
TEACHER ASSESSMENT PRACTICES AND THE IMPLICATIONS FOR TEACHING 21ST CENTURY STUDENTS IN NIGERIA

¹ FIAKUMAH, WILSON KOFI
DEPARTMENT OF MATHEMATICS AND ICT
ST. FRANCIS COLLEGE OF EDUCATION, HOHOE, VOLTA REGION GHANA

&

² GEORGE, NCHELEM ROSEMARY
DEPARTMENT OF MATHEMATICS
IGNATIUS AJURU UNIVERSITY OF EDUCATION PORT HARCORT,
RIVERS STATE, NIGERIA

&

³ TOGAH, FREDERICK KWASI
DEPARTMENT OF MATHEMATIC & COMPUTER STUDIES
DAMBAI COLLEGE OF EDUCATION, OTI REGION, GHANA

ABSTRACT

Contemporary discourse in educational assessment increasingly foregrounds a fundamental misalignment: the persistence of examination-centric evaluation paradigms in educational systems that ostensibly aspire to produce graduates equipped for the knowledge economy. This position paper interrogates that misalignment through a critical synthesis of empirical and theoretical literature, arguing that teacher assessment practices constitute one of the most consequential determinants of whether learners develop the competencies demanded by 21st century civic, professional, and technological contexts. Drawing on sociocultural learning theory, assessment for learning frameworks, and recent empirical research (2021–2026), the paper contends that the prevailing overreliance on summative, high-stakes assessment not only fails to cultivate higher-order thinking and collaborative problem solving but actively suppresses them. A reconceptualization of assessment as a pedagogically dynamic, equity-conscious, and competency-aligned practice is advanced. The paper concludes with a set of theoretically grounded and institutionally actionable recommendations for curriculum reform, professional capacity development, and policy realignment, with particular relevance to educational contexts in developing economies where structural constraints are most acute.

Keywords: Assessment practices, 21st century competences, teacher, mathematics education, students.

1. Introduction

Assessment has long occupied a paradoxical position within educational systems: universally acknowledged as central to learning, yet persistently configured in ways that undermine it. The tension between what assessment could accomplish—the diagnosis and acceleration of learning, the development of student agency, the cultivation of disciplinary thinking— and what it largely does in practice—rank, sort, and certify students according to their capacity to perform under narrow, artificial conditions— remains one of the most stubborn contradictions in contemporary education (Wiliam, 2021). Nowhere is this contradiction more consequential than in mathematics education, where assessment cultures that privilege procedural recall and speed of execution routinely obscure and suppress the mathematical reasoning, creative problem solving, and collaborative inquiry that the discipline actually demands (Boaler, 2022).

The urgency of this concern has intensified in the context of 21st century labor market transformations. The World Economic Forum's (2023) Future of Jobs Report identifies analytical thinking, creative cognition, technological literacy, and collaborative problem solving as among the most critical competencies employers will require through 2030 and beyond. Simultaneously, the UNESCO (2021) International Commission on the Futures of Education, in its landmark report *Reimagining Our Futures Together*, argues that education systems must be radically repurposed around the cultivation of shared knowledge, cooperation, and the capacity to navigate uncertainty—competencies that standardized, performance-based assessment frameworks are structurally ill-equipped to develop or measure.

Yet despite this convergence of economic imperative and pedagogical argument, assessment reform remains stubbornly elusive. Meta-analytic evidence consistently demonstrates that formative assessment practices, when rigorously implemented, yield substantial improvements in academic achievement across diverse learner populations (Hattie, 2023). The barriers to implementation are not, therefore, evident; the case for reform is overwhelmingly made. They are structural, cultural, and professional. It is this gap—between what assessment research tells us and what assessment practice looks like in classrooms—that this paper seeks to interrogate and address.

Teacher assessment practices are neither pedagogically neutral nor obviously straightforward. They reflect assumptions about the nature of knowledge, the goals of schooling, and learners' abilities that have important implications for equity and quality. The paper reviewed current research and theory to advocate for a conscious and systemic shift toward formative, authentic, and competency-based assessment methods. It highlighted the main obstacles to this shift and offers recommendations based on both research evidence and what institutions can realistically implement. Throughout, special attention was given to the effects on mathematics education and to the specific contexts of educational systems in developing economies. As mathematics educators situated within the Nigerian higher education system, the authors did this paper from a position of direct professional engagement with the assessment cultures critiqued here. The arguments advanced in this paper were informed by that situatedness and by recognition that the structural constraints facing Nigerian institutions are not peripheral to the global reform conversation but central to it.

2. Theoretical Review

The conceptual architecture of this paper draws on three complementary bodies of theory: sociocultural learning theory, the assessment for learning (AfL) framework, and competency-based education theory. Together, these frameworks provide a coherent and mutually reinforcing rationale for the assessment reforms advocated.

2.1 Sociocultural Learning Theory

Following Vygotsky's (1978) foundational conception of learning as inherently social and dialogic, sociocultural learning theory holds that cognitive development is mediated through interaction, language, and culturally situated tools. Assessment, from this perspective, is not a post hoc measurement of learning but an integral dimension of the learning process itself—a site at which understanding is constructed, negotiated, and refined. Summative assessment, which positions the learner as a passive subject of evaluation, is epistemologically inconsistent with this view. Formative assessment, by contrast, aligns with sociocultural theory insofar as it foregrounds dialogue, feedback, and the joint construction of understanding between teacher and student (Carless, 2022).

This theoretical alignment has important implications for mathematics education in particular, where the Vygotskian concept of the zone of proximal development—the space between what a learner can accomplish independently and what they can achieve with appropriate support—has long been recognised as a productive framework for instructional scaffolding. Assessment that functions within the zone of proximal development, identifying not merely what students have achieved but what they are capable of achieving with targeted guidance, is categorically different from assessment that simply records a summative outcome.

2.2 Assessment for Learning Framework

The assessment for learning (AfL) framework, developed substantially through the foundational work of Black and Wiliam (1998) and subsequently elaborated by Wiliam (2021) and others, reconceptualizes the relationship between assessment and pedagogy. Rather than treating assessment as an activity that follows instruction, AfL positions assessment as embedded within and constitutive of the instructional process. Wiliam (2021) identifies five core strategies that characterize effective AfL practice: making learning intentions and success criteria explicit and shared with students; fostering substantive classroom discussion and questioning; ensuring that feedback actively advances rather than merely reports on learning; encouraging students to serve as learning resources for one another through structured peer activities; and building student capacity to monitor and take ownership of their own learning progress.

These strategies reflect a substantive reconception of the teacher's role—from knowledge transmitter to learning architect—and of the student's role—from passive recipient to active, agentic participant in the assessment process. Andrade (2021) has demonstrated empirically that student self-assessment is among the highest leverage activities available for improving learning outcomes, particularly when students are taught explicit metacognitive strategies alongside content knowledge.

2.3 Competency-Based Education Theory

Competency-based education (CBE) theory holds that education should be organised around the attainment of defined, demonstrable competencies rather than the accumulation of seat time or the completion of content coverage. This orientation, which has been adopted in various forms by international policy frameworks including the OECD Learning Compass 2030 (OECD, 2019) and the P21 Framework for 21st Century Learning, has profound implications for assessment design. If the goal of education is the development of transferable competencies — rather than the reproduction of disciplinary content in examination conditions — then assessment must be redesigned to elicit and evaluate evidence of those competencies in authentic contexts of application (Pellegrino, 2022).

Competency-based assessment is necessarily more complex and contextually embedded than traditional testing. It requires tasks that present learners with genuine challenges: problems that lack single correct answers, that require the integration of multiple knowledge domains, that demand communication and collaboration, and that call for the kind of iterative revision and reflection characteristic of expert practice. These demands are, as subsequent sections of this paper explore, both the greatest strength of the competency-based approach and its primary implementation challenge.

3. Current Teacher Assessment Practices

The empirical literature on teacher assessment practices reveals a landscape characterised by significant diversity in stated values and considerable uniformity in actual practice. Across educational contexts, including those in Sub-Saharan Africa where Nigeria's educational system is situated, surveys of classroom assessment consistently find that summative, examination-based assessment remains dominant, notwithstanding widespread professional endorsement of formative and authentic alternatives (OECD, 2023).

3.1 Formative Assessment: Theory and Practice

Formative assessment, defined as assessment that is embedded in the instructional process and designed to generate information that teachers and students can use to adjust learning and teaching in real time, encompasses a wide range of pedagogical activities (Wiliam, 2021). These include classroom questioning and discussion, exit tasks, peer and self-assessment, teacher observation and anecdotal recording, rubric-guided feedback on student work, and diagnostic assessments designed to surface prior knowledge and misconceptions.

The evidence base for rigorously implemented formative assessment is extensive and robust. Hattie's (2023) updated synthesis of over 2,100 meta-analyses places feedback-the central mechanism of formative assessment-among the highest effect interventions available to educators, with an average effect size of $d = 0.70$. Crucially, Hattie distinguishes between feedback that merely informs students of their performance level and feedback that provides specific, actionable guidance on how to improve: the latter is substantially more effective. This distinction carries significant practical implications, as the evaluative feedback that dominates many classroom environments-a numerical score without commentary, a generalised commendation, a directive to seek additional help-corresponds much more closely to the former than to the developmental feedback that produces measurable learning gains.

In mathematics education, formative assessment takes on additional significance given the discipline's sequential and cumulative nature. Misconceptions at one stage of mathematical development-concerning the meaning of equals as equivalence rather than operation, the relationship between fractions and division, or the nature of mathematical proof-compound over time and create progressively more intractable barriers to understanding. Formative assessment that surfaces these misconceptions early and provides targeted instructional responses can interrupt this trajectory in ways that summative evaluation, by definition, cannot (Boaler, 2022).

Despite this evidence base, implementation of rigorous formative assessment practice remains inconsistent. Research across multiple national contexts finds that teachers frequently identify with formative assessment as a professional value while defaulting to evaluative, grade-focused feedback in practice (Carless, 2022). The gap between espoused and enacted assessment values is not primarily a problem of motivation; it reflects the structural constraints-time pressure, large class sizes, insufficient training-within which teachers operate, constraints that are particularly acute in Nigerian secondary and tertiary education contexts (Okonkwo & Abara, 2022).

3.2 Summative Assessment: Functions, Limitations, and Systemic Distortions

Summative assessment serves an irreducible and legitimate function within educational systems: the certification of learning attainment at defined checkpoints, for purposes of institutional accountability, professional credentialing, and systemic monitoring. End of term examinations, standardized national assessments, and terminal qualifications assessments fulfil this certifying function in ways that formative approaches, by their embedded and developmental nature, cannot. The argument for assessment reform is not, therefore, an argument for the abolition of summative assessment but for its repositioning within a more balanced assessment ecology.

The systemic distortions introduced by an overreliance on summative assessment are, however, well documented and consequential. The phenomenon of 'teaching to the test'-in which curriculum coverage is narrowed to content assessed by high-stakes examinations, often at the explicit exclusion of more complex, open-ended, and collaborative learning activities-has been documented across diverse national contexts (OECD, 2023). In mathematics education, this effect is particularly pronounced: the dominance of procedural fluency tasks in high-stakes examinations has been associated with the systematic neglect of mathematical reasoning, proof construction, and modelling-precisely the competencies that constitute expert mathematical practice and that the discipline's most authoritative professional bodies have identified as educational priorities (Boaler, 2022).

Summative assessment also carries significant equity implications that are insufficiently acknowledged in mainstream educational discourse. High stakes, timed examinations systematically disadvantage learners from lower socioeconomic backgrounds who lack access to private tutoring and examination preparation resources; learners with attention or processing differences for whom time constrained recall tasks are disproportionately demanding; and learners whose cognitive strengths-in creative synthesis, collaborative reasoning, or practical application-are not captured by the format of the typical written examination (UNESCO, 2021). An assessment system that positions itself as meritocratic while encoding these structural advantages is not meritocratic in any meaningful sense.

3.3 Authentic Assessment: Bridging School and World

Authentic assessment, defined as the use of assessment tasks that require students to demonstrate competencies through performance in contexts that reflect the genuine complexity and ambiguity of real-world challenges (Darling-Hammond et al., 2022), represents a theoretically coherent response to the limitations of both formative and summative traditions. Authentic tasks-including capstone projects, case-based analyses, collaborative inquiry investigations, multimedia productions, and performance-based demonstrations-share the characteristic that they cannot be completed through the application of memorised information alone. They require students to integrate knowledge across domains, exercise judgement under conditions of uncertainty, communicate with genuine audiences, and revise their work in response to feedback: competencies that correspond directly to those identified by employers and policymakers as critical for 21st century participation.

In mathematics education, authentic assessment has attracted sustained scholarly attention as a corrective to the procedural orientation of conventional examination culture. Boaler's (2022) research on mathematical mindsets and equitable assessment demonstrates that when students are assessed through open, investigative tasks that reward mathematical reasoning rather than computational speed, achievement gaps narrow, student engagement increases, and learners develop more accurate and productive conceptions of what mathematical ability actually entails. This finding has particular resonance for the Nigerian educational context, where mathematical underachievement is disproportionately distributed across socioeconomic and regional lines.

3.4 Digital Tools and Assessment Transformation

The rapid expansion of educational technology infrastructure has introduced new possibilities for assessment practice that have not yet been fully theorised or empirically evaluated. Learning management systems, adaptive assessment platforms, digital portfolio tools, learning analytics dashboards, and AI-driven feedback systems offer, in principle, the capacity to generate richer, more frequent, and more individualised evidence of student learning than was previously achievable at scale (Tsai et al., 2021). Real-time data on student performance trajectories, visualised through dashboards accessible to both teachers and learners, could, in principle enable the kind of continuous, responsive instructional adjustment that formative assessment theorists have long advocated.

In practice, however, the integration of digital tools into assessment has been characterised by what Selwyn (2022) terms 'digital replication': the use of sophisticated technological infrastructure to replicate traditional assessment formats rather than to transform them. Multiple choice quizzes administered through learning management systems remain multiple choice quizzes, regardless of the platform on which they are delivered. The transformative potential of educational technology for assessment is contingent on the existence of clear pedagogical frameworks for its deployment-frameworks that most teacher preparation programmes have not yet developed. Without such frameworks, the adoption of digital assessment tools risks adding technological complexity without adding pedagogical value.

4. Barriers to Assessment Reform: A Systemic Analysis

The persistence of traditional assessment practice in the face of an extensive and consistent evidence base for reform cannot be adequately explained by individual-level factors alone. An analysis of the literature identifies three interconnected systemic barriers that require coordinated policy and institutional responses.

4.1 Professional Capacity and Pedagogical Belief

Research across multiple national contexts consistently identifies professional capacity gaps as the primary proximate barrier to assessment reform. Teachers who have been trained and professionally socialized within traditional assessment cultures frequently lack the conceptual frameworks, practical skills, and professional identities necessary to implement formative and authentic assessment effectively (Darling-Hammond et al., 2022). Designing an assessment rubric that genuinely operationalizes critical thinking; facilitating a peer assessment process with sufficient rigour and equity to generate meaningful feedback; calibrating professional judgement against standardized exemplars to ensure consistent application of criteria-these are sophisticated professional practices that require sustained, deliberate development and cannot be assumed to emerge from goodwill alone.

Complicating the capacity question is the issue of pedagogical belief. Research by Carless (2022) and others finds that teachers' assessment practices are powerfully shaped by their implicit theories of learning and their conceptions of assessment's purpose. Teachers who conceive of assessment primarily as a mechanism for accountability and grading are unlikely to invest in the complex, time-intensive work of developmental feedback, however aware they may be of its evidential basis. Professional development that addresses assessment practice without also engaging the underlying belief structures that shape it is unlikely to produce durable change.

In the Nigerian higher education context, where this paper is situated, the challenge of professional capacity is compounded by the relatively limited tradition of assessment-focused continuing professional development and by the absence of systematic mentoring structures that would enable beginning teachers to observe and reflect on expert formative assessment practice (Okonkwo & Abara, 2022). Mathematics educators in particular report a consistent desire to assess 21st century competencies but express significant uncertainty about how to do so in ways that maintain academic rigour and produce reliable evidence of student learning.

4.2 Structural and Workload Constraints

Even where professional will and capacity exist, structural factors severely constrain the enactment of reformed assessment practice. The following barriers are most frequently identified in the literature:

- Class sizes in Nigerian secondary and tertiary institutions frequently exceed the threshold at which individualized formative feedback becomes practically feasible. Providing substantive written commentary on thirty or more student responses to an open-ended task demands a time investment that, accumulated across multiple class sections and teaching hours, is incompatible with sustainable professional practice under existing workload structures.

- Infrastructure constraints limit the deployment of digital assessment tools that might otherwise enable more efficient collection and processing of formative evidence. Unreliable electricity supply, insufficient device access, and inconsistent internet connectivity-conditions that disproportionately characterize educational institutions serving economically disadvantaged communities-undermine the implementation of technology-dependent assessment innovations.
- Curricular structures that specify content coverage requirements without corresponding competency-based learning outcomes create a structural tension between curriculum compliance and assessment reform. Teachers operating within crowded syllabi experience a genuine trade-off between the depth of formative engagement that authentic assessment requires and the breadth of coverage that examination preparation demands.
- Institutional accountability frameworks that evaluate teacher effectiveness primarily through student performance on standardized examinations create powerful incentive structures that work against formative and authentic assessment investment, even among teachers who are intellectually persuaded of its value.

Where these barriers are not actively and systematically addressed, well-intentioned reform efforts risk producing only superficial changes. Digital tools are adopted without meaningful integration; authentic tasks are introduced as occasional additions rather than central assessment experiences; formative feedback remains shallow and generic rather than substantive and growth-oriented. The deeper purposes of modern assessment go unrealised, and students bear the cost.

4.3 Curriculum Assessment Misalignment

A structural precondition for meaningful assessment reform that is frequently overlooked in the practitioner literature is curriculum alignment. Assessment practices cannot be reformed in isolation from the learning outcomes they are designed to evaluate. Where national and institutional curricula are constructed around content objectives rather than competency outcomes, there is no logical anchor for the design of authentic, competency-based assessments. Teachers who attempt to introduce formative or authentic assessment approaches within a content-driven curriculum framework encounter a fundamental incoherence: they are assessing competencies that the curriculum does not formally value and that will not be credited in the high-stakes examinations that ultimately determine student progression (Pellegrino, 2022).

This misalignment is not merely pedagogical but political. The persistent dominance of examination-based accountability in national educational frameworks reflects deeply entrenched institutional interests-examination boards, certification authorities, and higher education admissions systems-that have both the incentive and the capacity to resist curriculum changes that would disrupt established assessment architectures. Durable assessment reform, therefore, requires not only pedagogical and professional development at the classroom level but political will and coordination at the policy level.

5. Implications for 21st Century Learners

5.1 The Equity Costs of Assessment Conservatism

The implications of continued assessment conservatism are not evenly distributed. Research consistently demonstrates that high-stakes, standardized assessments disproportionately disadvantage learners from lower socioeconomic backgrounds, learners with neurodevelopmental differences, and learners whose competency profiles do not conform to the narrow range of abilities that timed written examinations assess (UNESCO, 2021; OECD, 2023). In the Nigerian educational context, where socioeconomic stratification is sharp and regional educational inequalities are substantial, assessment practices that encode socioeconomic advantage as academic ability are not merely pedagogically suboptimal — they are socially unjust.

The concept of ‘teaching to the test,’ while widely acknowledged, is frequently treated as a regrettable but manageable side effect of high-stakes assessment rather than as the systemic impoverishment of educational experience that it represents. When curriculum coverage narrows to examination content, students from well-resourced contexts can supplement their educational experience through private tutoring, extracurricular enrichment, and access to diverse knowledge environments. Students from under-resourced contexts experience only the narrowed curriculum. The examination, in this sense, does not reveal a preexisting ability gap; it produces one.

5.2 Formative Assessment and the Development of Mathematical Competence

The implications of high-quality formative assessment practice are particularly significant within mathematics education, where the recursive, cumulative nature of mathematical knowledge development means that unaddressed misconceptions compound over time. Research by Hattie (2023) and Andrade (2021) converges on the finding that metacognitive development—the capacity to monitor, evaluate, and regulate one’s own learning processes—is among the highest leverage outcomes that rigorously implemented formative assessment produces. For mathematics learners, this metacognitive capacity is directly relevant to the development of problem-solving resilience: the ability to persist productively in the face of difficulty, to identify and revise faulty solution strategies, and to reason about the reasonableness of one’s own answers.

These dispositions are not incidental to mathematical competence; they are constitutive of it. The disciplinary practices of professional mathematicians—conjecturing, testing, revising, proving, communicating—are metacognitive through and through. An assessment culture that consistently rewards the rapid production of correct answers over the careful exposition of mathematical reasoning actively cultivates an impoverished and ultimately counterproductive relationship with mathematics as a discipline (Boaler, 2022).

5.3 Authentic Assessment and Workforce Readiness

The World Economic Forum’s (2023) analysis of emerging workforce competency demands provides compelling external validation of the imperative for authentic assessment. The report identifies creativity, analytical reasoning, technological fluency, and collaborative problem solving as the competencies most likely to resist displacement by artificial intelligence and automation over the coming decade. These are precisely the competencies

that authentic assessment is structurally positioned to develop: they cannot be rehearsed through examination preparation, they require contextually embedded application, and they are best evidenced through performance in complex, realistic tasks.

For students preparing to enter AI augmented professional environments, including the increasingly technology-mediated contexts of mathematics education itself, assessment experiences that require only the production of memorized procedures provide systematically misleading preparation. The student who has been assessed exclusively on the capacity to execute standard algorithms is not only undertested; they are misprepared. Authentic assessment, by contrast, creates conditions in which students encounter and navigate the kinds of open-ended, collaborative, iterative challenges that professional mathematical practice actually involves.

5.4 Comparative Overview of Assessment Approaches

Table 1 presents a structured comparison of the three principal assessment modalities discussed in this paper, evaluated against 21st-century learning priorities.

Table 1: Comparative Analysis of Assessment Modalities and 21st Century Alignment

Assessment Type	Key Features	Learning Outcomes	21st Century Skills Alignment
Formative (exit tickets, discourse, peer review, diagnostic tasks)	Iterative; low stakes; dialogic; embedded in instructional cycle	Enhanced metacognition; reduced misconceptions; stronger self-regulation	Critical thinking, collaboration, communication, adaptability, growth orientation
Summative (terminal exams, standardized tests, graded portfolios)	End point, high stakes; norm-referenced; certifying function	Accountability benchmarks; institutional credentialing	Partial alignment; privileges recall over application; heightens performance anxiety
Authentic (capstone projects, case analyses, multimedia artefacts, real-world simulations)	Criterion referenced; performance driven; contextually embedded; multimodal.	Transferable competencies; intrinsic motivation; disciplinary identity formation	Strong alignment across all four Cs; builds digital literacy and problem-solving agency

6. Conclusion

This paper has argued that teacher assessment practices are not neutral technical instruments but pedagogically and politically consequential choices that shape, in fundamental ways, what students learn, what capacities they develop, and what life possibilities become available to them. The misalignment between the competencies demanded by 21st century civic and professional participation and the competencies that conventional, examination-

centric assessment actually develops and rewards is not a marginal problem of pedagogical preference. It is a structural failure with profound consequences for educational equity and human development.

The evidence base for reform is, at this stage, unambiguous. Formative assessment that provides specific, timely, developmental feedback produces measurably stronger learning outcomes across diverse student populations. Authentic assessment that engages students with realistic, complex, open-ended challenges develops the transferable competencies that neither formative feedback cycles nor terminal examinations can adequately cultivate on their own. Digital tools, judiciously integrated within coherent pedagogical frameworks, can extend the reach and richness of both. Together, these approaches constitute not a wholesale rejection of assessment tradition but a rebalancing of assessment ecologies toward approaches that are theoretically coherent, empirically supported, and educationally purposive.

The barriers to this rebalancing are real: professional capacity gaps, structural constraints, curriculum misalignment, and policy inertia present genuine obstacles to reform. But they are not insurmountable. Where institutions have committed to sustained professional development, curriculum assessment alignment, and policy conditions that make reform feasible, the evidence of transformative impact on student learning is compelling. The obligation to act on this evidence-particularly in educational contexts where the equity stakes of assessment conservatism are highest-is both professional and ethical.

It is the position of this paper that the time for incremental adjustment has passed. What is required is a systemic reconceptualization of assessment's purpose, design, and institutional infrastructure-one that places the development of human competency, rather than the certification of academic performance, at the centre of educational accountability. The knowledge and the tools to undertake this reconceptualization exist. What remains is the institutional will to enact it.

7. Suggestions

- i. The educational policy makers should establish a structured, longitudinal programme of assessment literacy development that combines theoretical grounding in formative and authentic assessment frameworks with supported experimentation in participants' own teaching contexts.
- ii. The educational policy makers should ensure that professional development must address not only the technical skills of assessment design such as rubric construction, task design, feedback formulation but also the pedagogical beliefs and professional identities that shape assessment practice.
- iii. Institutions seeking to shift assessment practice toward formative and authentic approaches must simultaneously revise their curriculum frameworks to specify the competency-based learning outcomes that those assessments are designed to develop and evaluate.
- iv. Hybrid Assessment Architectures should be designed and institutionalized.

REFERENCES

- Andrade, H. L. (2021). A critical review of research on student self-assessment. <https://doi.org/10.3389/feduc.2020.628479>
- Black, P., & Wiliam, D. (1998). Assessment and classroom learning. *Assessment in Education: Principles, Policy & Practice*. <https://doi.org/10.1080/0969595980050102>
- Boaler, J. (2022). *Mathematical mindsets: Unleashing students' potential through creative mathematics, inspiring messages, and innovative teaching* (2nd ed.). Jossey-Bass.
- Carless, D. (2022). From teacher transmission of information to student feedback literacy: Activating the learner role in feedback processes. *Active Learning in Higher Education*, <https://doi.org/10.1177/1469787420945845>
- Darling-Hammond, L., Schachner, A., & Plasencia, S. (2022). Restarting and reinventing school: Learning in the time of COVID and beyond. Learning Policy Institute.
- Hattie, J. (2023). Visible learning: The sequel. A synthesis of over 2,100 meta-analyses relating to achievement. Routledge.
- OECD. (2019). *OECD learning compass 2030: A series of concept notes*. OECD Publishing.
- OECD. (2023). PISA 2022 results (Volume I): The state of learning and equity in education. <https://doi.org/10.1787/53f23881-en>
- Okonkwo, C. A., & Abara, N. I. (2022). Assessment practices and instructional effectiveness in Nigerian tertiary mathematics classrooms. *Journal of the Mathematical Association of Nigeria*, 47(2), 112–129.
- Pellegrino, J. W. (2022). Connecting learning sciences research to educational assessment practice. In C. A. Chinn, T. Tan, C. Chan, & Y. Kali (Eds.), *International handbook of the learning sciences* (pp. 512–523). Routledge.
- Selwyn, N. (2022). *Education and technology: Key issues and debates* (3rd ed.). Bloomsbury Academic.
- Tsai, Y. S., Perrotta, C., & Gasevic, D. (2021). Empowering learners with personalized learning approaches? Agency, equity, and transparency in the context of learning analytics. <https://doi.org/10.1080/02602938.2020.1765811>
- UNESCO. (2021). Reimagining our futures together: A new social contract for education. UNESCO Publishing.
- Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes*. Harvard University Press.
- Wiliam, D. (2021). *Embedded formative assessment: Practical strategies and tools for K–12 teachers* (3rd ed.). Solution Tree Press.
- World Economic Forum. (2023). The future of jobs report 2023. World Economic Forum.