment of T/L processes.	–
3.	The teacher varied assessment activities that are suitable to different levels (gifted, normal, students with learning difficulty)	–
4.	The teacher employs hands-on-activities that promotes creativity and critical thinking skills.	–
5.	The teacher uses technology in assessing students’ learning when teaching.	–
6.	The teacher uses assessment methods that enhances problem solving skills	–
7.	The teacher uses assessment methods that support collaboration and communication skills.	±

**Source:** Field Data Survey

**Key:** + = fully employed. ± = partially employed, – = Not employed assessment methods.

The results in Table 3 show that some teachers employ assessment methods that are suitable for promoting 21st-century skills. The findings revealed that out of 7 items prepared for measuring teachers’ application of classroom-based formative assessment strategies that promote 21st-century skills, only 2 items were partially employed in item of employing assessment methods which are suitable for the concept/content taught. Besides, 5 out of 7 items prepared were observed not applied in classroom teaching and learning processes. Researchers assumed that perhaps teachers were not applying classroom-based formative assessment strategies that promote 21st-century skills due to time constraints; at the time researchers were collecting data, it was the time the majority of teachers were making revisions, and some were winding up the syllabus.

However, during focus group discussions, it was observed that some teachers are not conversant with the current move of paradigm shift of competence-based assessment and they use their own ways of assessing teaching and learning activities. According to the National Curriculum Framework for Basic and Teacher Education ([NCFBTE], 2019) states that teachers are required to employ several assessment methods at the classroom level in each stage of teaching in order to determine the level of students’ performance and whether the learning was taking place. Besides, a growing body of knowledge (Senjiro & Lupeja 2023; Mkimbili & Kitta 2019; Sanga 2016)

observed teacher's incompetency due to unpreparedness, lack of frequent seminars and workshops, lack of motivation as few teachers are attending training, while others have to be taught by the teachers attended (Cascade model). As a result, teachers in the line discover that they lack the motivation to learn from their peers and that they know very little about using formative assessment in the classroom to promote 21st-century skills. Furthermore, large number of students in the class and overloaded number of periods to teachers hampers the effective implementation of authentic classroom-based assessment as results the stipulated goals for 21st-century remains uncultivated.

### **Conclusion and Recommendation**

Teachers' preparedness and knowledge of classroom-based formative assessment are crucial for improving the teaching and learning process. This study aimed to explore teachers' awareness of 21st-century skills and how they implement them in the classroom. The findings revealed that while teachers had a positive perception of 21st-century skills, this perception was not reflected in their actual teaching practices. The study suggests that teachers in the selected area have limited knowledge of 21st-century skills, despite claiming to have been trained in these skills.

Additionally, the study sought to understand the extent to which teachers are prepared to use classroom-based formative assessment that aligns with 21st-century skills. It was observed that there was a discrepancy between teachers' understanding of classroom-based formative assessment and their actual practices in the classroom. As a result, the study concludes that teachers are not adequately prepared to use classroom formative assessment to foster 21st-century skills, leading to limited knowledge of employing classroom-based assessment. Based on these findings, the study recommends that the Ministry of Education, Science, and Technology, in collaboration with educational institutions, continue to offer seminars, workshops and other professional development opportunities on classroom based-formative assessment which mirrors 21st-century skills.

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