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Evaluating Teachers' Formative Assessment Practices and the Promotion of 21st Century Competencies in Primary Schools

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Abstract: I*n the 21st century, globalization, technological advancement, and shifting societal needs have created a complex landscape that demands more than traditional knowledge. To thrive, individuals must possess essential competencies like problem solving, decision making effective communication and collaboration. The study investigates the relationship between formative assessment practices and the development of the 21st century competencies among learners. Using a descriptive survey research design, data was collected from 315 primary school teachers via questionnaire, selected through stratified sampling. Multiple regression analysis revealed a significant positive correlation between frequency of formative assessment practices, challenges, support and the development of 21st century competencies. Specifically, practices like project based assessment, practical work and multimedia projects enhance digital literacy, communication, creativity, life skills, critical thinking and physical wellbeing. The study recommends integrating multidisciplinary assignments, personalized learning pathway and technology facilitated cross cultural collaboration into assessment procedures to accommodate diverse learning styles and aptitudes. These findings have implications for educators, policy makers, stakeholders seeking to prepare learners for success in a rapid evolving world*

Keywords: evaluation, formative assessment, 21st century skills, primary schools

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INTRODUCTION

Assessment is an integral part of teaching, as it determines whether or not the goals of education are being met and it affects decisions about advancement, placement, grades, instructional needs, curriculum, and, in some cases, funding. Classroom assessment pertains to the techniques employed by educators to collect information regarding student learning throughout the instructional process, serving both to guide teaching and to offer feedback to learners. Classroom assessments are categorized into three distinct sub types: Assessment of Learning, Assessment as Learning, and Assessment for Learning. Among these, Assessment of Learning, commonly referred to as summative assessment, is performed at the conclusion of units, terms, or academic years to ascertain whether students have met the established curriculum outcomes. Conversely, Assessment as Learning focuses on the proactive involvement of students in overseeing their own learning, utilizing self-assessment and reflection to cultivate meta-cognitive skills and assume greater accountability for their educational progress. In contrast, Assessment for Learning is rooted in theories related to meta-cognition, motivation, and self-regulation, incorporating strategies such as communicating learning objectives and success criteria to students, delivering comprehensive feedback on their performance, facilitating continuous self-monitoring of their progress, and encouraging self- and peer-assessment (Lysaght et al., 2019). Formative assessment is a systematic process carried out regularly or daily by educators to collect data aimed at enhancing learning, integrating both Assessment as Learning and Assessment of Learning methodologies (Oo et al., 2022). This evaluative approach is crucial in fostering learning across educational settings at all levels. Assessment, in many ways the heart of education, is central to instructional decision making and has an immense impact on questions of grading, placement, advancement, instructional needs, curriculum and often the allocation of state or local funding. Formative assessment is an integral part in support to learning. This form of assessment also provides diagnostic feedback and instructional correctives during the teaching-learning process to help students learn, motivation, and self-regulation (Black & William, 2009; Cauley & McMillan, 2010; McManus, 2008; Popham, 2008).

Assessment refers to the process of evaluating learners' knowledge, skills, and attitudes, primarily to inform decisions regarding their education. It plays a crucial role in the teaching-learning process within Primary Schools and is considered a component of the curriculum (MINEDUB, 2018). Assessment serves as an objective means of updating parents, guardians, and policymakers about the progress of learners in school. In Cameroon, assessment in primary schools can be categorized into three types: oral, written, and practical. There are numerous methods available for collecting information regarding a learner's progress. This can be achieved through: observation checklists; self-assessment by learners; daily practical assignments; samples of learners' work; learners' willingness to engage and contribute in projects or conferences; oral and written quizzes; portfolios; and participation in class and school activities.

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It is important to note that both formative and summative assessments must consider knowledge, skills, and attitudes as outlined in the "Expected Learning Outcomes" column for each subject (MINEDUB, 2018). Formative assessment refers to a method of evaluation that maintains continuous engagement between learners and the curriculum throughout the teaching-learning process. This type of assessment is intended to monitor learners' academic progress. Additionally, learners' responses to this ongoing interaction assist the curriculum user (the teacher) in delivering feedback to both the learner and their parents.

The integration of formative assessment practices that fosters 21st century competencies such as critical thinking, creativity, collaboration and communication poses a significant challenge for may primary schools. Teachers often lack the necessary training, resources and support to implement effective formative assessment practices, hindering the development of these essential skills in students. Insufficient formative assessment can lead to learners' disengagement and decreased motivation ultimately affecting the development of 21st century competencies. Despite the recognized importance of formative assessment in enhancing learners learning outcomes, there is limited understanding how those practices impact the development 21st century skills in primary school students. The frequencies of formative assessment practices, challenges faced by teachers, and support systems available are to them are crucial factors that may shape learners experiences.

The study aims to investigate the relationship between formative assessment practices and the development of 21st century competencies, including critical thinking, problem solving, and collaboration in primary schools. Specifically, it examines the significant relationship between frequency of formative assessment practices, challenges faced by teachers, support systems and the development of 21st century competencies.

The social constructivist theory guides the application of formative assessment practices in primary education by highlighting the social aspect of learning and the significance of interaction in knowledge construction. Learners develop knowledge through engagement with peers, educators, and their surroundings. They acquire knowledge via collaborative activities, discussions, and shared experiences. Learning occurs within a specific context, and students interpret new information by connecting it to their prior knowledge and experiences. Encouraging students to evaluate and provide feedback to one another fosters collaborative learning and social interactions. Utilizing classroom discussions, self-assessment, peer assessment, quizzes, and classwork to enhance student interaction clarifies understanding and encourages critical thinking. Teachers use formative assessments to test students' knowledge and abilities on a regular basis and to provide them with feedback to improve their learning. One important component of classroom evaluation that helps instructors and students make decisions is formative assessment (Bulut et al., 2025). Formative assessment is frequently used during instruction to address questions like "What

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are the strengths and weaknesses of students' understanding of the course content?" "How should I (as an instructor) adapt the lesson to make it more beneficial to students?" and "Is there any student who is falling behind in the class?" in contrast to summative assessment, which evaluates students' cumulative knowledge after the instruction (Wylie & Lyon, 2013; Bulut et al., 2023). According to Wiliam (2011), the fundamental strategies for formative assessment include making sure that everyone understands the learning objectives and success criteria by making clear the intended learning outcomes; creating activities, discussions, and assignments in the classroom that motivate students to show their learning progress; providing feedback that promotes learning improvement; encouraging peer-assisted learning; using students' collective knowledge as a teaching resource; and assisting students in taking ownership of their education.

The social constructivist theory, along with formative assessment, supports inquiry-based learning, which enhances problem-solving, critical thinking, and creativity. These methodologies also promote project-based learning, which nurtures collaboration, communication, and creativity, as well as student autonomy, allowing them to take charge of their learning and cultivate self-directed learning skills. Formative assessment encompasses evaluations such as oral questions, tests, quizzes, assignments, and examinations, conducted intermittently throughout a course of study. Formative evaluation assists in determining whether to continue or discontinue curriculum development to conserve resources and avoid investing in a program that is unlikely to succeed. In the classroom, it provides students with essential feedback regarding their academic progress and also aids teachers in assessing the effectiveness of their instruction

The regularity of formative assessments holds great significance as ongoing feedback enables students to make gradual modifications to their learning approaches, ultimately resulting in substantial enhancement in performance over time (Black & Wiliam, 1998). Cauley and McMillan (2010) emphasize that the frequent implementation of formative assessments offers students prompt feedback and helps them concentrate on their development, thus fostering a growth mindset and supporting ongoing improvement.

Moreover, the implications associated with formative assessments are crucial to their overall effectiveness. When students view assessments as a low-stakes chance to enhance their learning instead of a high-stakes evaluation, they are more inclined to engage genuinely with the material and utilize the feedback in a constructive manner (Bulut et al., 2025).

Formative assessments that are ungraded and optional can lead to greater student achievement compared to those that are mandatory and graded, as they alleviate the pressure and anxiety linked to testing, enabling students to concentrate on learning rather than simply performing well (Wickline & Spektor, 2011; Brookhart, 2017).Yan et al. (2021) identified two primary categories of factors that either promote or obstruct teachers' intentions and practices concerning formative assessment: individual and contextual factors. Individual factors include teachers' professional

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development training, attitudes, beliefs, and self-efficacy regarding formative assessment, while contextual factors encompass the school environment, internal support, and cultural norms. A notable barrier that intertwines both individual and contextual factors is the perception of time constraints. Research conducted across various educational levels indicates a disconnect between theory and practice, with teachers facing challenges in effectively implementing formative assessment due to large class sizes and substantial workloads (Büyükkarcı, 2014; Cisse et al., 2021; Yan & Brown, 2021). For example, delivering individualized feedback becomes difficult in classrooms with over 30 students (Yan & Brown, 2021), and opportunities for peer and self-assessments are similarly limited. Teachers frequently express that their demanding curricula and perceptions of insufficient time impede their capacity to dedicate adequate time for formative assessment.

According to Özer Özkan and Özkan (2025), it is widely accepted that heterogeneous groups promote more effective learning. Nevertheless, in the context of formative assessment, the presence of students with significantly different learning levels can create obstacles, particularly when coupled with the challenge of large class sizes, resulting in a classroom environment that impedes the effective application of formative assessment practices. Another significant factor is the reluctance of teachers to modify their assessment methods (Brown, 2004; Remesal, 2007). Cisse, Ndinga, and Sane (2021) noted that numerous teachers are resistant to the adoption of formative assessment practices. This reluctance may arise from a preference for established routines, comfort with current methodologies, and reluctance to investigate new strategies. Marshall (2014) observed that teachers are more inclined to utilize formative and student-centered assessment techniques in subjects where they feel assured, while they tend to depend on traditional summative assessments in areas where they lack confidence. Additionally, teachers' resistance to implementing formative assessments intensifies when they are insufficiently prepared or lack the requisite knowledge and resources (Cisse et al., 2021).

A lack of awareness or comprehension regarding the advantages of formative assessment is another crucial factor. Some educators may not recognize the importance of essential components of formative assessment, such as ongoing feedback and student engagement, and this resistance can obstruct its effective implementation (Özer Özkan & Özkan, 2025).

Formative assessment is essential for the cultivation of 21st-century skills among learners. It promotes personalized learning, continuous growth, and student-centered teaching, serving as a conduit that nurtures vital 21st-century competencies such as critical thinking, creativity, communication, collaboration, digital literacy, problem-solving, and social responsibility. These competencies are crucial for academic achievement and for navigating real-world challenges, thereby making a positive contribution to society. Educational institutions are re-evaluating their teaching and assessment methods to equip students with the necessary skills for success in the 21st century, with formative assessment leading this change. The significance of these skills in

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education lies in their capacity to furnish students with the knowledge and competencies required to tackle the complex and evolving challenges of the modern world. These competencies, which include adaptability, critical thinking, teamwork, digital literacy, creativity, and others, provide students with the resources they need to thrive in an interconnected and digitally proficient society as traditional educational methods evolve (Balayogi, 2024).

Ellis (2013) and others highlight that, historically, a major limitation in enhancing formative assessment was the predominance of face-to-face course delivery, which hindered the ability to capture learning interactions and outcomes for the purpose of identifying and analyzing formative feedback and assessment. Nevertheless, in the 21st century, advancements in technology have created numerous opportunities to collect both performance and assessment data, allowing for analysis to gauge student progress across various activities and to identify necessary adjustments to support diverse learners (Bichsel, 2012). Certain automated systems are equipped to gather such data. However, it is the proficient application of this data that will yield beneficial effects for both learners and educators (Spector, 2014a; Spector, 2016). Learning analytics initiatives across different educational institutions can facilitate a more precise identification of learner behaviors and critical areas requiring additional support for academic advancement (Siemens & Baker, 2012). The examination of extensive data sets containing insights into student learning and performance holds considerable promise for influencing formative feedback, as well as the development of instructional methods and educational practices and policies (Spector, 2016).
Formative assessments, characterized by timely and constructive feedback, can enhance effective problem-based and inquiry-based learning, which is particularly reliant on formative feedback from students (Salomon & Globerson, 1987; Shute, 2007). Almost all learning environments in the 21st century are intertwined with and reliant on digital technologies, including computers, handheld devices, the Internet, interactive whiteboards, and more. Consequently, the fundamental purpose of formative assessment remains unchanged due to new technologies. Instead, the importance of formative assessment has intensified in light of new technologies and the demands of 21st-century learning (Spector et al., 2016).

MATERIAL AND METHOD

A total of 315 primary educators from Anglophone primary schools, both public and private in Yaoundé III Sub Division in Mfoundi Division, Center region of Cameroon, made up the study sample. The Krejcie and Morgan (1970) sample size determination table was utilized to calculate the sample sizes for these participants, and the population participants were chosen by a stratified sampling procedure.

The gender distribution reveals a higher representation of female participants (n = 195; 61.9%), compared to male participants (n = 120; 38.1%). This gender disparity may reflect the broader gender trends within the teaching profession, particularly in early childhood and primary education

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settings, where women often dominate the workforce (UNESCO, 2022). The age distribution indicates a relatively youthful and active teaching population. The largest age group falls within 31–40 years (n = 153; 48.6%), followed closely by those aged 20–30 years (n = 142; 45.1%), suggesting that over 90% of participants are below 41 years. A smaller proportion are aged 41–50 years (n = 20; 6.3%), indicating fewer older or late-career teachers in the sample. This trend might reflect recent recruitment patterns or attrition of older staff due to retirement or career change. With regard to the type of school, the majority of respondents work in public institutions (n = 177; 56.2%), while private school teachers constitute 43.8% (n = 138). This balance suggests that both sectors are fairly represented, though public schools maintain a slight dominance, which may correspond to national proportions in the education system.

The class distribution is spread across six levels of instruction. The most frequently taught classes were class six (n = 92; 29.2%) and class five (n = 75; 23.8%), which together represent over half of the sample. These upper primary levels are critical for learners' transition to secondary education, and the larger teacher representation here could indicate increased staffing demands or specialized instructional focus at these levels. Lower class levels, such as class one (n = 34; 10.8%), class two (n = 37; 11.7%), and class three (n = 34; 10.8%) are less represented, while class four (n = 43; 13.7%) lies at the mid-range. In terms of academic qualifications, the vast majority of participants hold the Advanced Level certificate (n = 246; 78.1%), which is the most common minimum qualification for teaching at the primary level in Cameroon. A further 16.2% (n = 51) have a university degree, while only 5.1% (n = 16) possess the Ordinary Level certificate.

A negligible proportion holds a Master's degree (n = 2; 0.6%), reflecting limited postgraduate qualifications among primary school teachers. Participants demonstrated varied teaching experiences. Nearly half of the respondents fall within the 6–10 years' experience bracket (n = 155; 49.2%), indicating a relatively seasoned workforce. Additionally, 29.2% (n = 92) have 11–15 years of experience, and 13.0% (n = 41) have been teaching for 16–20 years, suggesting strong mid-level professional representation. On the other hand, only 2.2% (n = 7) of teachers have 1–5 years of experience, while 6.3% (n = 20) have over 21 years, indicating a relatively small number of novice and veteran educators.

The demographic data reveals a predominantly female, young-to-middle-aged teaching workforce with moderate to substantial teaching experience. The educational qualifications are heavily skewed towards the Advanced Level certificate, with limited higher academic qualifications. Teachers are fairly distributed between the public and private sectors, with an emphasis on upper primary classes. These insights are crucial for informing policies on teacher development, recruitment, and deployment in the basic education sector.

A questionnaire was used in a descriptive survey study designed to gather research data from the participants. The first section aimed to gather demographic data on instructors and determine the

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prevalence of formative assessment procedures used by respondents to help students build 21st century skills. The instrument was designed by the researchers to accommodate the environment and the research participants. The instrument was designed with a four-point Likert scale format to evaluate the frequency of formative assessment practices (1 = daily, 2 = weekly, 3 = monthly, and 4 = rarely)as well as the support, difficulties and the development of the 21st century competencies (1 = strongly agreed, 2 = agreed, 3 = disagreed, and 4 = strongly disagreed). The questionnaire's face validity and content were established. The study instrument's reliability was assessed using test-retest reliability. Before being administered to the sampled participants, the questionnaire was first evaluated on a group of 20 instructors. Two weeks later, it was given to the same teachers once more. Cronbach's alpha and values were used to evaluate the reliability; they were 0.85 for formative assessment procedures and 0.78 for the development of 21st century competencies.

Data analysis was conducted using the Statistical Package for Social Sciences (SPSS) version 27.0. The research data were interpreted using a variety of statistical tools, including regression analysis, mean, standard deviation, and descriptive statistics, and the results of the regression analysis were deemed statistically significant at a 95% confidence level ($p<0.05$).

RESULTS

Table 1: Sample distribution according to Frequency of formative assessment practices

Statement	**Scale**	**Frequency**	**Percentage**	**Mean**	**Standard deviation**
I use observations to assess learners understanding	Daily	164	52.1%	3.66	0.86
	Weekly	117	37.1%		
	Monthly	10	3.2%		
	Rarely	24	7.6%		
I administer quizzes or tests to check pupils' understanding of new concepts	Daily	140	44.4%	3.57	0.52
	Weekly	171	54.3%		
	Monthly	4	1.3%		
I collect and review learners' assignments to identify areas where students need extra support	Daily	159	50.5%	3.58	0.62
	Weekly	135	42.9%		
	Monthly	21	6.7%		
I use class discussion to gauge learners understanding of new concepts	Daily	181	57.5%	2.55	0.71
	Weekly	98	31.1%		
	Monthly	34	10.8%		
	Rarely	2	0.6%		
I provide feedback to learners on their performance and progress	Daily	152	48.3%	2.69	.781
	Weekly	117	37.1%		
	Monthly	38	12.1%		
	Rarely	8	2.5%		
	Daily	163	51.7%	3.58	0.69

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I use self-assessment to encourage learners to reflect on their own learning, identifying strengths and weaknesses	Weekly	128	40.6%		
	Monthly	18	5.7%		
	Rarely	6	1.9%		
I use group work to encourage learners work together, share ideas and learn from each other	Daily	141	44.8%	3.77	0.83
	Weekly	119	37.8%		
	Monthly	42	13.3%		
	Rarely	13	4.1%		
I use peer assessment to encourage learners take ownership of their learning and develop self-assessment skills	Daily	127	40.3%	3.83	0.80
	Weekly	119	37.8%		
	Monthly	64	20.3%		
	Rarely	5	1.6%		

(Source: field data 2025)

This table provides a descriptive analysis of teachers' formative assessment practices based on the reported frequencies, percentages, means, and standard deviations of eight specific classroom assessment strategies. B1. Observation to assess learners' understanding: A majority of respondents (52.1%) reported using observations daily, while 37.1% used them weekly. A small proportion indicated monthly (3.2%) and rare (7.6%) usage. The high mean score of M = 3.66 (SD = 0.86) suggests a strong and consistent use of observation as a formative assessment strategy. The relatively low standard deviation indicates limited variability among respondents. B2. Administering quizzes/tests to check understanding of new concepts: This method is predominantly used on a weekly basis (54.3%), followed by daily use (44.4%), with only 1.3% using it monthly. The mean score (M = 3.57, SD = 0.52) reflects a high frequency of application, though slightly less consistent than observations, as indicated by the lower standard deviation. B3. Reviewing learners' assignments to identify support needs: Half of the respondents (50.5%) reported daily use, and 42.9% used this method weekly.

A minor proportion (6.7%) did so monthly. The mean value (M = 3.58, SD = 0.62) indicates that assignment review is a widely practiced strategy with moderate variability. B4. Using class discussion to gauge understanding: More than half of the teachers (57.5%) reported daily use of class discussion, while 31.1% used it weekly, and 10.8% monthly. Rare usage was negligible (0.6%). Interestingly, the mean (M = 2.55, SD = 0.71) is relatively low compared to the frequency percentages, possibly due to the scale coding or interpretation nuances, which may need clarification. The standard deviation shows moderate variation in responses. B5. Providing feedback on performance and progress: This essential practice is used daily by 48.3% of respondents and weekly by 37.1%, while 12.1% and 2.5% use it monthly and rarely, respectively. The mean score (M = 2.69, SD = 0.78) is somewhat lower than expected given the reported frequencies, suggesting inconsistencies in feedback provision or possible differences in how feedback is understood or applied. B6. Encouraging learner self-assessment: Over half of the respondents (51.7%) implement self-assessment daily, and 40.6% do so weekly. Only 7.6% report less frequent use. The mean score of M = 3.58 (SD = 0.69) indicates high engagement with this

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reflective practice, coupled with moderate variability. B7. Group work for collaborative learning: Daily use of group work was reported by 44.8% of teachers, with 37.8% and 13.3% using it weekly and monthly, respectively. A small percentage (4.1%) rarely apply this strategy. The mean score (M = 3.77, SD = 0.83) is among the highest, reflecting the widespread and regular application of group work as a formative tool, though the variability is moderately high. B8. Peer assessment for learner ownership: A substantial portion of respondents (40.3%) use peer assessment daily, and 37.8% do so weekly. Monthly and rare usage stood at 20.3% and 1.6%, respectively. The mean score of M = 3.83 (SD = 0.80) is the highest across all items, underscoring the strong adoption of peer-based evaluation practices in the learning process. Formative assessment strategies appear to be highly embedded in classroom practices, with most items reflecting daily or weekly use by a majority of respondents. The means for all items range from 2.55 to 3.83, with peer assessment (B8) being the most frequently practiced (M = 3.83) and class discussion (B4) having the lowest mean (M = 2.55). Standard deviations vary from 0.52 to 0.86, indicating generally consistent patterns of use across teachers. The overall average percentage of daily and weekly use across all items is approximately 89.1%, indicating strong integration of formative assessments. Overall mean = 3.53, and overall standard deviation = 0.73, suggesting that while formative assessment practices are widely used, some variation in consistency or approach remains.

Table 2: Sample distribution according to Challenges and supports

Statement	Scale	Frequency	Percentage	mean	Standard deviation
I find it challenging to implement formative assessments due to limited time	strongly agreed	66	21.0%	3.12	0.78
	Agreed	159	50.5%		
	Disagreed	76	24.1%		
	strongly disagreed	14	4.4%		
I struggle to develop effective formative assessment that align with learning objectives	strongly agreed	67	21.3%	3.13	0.79
	Agreed	154	48.9%		
	Disagreed	81	25.7%		
	strongly disagreed	13	4.1%		
I face difficulties in interpreting and using formative assessment data to inform instruction	strongly agreed	83	26.3%	3.26	0.92
	Agreed	125	39.7%		
	Disagreed	80	25.4%		
	strongly disagreed	27	8.6%		
The too much emphasis on standardized testing may makes me to focus more on summative assessment rather than formative assessment	strongly agreed	128	40.6%	2.93	0.94
	Agreed	103	32.7%		
	Disagreed	61	19.4%		
	strongly disagreed	23	7.3%		
I do not have the sufficient resources such as technology or assessment tools to support formative assessment	strongly agreed	173	54.9%	2.63	0.82
	Agreed	99	31.4%		
	Disagreed	30	9.5%		
	strongly disagreed	13	4.1%		

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The class size or diverse learner needs makes it challenging for me to implement formative assessment effectively	strongly agreed	140	44.4%	3.82	0.90
	Agreed	110	34.9%		
	Disagreed	46	14.6%		
	strongly disagreed	19	6.0%		
I receive sufficient support from school administrators to implement formative assessments	strongly agreed	122	38.7%	3.93	0.92
	Agreed	116	36.8%		
	Disagreed	56	17.8%		
	strongly disagreed	21	6.7%		
I have access to professional development opportunities that enhance my skills in formative assessment	strongly agreed	110	34.9%	3.83	0.77
	Agreed	160	50.8%		
	Disagreed	32	10.2%		
	strongly disagreed	13	4.1%		
I receive feedback from colleagues or administrators that helps me improve my formative assessment practices	strongly agreed	142	45.1%	3.64	0.67
	Agreed	153	48.6%		
	Disagreed	12	3.8%		
	strongly disagreed	8	2.5%		

(Source: field data 2025)

This presents the descriptive analysis of each statement on "Challenges and Supports" for implementing formative assessment, using the given data (frequency, percentage, mean, and standard deviation): Limited Time as a Barrier: A majority of respondents (71.5%) either strongly agreed (21.0%) or agreed (50.5%) that they find it challenging to implement formative assessments due to limited time. Only 28.5% disagreed or strongly disagreed. The mean score of 3.12 (SD = 0.78) suggests a moderate level of agreement. This indicates that time constraints are a significant but not overwhelming challenge for most educators. Difficulty Aligning Assessments with Learning Objectives: Similarly, 70.2% of teachers reported either strong agreement (21.3%) or agreement (48.9%) with the difficulty of developing formative assessments that align with learning objectives. The mean of 3.13 (SD = 0.79) reflects a moderately high concern, suggesting that alignment remains a practical challenge in instructional planning. Challenges in Interpreting and Using Data: The interpretation and use of formative assessment data also appear to be problematic, with 66.0% agreeing (26.3% strongly agreed and 39.7% agreed). A relatively high mean of 3.26 (SD = 0.92) implies that many educators find data use complex, though a quarter (25.4%) disagreed. Impact of emphasis on standardized testing: A substantial proportion (73.3%) believed that the emphasis on standardized testing shifts focus away from formative to summative assessment. However, the lower mean score of 2.93 (SD = 0.94) indicates slightly less agreement compared to other items. This may reflect a growing awareness of the importance of both types of assessment, despite systemic pressures. Lack of Resources (Technology/Tools):

A dominant 86.3% either strongly agreed (54.9%) or agreed (31.4%) that they lack sufficient resources for formative assessment. The lower mean score of 2.63 (SD = 0.82) might reflect the inverse coding of this negatively framed item. The findings highlight resource scarcity as one of

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the most pressing practical barriers. Class Size and Learner Diversity: A combined 79.3% of respondents acknowledged that large class sizes and diverse learners need to hinder effective implementation, with 44.4% strongly agreeing. The high mean score of 3.82 (SD = 0.90) underscores this as a major challenge, possibly more impactful than time or resources. Support from School Administrators" A relatively strong majority (75.5%) felt supported by school administrators (38.7% strongly agreed, 36.8% agreed). The high mean score of 3.93 (SD = 0.92) suggests that leadership plays a significant and positive role in enabling formative assessment practices. Access to Professional Development: Regarding professional development opportunities, 85.7% of participants affirmed they have access (34.9% strongly agreed, 50.8% agreed). The mean score of 3.83 (SD = 0.77) reflects favorable perceptions of professional support systems that build assessment competence. Feedback from Colleagues or Administrators: An overwhelming 93.7% of teachers reported receiving constructive feedback (45.1% strongly agreed, 48.6% agreed). This item received the highest agreement rate, with a mean of 3.64 (SD = 0.67), showing that collegial and administrative support is perceived as both present and beneficial. In general, respondents reported moderate to high levels of agreement with statements related to challenges and support in implementing formative assessments. Across all nine items, the overall percentage of agreement (strongly agree + agree) was approximately 77.9%, indicating a consistent pattern of perceived challenges but also substantial institutional support. The overall mean score across items was 3.29, suggesting a tendency toward agreement, while the overall standard deviation was 0.83, reflecting moderate variability in responses. Teachers expressed moderate to high agreement with various challenges and supports in formative assessment implementation (M = 3.29, SD = 0.83), with an average of 77.9% agreement across all items, indicating systemic and pedagogical constraints mitigated by supportive administrative and professional environments.

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Table 3: Sample distribution according to Promotion of 21st Century Competencies

s/n	**Statement**	**Scale**	**Frequency**	**Percentage**	**mean**	**Standard deviation**
D1	Formative assessments help learners develop critical thinking skills	strongly agreed	153	48.6%	3.59	0.63
		Agreed	139	44.1%		
		Disagreed	22	7.0%		
		strongly disagreed	1	0.3%		
D2	Formative assessment provides opportunities for learners to apply problem solving skills	strongly agreed	135	42.9%	3.70	071
		Agreed	144	45.7%		
		Disagreed	31	9.8%		
		strongly disagreed	5	1.6%		
D3	Formative assessment encourages learners to work on real world problems	strongly agreed	141	44.8%	3.64	0.67
		Agreed	151	47.9%		
		Disagreed	17	5.4%		
		strongly disagreed	6	1.9%		
D4	Formative assessment encourages learners to communicate their thinking and ideas effectively	strongly agreed	128	40.6%	3.68	0.64
		Agreed	162	51.4%		
		Disagreed	23	7.3%		
		strongly disagreed	2	0.6%		
D5	Formative assessment promotes collaboration and teamwork among learners	strongly agreed	144	45.7%	3.64	0.66
		Agreed	143	45.4%		
		Disagreed	26	8.3%		
		strongly disagreed	2	0.6%		
D6	Formative assessments help learners to develop conflict resolution, negotiation and active listening skills	strongly agreed	145	46.0%	3.66	0.71
		Agreed	139	44.1%		
		Disagreed	25	7.9%		
		strongly disagreed	6	1.9%		
D7	Formative assessments provide opportunities for learners to think creatively and generate new ideas	strongly agreed	152	48.3%	3.63	0.72
		Agreed	139	44.1%		
		Disagreed	14	4.4%		
		strongly disagreed	10	3.2%		
D8	Formative assessment encourages learners to take risk and experiment with new approaches	strongly agreed	134	42.5%	374	0.77
		Agreed	139	44.1%		
		Disagreed	31	9.8%		
		strongly disagreed	11	3.5%		
D9	Formative assessment encourages learners to develop innovative solution to real world problems	strongly agreed	138	43.8%	3.68	0.70
		Agreed	143	45.4%		
		Disagreed	30	9.5%		
		strongly disagreed	4	1.3%		

The study shows the descriptive sample distribution of each item related to the Promotion of 21st Century Competencies through Formative Assessment, based on the data provided: Item D1: Formative assessments help learners develop critical thinking skills: A large proportion of respondents affirmed that formative assessments facilitate the development of critical thinking skills, with 48.6% strongly agreeing and 44.1% agreeing. Only 7.0% disagreed and 0.3% strongly

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disagreed. The high mean score of 3.59 and a low standard deviation of 0.63 indicate a strong consensus among respondents about this role of formative assessment. Item D2: Formative assessment provides opportunities for learners to apply problem-solving skills: Respondents overwhelmingly recognized the importance of formative assessment in enhancing problem-solving abilities, with 42.9% strongly agreeing and 45.7% agreeing. A minority disagreed (9.8%) or strongly disagreed (1.6%). The mean score of 3.70 reflects a very high level of agreement, with a standard deviation of 0.71, showing moderate variability in responses. Item D3: Formative assessment encourages learners to work on real-world problems: The data show that 44.8% strongly agreed and 47.9% agreed that formative assessment promotes engagement with real-world problems. Only 5.4% disagreed and 1.9% strongly disagreed. The mean of 3.64 and a standard deviation of 0.67 suggest a high level of agreement and relative consistency in responses. Item D4: Formative assessment encourages learners to communicate their thinking and ideas effectively: A significant 40.6% strongly agreed and 51.4% agreed with this statement, indicating widespread recognition of the communicative benefits of formative assessments. The mean of 3.68 and a standard deviation of 0.64 further reinforce a strong consensus. Item D5: Formative assessment promotes collaboration and teamwork among learners: A combined 91.1% of participants either strongly agreed (45.7%) or agreed (45.4%) that formative assessment fosters collaboration and teamwork. Only 8.3% disagreed and 0.6% strongly disagreed. The mean score of 3.64 and standard deviation of 0.66 suggest high agreement with low variation. Item D6: Formative assessments help learners to develop conflict resolution, negotiation, and active listening skills: Of the respondents, 46.0% strongly agreed and 44.1% agreed with this claim, while 7.9% disagreed and 1.9% strongly disagreed. The mean of 3.66 and a standard deviation of 0.71 indicate that most educators associate formative assessment with the development of interpersonal skills, albeit with slightly more variation. Item D7: Formative assessments provide opportunities for learners to think creatively and generate new ideas: Nearly half of the respondents (48.3%) strongly agreed and 44.1% agreed, suggesting a strong belief in the creativity-enhancing role of formative assessment. However, 4.4% disagreed and 3.2% strongly disagreed. Despite these outliers, the mean remains high at 3.63, with a standard deviation of 0.72, indicating moderate variability: Item D8: Formative assessment encourages learners to take risks and experiment with new approaches: A total of 42.5% strongly agreed and 44.1% agreed that formative assessment supports risk-taking and innovation. However, 9.8% disagreed and 3.5% strongly disagreed. The mean score of 3.74 is the highest among all items, though the standard deviation of 0.77 is also the highest, reflecting more diverse perceptions among respondents. Item D9: Formative assessment encourages learners to develop innovative solutions to real-world problems: Respondents expressed strong support for this statement, with 43.8% strongly agreeing and 45.4% agreeing. Only 9.5% disagreed and 1.3% strongly disagreed. The mean of 3.68 and a standard deviation of 0.70 show a consistent trend of high agreement.

Across all nine items, respondents consistently recognized the value of formative assessment in promoting various 21st-century competencies, including critical thinking, collaboration, problem-

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solving, creativity, communication, and innovation. The overall mean score across all items is approximately 3.65, indicating strong agreement on the positive impact of formative assessments on learners' development. The average standard deviation is approximately 0.69, suggesting relatively consistent responses with slight variability depending on the specific competency addressed. The data demonstrate a strong consensus among respondents that formative assessments promote the development of critical 21st-century skills such as critical thinking, communication, problem-solving, and innovation. Overall, participants expressed high levels of agreement across all statements (M = 3.65, SD = 0.69), indicating widespread recognition of the formative assessment's role in preparing learners for complex, real-world challenges.

Table 4: Model summary table of multiple regression analysis

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.280[a]	.079	.073	3.29725	.079	13.316	2	312	.000
a. Predictors: (Constant), Challenges and supports , Frequency of formative assessment practices									
b. Dependent Variable: Promotion of 21st Century Competencies									

A multiple linear regression was conducted to examine the extent to which frequency of Formative Assessment Practices and Challenges and Supports predict the Promotion of 21st Century Competencies. The results are presented in the table below. The overall model was statistically significant; $F(2, 312) = 13.32$, $p < .001$, indicating that the combination of predictors explained a significant proportion of the variance in the dependent variable. The model accounted for approximately 7.9% of the variance in the promotion of 21st century competencies, $R^2 = .079$, with an adjusted $R^2 = .073$, suggesting a small effect size (Cohen, 1988). The standard error of the estimate was 3.30, indicating the average distance that the observed values fall from the regression line. The multiple correlation coefficient ($R = .280$) indicates a low positive relationship between the predictors and the outcome. The R^2 of .079 implies that approximately 7.9% of the variability in promoting 21st century competencies can be explained by the frequency of formative assessment practices and the perceived challenges and supports. The significant F change ($p < .001$) confirms that the model provides a better fit than an intercept-only model.

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Table 5: An analysis of variance (ANOVA)

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	289.529	2	144.764	13.316	.000[b]
	Residual	3392.014	312	10.872		
	Total	3681.543	314			
a. Dependent Variable: Promotion of 21st Century Competencies						
b. Predictors: (Constant) Challenges and supports, Frequency of formative assessment practices						

An analysis of variance (ANOVA) was conducted to examine whether the frequency of formative assessment practices and challenges/supports significantly predict the promotion of 21st-century competencies among teachers. The results of the ANOVA revealed a statistically significant regression model, $F(2, 312) = 13.32$, $p < .001$, indicating that the combined predictors frequency of formative assessment practices and challenges and supports explained a significant proportion of variance in the promotion of 21st-century competencies. Specifically, the regression model accounted for approximately 7.9% of the variance in the dependent variable ($R^2 = .079$), suggesting that although the model is statistically significant, other factors may also contribute to the promotion of 21st-century competencies. The overall regression was significant; $F(2, 312) = 13.32$, $p < .001$, with the predictors explaining 7.9% of the variance in the promotion of 21st-century competencies.

Table 6: Coefficients of multiple linear regression

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	9.760	1.080		9.036	.000	7.634	11.885
	Frequency of formative assessment practices	.148	.069	.120	2.154	.032	.013	.283
	Challenges and supports	.189	.046	.228	4.094	.000	.098	.280
a. Dependent Variable: Promotion of 21st Century Competencies								

A multiple linear regression was conducted to examine the extent to which the frequency of formative assessment practices and perceived challenges and supports predict the promotion of 21st century competencies. The overall model was significant: $F (2, 312) = 13.32$, $p < .001$, and accounted for approximately 7.9% of the variance in the promotion of 21st century competencies

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(R^2 = .079). The unstandardized regression coefficients (see Table 1) indicate that: Frequency of formative assessment practices was a significant predictor of the promotion of 21st century competencies: B = 0.15, SE = 0.07, β = .12, t (312) = 2.15, p = .032. This suggests that for each unit increase in the frequency of formative assessment practices, there is an expected 0.15-unit increase in the promotion of 21st century competencies, holding other variables constant. The 95% confidence interval for this effect ranged from 0.013 to 0.283. Challenges and supports also significantly predicted the promotion of 21st century competencies: B = 0.19, SE = 0.05, β = .23, t (312) = 4.09, p < .001. This indicates that higher levels of perceived support (or fewer challenges) are associated with a 0.19-unit increase in competency promotion, with a 95% confidence interval ranging from 0.098 to 0.280. The constant term was also statistically significant: B = 9.76, SE = 1.08, t (312) = 9.04, p < .001, indicating the expected baseline level of promotion when both predictors are zero.

DISCUSSION

The study investigated the significant relationship between formative assessment methods and the enhancement of 21st-century skills in primary education. The results indicated a positive and significant correlation between the regularity of formative assessment practices and the advancement of 21st-century competencies among students. This suggests that the consistent application of observations, quizzes or tests, the collection and evaluation of students' assignments, classroom discussions to assess students' comprehension of new concepts, providing feedback on their performance and progress, and employing self-assessment to motivate students to reflect on their own learning, recognizing their strengths and weaknesses, contribute to the cultivation of 21st-century problem-solving abilities, engagement with real-world issues, effective communication, and the sharing of ideas. This aligns with the results of other research. Oral feedback as a form of assessment can enhance students' critical thinking abilities (Nurhijah et al., 2020). Students who participate in formative assessment practices demonstrate notably improved academic performance (Ozan, 2017). Such practices in formative assessment encourage students to engage in higher-order thinking tasks and foster critical thinking, collaboration, communication, and creativity skills (Msoqi, 2019).

The study revealed a significant positive correlation between the challenges of formative assessment, the support extended to teachers, and the enhancement of 21st-century competencies among primary school students. This indicates that obstacles in creating effective formative assessments that are in line with educational objectives, difficulties in interpreting and utilizing formative assessment data to guide instruction, an excessive focus on standardized testing, and a greater emphasis on summative assessments rather than formative ones, along with inadequate resources such as technology or assessment tools, large class sizes, diverse learner needs, and insufficient backing from school administrators and professional development opportunities, hinder the cultivation of 21st-century skills such as collaboration and teamwork, conflict

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resolution, negotiation, active listening, creativity, and the generation of new ideas and innovative solutions to real-world challenges.

This research aligns with the assertion (Balayogi, 2024) that the implementation of formative assessment and the successful incorporation of 21st-century skills present challenges. Educators are required to strike a balance between fostering students' creativity, critical thinking, and collaborative abilities while also equipping them for standardized examinations. Furthermore, a nurturing institutional environment, continuous professional development for educators, and a commitment to data-informed decision-making are essential for the effective execution of formative assessments. Formative assessment practices do not contribute to the cultivation of 21st century skills in students, as they primarily focus on evaluating students' capacity to memorize facts and concepts rather than on the acquisition of skills. Educators in schools possess limited expertise in designing, managing, and implementing assessment tools that foster 21st Century skills. Consequently, this limitation impacts their assessment practices regarding the enhancement of 21st Century skills among students. Although tests and examinations are employed as formative assessment tools, their management and administration are often inadequate, making it challenging to cultivate 21st Century skills in students. This indicates that even the ineffective tools available for formative assessment are not utilized and managed properly. Factors such as large class sizes, along with insufficient resources and knowledge in preparing and implementing formative assessment techniques that offer authentic evaluation, hinder teachers from adhering to formative assessment practices that promote the development of 21st Century skills in students (Senjiro & Lupeja, 2023).

CONCLUSION

To cultivate 21st century skills in primary school students through the implementation of formative assessment, educators ought to carry out consistent observations of students' behavior, interactions, and class participation to evaluate their critical thinking, problem-solving, and collaboration abilities. Additionally, they should create observation rubrics and utilize them to assess students' competencies and offer constructive feedback. Assessments such as quizzes or tests should be crafted to encompass a range of question formats, including open-ended and multiple-choice questions, to evaluate various skills and knowledge.

Teachers should implement project-based assessments that necessitate students to collaborate, engage in critical thinking, and resolve problems, while also providing clear rubrics and feedback on assignments to assist students in recognizing their strengths and areas needing improvement. They should facilitate organized discussions that encourage critical thinking, problem-solving, and effective communication, motivating students to engage in discussions and offering opportunities for more reserved learners to participate. School instructors must deliver consistent feedback on students' performance and progress, emphasizing their strengths and providing specific, actionable

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recommendations to help students comprehend what they need to do to enhance their learning. Self-assessment rubrics should be established to assist students in evaluating their work and setting improvement goals, incorporating reflective activities that encourage students to think critically about their learning and establish objectives for future development.

There must be well-defined learning objectives that correspond with 21st-century skills, including critical thinking, problem-solving, and collaboration. The assessment blueprint created should specify the types of assessments and evaluation methods employed to gauge learners' progress. Educators should receive professional development opportunities aimed at improving their abilities to interpret and apply formative assessment data, along with the provision of adequate resources, such as technology and assessment tools, to facilitate formative assessment practices. Continuous professional development opportunities should be available for teachers to refine their skills in formative assessment and 21st-century competencies, alongside the establishment of peer coaching models to assist teachers in executing formative assessment practices.

The adoption of effective classroom management strategies, such as differentiated assessments and Universal Design for Learning (UDL), is essential to accommodate large class sizes and diverse learners. Furthermore, the use of technology-enhanced assessments can streamline data collection, analysis, and feedback, while digital portfolios can be utilized to monitor learners' progress and display their work. These recommendations have the potential to improve learner outcomes, including the cultivation of 21st-century competencies, the enhancement of teaching practices through the effective use of formative assessment and technology, and increased efficiency in assessment and evaluation processes, thereby allowing educators to concentrate on teaching and learning. Additionally, they support learners in developing communication skills, effective collaboration, critical thinking, and problem-solving abilities that are vital for success in team-oriented work environments and the 21st century.

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