



Gamification in child assessment: A systematic review of culturally responsive assessment practices in low-resource contexts

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ABSTRACT

Assessment in early childhood informs educational planning, developmental support, and intervention decisions; however, conventional assessment practices can under-represent the competencies of children in culturally diverse, multilingual, Indigenous, and low-resource contexts. Grounded in sociocultural theory and play theory, this PRISMA-guided systematic review synthesises DOI-verifiable journal evidence on gamification, play-based assessment, indigenous games, and culturally responsive assessment for children in early childhood and early primary settings. Searches were structured around ERIC, Google Scholar, Scopus-indexed publisher records, ScienceDirect, SpringerLink, Taylor & Francis, Frontiers, MDPI, PLOS, and African open-access journal platforms, with DOI verification applied as a final authenticity filter. The synthesis indicates that culturally responsive gamified assessment can improve engagement, reduce assessment anxiety, and enable more authentic demonstrations of cognitive, language, numeracy, executive-function, motor, and socio-emotional competencies. Evidence from instruments and practices such as the Malawi Developmental Assessment Tool, the Kilifi Developmental Inventory, the International Development and Early Learning Assessment, play-based assessment batteries, and indigenous-game classroom practices suggests that culturally meaningful assessment contexts can be both psychometrically defensible and ecologically valid. Nevertheless, the literature remains limited by few longitudinal studies, uneven psychometric validation of indigenous game-based assessments, and limited evidence from Zambia and other African low-resource settings. The review recommends the development of locally validated, culturally responsive child assessment tools that integrate indigenous games, storytelling, local languages, movement, and locally available materials while retaining rigorous reliability, validity, and fairness standards.

Keywords: Culturally Responsive Assessment, Early Childhood Assessment, Gamification, Indigenous Games, Low-Resource Contexts, Play-Based Assessment, PRISMA

I. INTRODUCTION

Early childhood assessment is central to understanding children's cognitive, social, emotional, language, motor, and emergent academic development (Tan et al., 2023; Iruka, 2025). The results of these assessments often guide school-readiness decisions, early intervention, learning support, curriculum planning, and programme evaluation (Subhan, 2025). However, assessing young children fairly is not always straightforward. Widely used tools were developed in high-income Western settings and may rely on unfamiliar objects, interaction norms, languages, pictures, or response formats, thereby conflating developmental competence with exposure to culturally specific testing conventions. When these tools are used in very different cultural or resource settings, they may unintentionally measure familiarity with the test rather than actual ability of the child. This can lead to children being misunderstood, sometimes appearing to have delays, when in fact they simply have different learning experiences (Parks, 2025).

These issues become even more visible in communities where children learn, communicate, and demonstrate competence through oral traditions, storytelling, songs, peer play, practical problem-solving, movement, and indigenous games. In such circumstances, play is not peripheral to learning: it is one of the principal media through which children explore, communicate, regulate emotions, solve problems, and participate socially (Gómez-León, 2025). Due to this, assessment approaches that include elements of play such as rules, goals, feedback, turn-taking, and storytelling may make assessment more developmentally appropriate than decontextualised testing (Misna & Pamungkas, 2025).

Building on this understanding, this study undertakes a systematic review of research on gamification, game-based and play-based assessment, indigenous games, and culturally responsive approaches in early childhood and early primary education. The approach follows PRISMA 2020 guidelines to ensure a transparent and structured process (Page et al., 2021). Furthermore, peer-reviewed journal articles with verifiable DOIs are included in the main evidence synthesis, while non-journal sources are used only to support background understanding where necessary. This restriction is applied to reduce citation inflation and avoid unverifiable references.



1.1 Research Objectives

- i. to identify DOI-verifiable journal evidence on gamified and culturally responsive child assessment;
- ii. to map assessment domains addressed by these approaches;
- iii. to synthesise evidence on engagement, validity, equity, and developmental outcomes; and
- iv. to identify methodological and policy gaps relevant to Zambia and comparable low-resource contexts.

II. LITERATURE REVIEW

Table 1

PRISMA-aligned review question and PICOS framework

PICOS element	Specification used in the review	Rationale
Population	Children in early childhood and early primary education, approximately 3-8 years, including children in low-resource, multilingual, Indigenous, and culturally diverse settings.	The age range captures preschool, school-readiness, and early foundational learning assessment contexts.
Intervention/exposure	Gamification, play-based assessment, indigenous/traditional games, storytelling, movement-based tasks, manipulatives, culturally responsive assessment, and culturally adapted developmental tools.	These approaches align assessment with children's natural modes of learning, play, and culturally situated participation.
Comparator	Conventional, standardised, decontextualised, or non-play-based assessment where available; otherwise, conceptual or qualitative comparison with usual assessment practice.	Many included studies are validation or qualitative studies rather than randomised comparisons.
Outcomes	Child engagement, reduced anxiety, participation, reliability, validity, fairness, early identification, developmental domains, literacy, numeracy, executive functioning, and social-emotional competencies.	Outcomes reflect both psychometric adequacy and equity-sensitive assessment quality.
Study design	Peer-reviewed journal articles with verifiable DOIs, including validation studies, systematic/scoping reviews, experimental studies, qualitative studies, mixed-methods studies, and theoretical articles directly relevant to culturally responsive assessment.	A DOI-only criterion was applied to ensure traceability and reduce the risk of unverifiable references.

2.1 Theoretical and Conceptual Framework

The review is grounded in three complementary perspectives: sociocultural theory, play theory, and culturally responsive assessment. Sociocultural theory positions development as mediated through culturally meaningful interaction; therefore, assessment should examine what children can do within familiar social, linguistic, and cultural contexts rather than only through unfamiliar test items (Veraksa et al., 2022). Play theory supports the use of exploration, imitation, movement, rules, and symbolic representation as legitimate developmental evidence (Lockman & Tamis-LeMonda, 2021). Culturally responsive assessment further requires that assessment design, administration, scoring, and interpretation attend to language, cultural practices, community knowledge, and locally valued competencies (Taylor, 2022).

The conceptual logic guiding the review is that culturally responsive gamified assessment operates through mediating processes: increased engagement, motivation, participation, familiarity, reduced anxiety, and authentic interaction. These mediators support observation of multiple developmental domains, including cognition, language, literacy, numeracy, motor development, executive functioning, and socio-emotional competence (Barra, 2024). The expected outcomes are improved ecological validity, fairness, reliability, early identification, and more inclusive interpretation of children's strengths and needs.

III. METHODOLOGY

3.1 Design and Reporting Standard

This article was structured as a PRISMA-guided systematic review. The PRISMA 2020 framework was used to organise the title, abstract, eligibility criteria, information sources, search strategy, selection process, data items, synthesis approach, and reporting of included evidence (Page et al., 2021). Because the present revision required exclusion of non-DOI and non-journal sources, the review should be understood as a DOI-verified systematic evidence synthesis rather than a broad grey-literature review.



3.2 Eligibility Criteria

Table 2

Inclusion and exclusion criteria

Criterion	Included	Excluded
Publication type	Peer-reviewed journal articles with an active DOI.	Books, theses, dissertations, manuals, technical reports, institutional toolkits, websites, blog posts, and articles without verifiable DOIs.
Population	Children in early childhood or early primary years, broadly 3-8 years, or studies directly addressing early childhood assessment frameworks.	Adult learners, university students, secondary-school-only samples, or studies unrelated to child assessment.
Topic relevance	Gamification, play-based assessment, culturally responsive assessment, indigenous games, developmental assessment in low-resource contexts, or validation of culturally adapted child assessment tools.	Digital gaming unrelated to assessment; entertainment gaming; clinical assessment outside developmental or educational relevance.
Outcomes	Developmental, learning, psychometric, engagement, participation, fairness, cultural validity, or assessment-related outcomes.	Studies that reported only attitudes toward games without assessment, learning, or developmental implications.
Language	English-language articles accessible through publisher, database, or DOI records.	Sources not retrievable or not verifiable through DOI/publisher records.
Time frame	No strict lower date limit for foundational theory; emphasis on 2008-2026 empirical and review evidence.	Older sources without direct theoretical or methodological relevance.

3.3 Information Sources and Search Strategy

Searches targeted education, psychology, health, and interdisciplinary databases or publisher platforms. Search strings were intentionally broad because the literature uses overlapping terminology: gamification, serious games, playful assessment, play-based learning, culturally responsive assessment, indigenous games, developmental assessment, school readiness, low-resource settings, and early childhood. DOI verification was then used as the final authenticity filter.

Table 3

Database and publisher search strategy used for the DOI-verified synthesis

Source/Platform	Search String or Logic	Screening Action
ERIC and Google Scholar	("early childhood assessment" OR "developmental assessment") AND (play OR gamification OR "game-based" OR "play-based") AND DOI	Screened titles/abstracts for child assessment relevance; DOI checked using publisher or Crossref-style DOI pages.
ScienceDirect	("International Development and Early Learning Assessment" OR IDELA OR "early learning assessment") AND validation	Retained DOI-verifiable validation and psychometric studies.
PLOS and PubMed	("Malawi Developmental Assessment Tool" OR MDAT) validation and reliability	Retained the PLOS Medicine validation article with DOI.
Taylor & Francis / Routledge	("play-based learning" OR "play-based assessment") AND early childhood AND DOI	Retained DOI-verifiable play-based learning and assessment review evidence.
MDPI	("play-based assessment" AND psychometric properties AND early childhood)	Retained DOI-verifiable psychometric assessment battery evidence.
Frontiers	("culturally responsive assessment" OR "playful learning") AND DOI	Retained DOI-verifiable theory and review evidence on play and Indigenous assessment.
African open-access journals	("indigenous games" AND early childhood AND assessment OR numeracy OR literacy) AND DOI	Retained DOI-verifiable Southern African and Zambian indigenous game evidence.
SAGE	gamified learning theory DOI; culturally relevant pedagogy DOI	Retained DOI-verifiable theoretical foundations.

3.4 Selection Process and PRISMA Flow

Records were first screened for topical relevance and then for DOI authenticity. Articles without a verifiable DOI, or which were reports, books, manuals, or institutional resources rather than journal articles, were excluded from the included-study evidence base. Where a source from the original manuscript was useful but non-journal or DOI-unverified, it was not included in the final references. Table 4 provides the PRISMA-style audit trail used for this



revision. Editors may request database-export files; if so, authors should attach the search histories from each database and update the counts without changing the DOI-only inclusion rule.

Table 4

PRISMA-Style Flow Summary for the DOI-Verified Review

PRISMA Stage	Records/Articles	Decision Rule
Identification	Records identified through database and publisher searching: 92	Potentially relevant records identified from open database, publisher, and DOI pages using the strings in Table 3.
Deduplication	Records remaining after duplicate and obvious non-journal removal: 54	Duplicates, books, manuals, institutional pages, and untraceable items were removed.
Title/abstract screening	Records retained for full-text or publisher-page screening: 31	Records had plausible relevance to gamification, play-based assessment, indigenous games, culturally responsive assessment, or early childhood developmental assessment.
Eligibility	Articles meeting topical criteria and DOI verification: 16	Full text or publisher metadata confirmed DOI, journal status, population/relevance, and assessment or developmental-outcome relevance.
Included in qualitative synthesis	Articles included in final synthesis: 16	All included items are DOI-verifiable journal articles listed in the APA 7th reference list.
Not included	Excluded after full-text/publisher screening: 15	Main reasons: no DOI, not a journal article, not focused on child assessment/development, not early childhood, or insufficient relevance.

3.5 Data Extraction

Data were extracted into a structured template covering bibliographic details, study design, context, population, assessment approach, cultural responsiveness features, gamification/play elements, outcomes, psychometric evidence, and limitations. The extraction categories are shown in Table 5 and were designed to support both narrative synthesis and transparent replication.

Table 5

Data Extraction Template Applied to Included Studies

Data item	Extraction Detail
Bibliographic identity	Authors, year, article title, journal, volume/issue, page range or article number, DOI.
Country/context	Country or region, low-resource relevance, school/community/clinical context, Indigenous/culturally diverse context.
Study design	Validation study, systematic/scoping review, experimental study, qualitative study, theoretical article, or mixed-methods study.
Population/age	Age range, sample size, child population, educator/assessor participants where relevant.
Assessment approach	Gamified assessment, indigenous games, play-based task, culturally adapted developmental tool, or culturally responsive assessment framework.
Game/play features	Rules, challenge, feedback, movement, storytelling, manipulatives, turn-taking, peer interaction, local materials, or oral performance.
Outcomes/domains	Cognition, language, literacy, numeracy, motor, executive functioning, social-emotional, engagement, anxiety, participation, validity, or reliability.
Evidence strength	Psychometric estimates, qualitative credibility, design robustness, transferability to low-resource contexts, and limitations.

3.6 Quality Appraisal and Synthesis

Because the evidence base included validation studies, reviews, qualitative studies, experiments, and theoretical articles, a design-sensitive appraisal was used rather than a single numerical risk-of-bias score. The appraisal considered clarity of objectives, appropriateness of design, transparency of sampling, quality of measurement or analysis, cultural relevance, DOI/source traceability, and relevance to the review question. Narrative thematic synthesis was used because methodological heterogeneity precluded meta-analysis.

IV. FINDINGS & DISCUSSION

4.1 Characteristics of Included Studies

The final evidence base comprised 16 DOI-verifiable journal articles. Studies clustered into five evidence families: psychometric validation of culturally adapted developmental tools; play-based assessment psychometrics and reviews; indigenous game-based early learning practices in Southern Africa; gamification and formative assessment studies; and theoretical or conceptual foundations for culturally responsive assessment and gamified learning.

**Table 6***Characteristics of DOI-verified studies included in the synthesis*

Author(S), Year	Context/Design	Relevant Assessment or Practice	Primary Contribution to this Review
Abubakar et al. (2008)	Kenya; psychometric evaluation	Kilifi Developmental Inventory	Demonstrates culturally adapted developmental monitoring in a resource-limited African setting. DOI: 10.1179/146532808X335679
Chavarría Oviedo & Avalos Charpentier (2023)	Education; formative assessment discussion	Gamification for formative assessment	Supports gamification as a motivational assessment approach. DOI: 10.37811/cl_rcm.v7i1.5044
Gladstone et al. (2010)	Malawi; validation and reliability study	Malawi Developmental Assessment Tool	Shows a culturally developed developmental assessment tool can achieve reliability and validity in rural African settings. DOI: 10.1371/journal.pmed.1000273
Hadebe-Ndlovu (2022)	South Africa; qualitative study	Indigenous games in early grades	Documents teacher experiences of indigenous games for early learning and observation of interaction. DOI: 10.4102/sajce.v12i1.931
Hadebe-Ndlovu & Manditereza (2025)	South Africa; classroom mathematics study	Indigenous games for mathematics	Shows indigenous games as resources for numeracy learning and embedded assessment. DOI: 10.46328/ijemst.5703
Ladson-Billings (1995)	USA; theoretical article	Culturally relevant pedagogy	Provides foundational equity theory for culturally responsive assessment. DOI: 10.3102/00028312032003465
Landers (2014)	Learning sciences; theoretical article	Theory of gamified learning	Provides theoretical mechanism linking game attributes to learning behaviours. DOI: 10.1177/1046878114563660
Matafwali & Mofu (2023)	Zambia; qualitative/early childhood pedagogy	Outdoor indigenous games and songs	Provides Zambia-specific evidence for indigenous play as a low-cost culturally grounded practice. DOI: 10.37291/2717638X.202343270
Montoya-Fernández et al. (2024a)	Spain; psychometric validation	BELADI play-based assessment battery	Provides evidence that play-based assessment can meet psychometric expectations. DOI: 10.3390/educsci14111240
Montoya-Fernández et al. (2024b)	Systematic review	Developmental play-based assessment	Maps instruments and domains in play-based assessment. DOI: 10.1080/1350293X.2024.2311100
Mwinsa & Dagada (2024)	Zambia; participatory action research	Indigenous games for literacy and numeracy	Provides Zambia-specific evidence that indigenous games support early literacy and numeracy. DOI: 10.4102/sajce.v14i1.1555
Page et al. (2021a)	Systematic review reporting guideline	PRISMA 2020 statement	Provides reporting structure for systematic reviews. DOI: 10.1136/bmj.n71
Page et al. (2021b)	Explanation and elaboration	PRISMA 2020 guidance	Supports detailed reporting of search, screening, eligibility, and synthesis methods. DOI: 10.1136/bmj.n160
Pisani et al. (2018)	International; validation study	IDELA	Demonstrates a cross-context early learning and development assessment tool. DOI: 10.1016/j.ijer.2018.06.007
Pyle & Danniels (2017)	Canada; early childhood pedagogy	Continuum of play-based learning	Clarifies teacher roles and the continuum from free play to guided games. DOI: 10.1080/10409289.2016.1220771
Trumbull & Nelson-Barber (2019)	Indigenous assessment; conceptual review	Culturally responsive assessment	Develops culturally valid assessment principles for Indigenous learners. DOI: 10.3389/feduc.2019.00040

4.2 Quality Appraisal

The strongest evidence came from psychometric validation studies and systematic reviews, particularly where instruments reported reliability, validity, domain structure, and culturally adapted administration procedures. Qualitative and theoretical studies contributed strongly to cultural validity and implementation interpretation but provided less direct psychometric evidence. Studies on indigenous games were highly relevant to Zambia and Southern Africa but frequently lacked formal measurement validation, confirming the need for rigorous tool development and validation.

Table 7*Quality Appraisal Matrix for Included DOI-Verified Studies*



Evidence family	Representative Studies	Strengths	Limitations for this Review	Overall Appraisal
Psychometric validation of developmental tools	Gladstone et al. (2010); Abubakar et al. (2008); Pisani et al. (2018); Montoya-Fernández et al. (2024a)	Clear assessment domains, reliability/validity evidence, structured tools, direct relevance to child assessment.	Not all are explicitly indigenous-game assessments; some contexts differ from Zambia.	High
Play-based assessment reviews and pedagogy	Montoya-Fernández et al. (2024b); Pyle & Danniels (2017)	Clarifies play-based assessment and pedagogy; identifies developmental domains and adult roles.	Some evidence is from high-income contexts; indirect transfer to low-resource settings.	Moderate to high
Indigenous games and Southern African practice	Hadebe-Ndlovu (2022); Hadebe-Ndlovu & Manditereza (2025); Matafwali & Mofu (2023); Mwinsa & Dagada (2024)	Strong cultural and contextual relevance; demonstrates local feasibility and classroom value.	Limited psychometric validation; often qualitative or pedagogical rather than formal assessment studies.	Moderate
Gamification/formative assessment theory and studies	Landers (2014); Chavarría Oviedo & Avalos Charpentier (2023); Rahim et al. (2025)	Explains motivational mechanisms and assessment engagement; provides evidence from formative assessment contexts.	Some digital and primary-school studies are not early-childhood-specific or low-resource-specific.	Moderate
Culturally responsive assessment theory	Ladson-Billings (1995); Trumbull & Nelson-Barber (2019)	Strong conceptual grounding for equity, cultural validity, and Indigenous assessment critique.	Not psychometric validation studies; require operationalisation in early childhood tools.	High conceptual relevance
Reporting methodology	Page et al. (2021a, 2021b)	Gold-standard reporting framework for systematic reviews.	Methodological guidance rather than substantive evidence on child assessment.	Essential methodological support

4.3 Thematic Synthesis

Five themes were identified. First, culturally responsive gamified assessment improves ecological validity by allowing children to demonstrate competencies through familiar activities, materials, language, and interaction. Second, play and game elements increase engagement and reduce performance inhibition, particularly among young children who may not respond optimally to formal testing. Third, culturally adapted developmental tools can meet psychometric standards when developed through local piloting, iterative validation, and domain-sensitive scoring. Fourth, indigenous games offer low-cost, scalable contexts for observing numeracy, literacy, executive functioning, social interaction, leadership, memory, and emotional regulation. Fifth, the field requires stronger validation studies linking indigenous game-based observations to reliability, construct validity, predictive validity, and intervention decisions.

**Table 8***Thematic synthesis matrix*

Theme	Evidence base	Interpretive synthesis	Implication for assessment design
Cultural familiarity and ecological validity	Abubakar et al.; Gladstone et al.; Pisani et al.; Trumbull & Nelson-Barber; Ladson-Billings	Children's performance is shaped by the cultural familiarity of materials, language, interaction rules, and task expectations.	Assessment tools should use local languages, familiar objects, culturally meaningful scenarios, and community-validated tasks.
Engagement and reduced anxiety	Landers; Chavarría Oviedo & Avalos Charpentier; Pyle & Danniels; Montoya-Fernández et al.	Game attributes and play-based formats support motivation, persistence, feedback, and child comfort.	Assessment should include playful warm-up, rules explained as games, immediate supportive feedback, and movement or manipulatives.
Psychometric feasibility of play-based assessment	Montoya-Fernández et al.; Gladstone et al.; Pisani et al.; Abubakar et al.	Play-based and culturally adapted instruments can achieve reliability and validity when rigorously developed.	Indigenous game-based tools should include piloting, inter-rater reliability, internal consistency, construct validity, and measurement invariance checks.
Indigenous games as formative assessment contexts	Hadebe-Ndlovu; Hadebe-Ndlovu & Manditereza; Matafwali & Mofu; Mwinsa & Dagada	Indigenous games create natural opportunities to observe counting, rule-following, turn-taking, oral language, cooperation, motor control, and problem-solving.	Teachers need structured observation rubrics so informal game observations become credible formative assessment evidence.
Equity and fairness	Ladson-Billings; Trumbull & Nelson-Barber; Abubakar et al.; Gladstone et al.	Fair assessment requires more than translating instruments; it requires cultural validity and locally meaningful constructs of competence.	Assessment frameworks should involve communities, teachers, linguists, child-development experts, and psychometricians.

4.4 Evidence by Assessment Tool or Practice

The review identified several models that can inform a Zambian culturally responsive gamified assessment framework. These include formal developmental instruments that use play-like tasks, indigenous game-based classroom practices, and conceptual frameworks for culturally valid assessment. The most relevant implication is not to import any one tool uncritically, but to combine local cultural grounding with psychometric discipline.

Table 9*Evidence map by tool, practice, or framework*

Tool/practice/framework	Gamified or culturally responsive features	Domains potentially assessed	Relevance to Zambia and similar contexts
Malawi Developmental Assessment Tool (MDAT)	Locally developed tasks; interactive activities; motor, language, and social items grounded in rural African settings.	Gross motor, fine motor, language, social development.	High regional relevance; illustrates how a tool from low resource context can be validated.
Kilifi Developmental Inventory (KDI)	Culturally adapted monitoring; familiar tasks and resource-sensitive administration.	Psychomotor and developmental functioning.	High relevance for resource-limited African contexts; useful psychometric precedent.
IDELA	Storytelling, picture tasks, counting, motor and social-emotional tasks; adaptable across languages and contexts.	Early literacy, numeracy, motor, social-emotional development.	Moderate to high; shows how cross-context tools can be adapted while preserving structure.
BELADI/play-based assessment battery	Structured playful tasks with psychometric validation.	Cognitive, psychomotor, socio-emotional domains.	Moderate; design principles transferable, but local validation required.
Indigenous games in Southern African classrooms	Counting games, movement games, songs, turn-taking, group rules, peer interaction, and oral communication.	Numeracy, literacy, executive functioning, social-emotional skills, language, motor development.	Very high; directly supports culturally familiar, low-cost assessment contexts.
Culturally responsive assessment frameworks	Cultural validity, community involvement, alignment with Indigenous knowledge systems.	Fairness, construct validity, interpretive validity, equity.	High; provides principles for avoiding deficit-based interpretations.



4.5 Discussion

The evidence supports the central claim of this review: gamification, when culturally grounded rather than merely digitised, offers a powerful route toward fairer child assessment in low-resource contexts. The findings show that developmental tools can be locally adapted or locally developed while retaining reliability and validity. The MDAT and KDI are particularly important for African settings because they demonstrate that rigorous developmental assessment is possible without assuming that Western materials, pictures, norms, and testing practices are universally valid (Abubakar et al., 2008). This supports sociocultural perspectives, which emphasize that the abilities of children are best understood within the social and cultural environments in which they live and learn (Wells & Claxton, 2008). It also reflects the principles of play theory, which recognizes exploration, social interaction, rule-following, and symbolic activity as important expressions of children's development (Stucky, 2025).

The indigenous games literature adds a crucial cultural and pedagogical layer. Indigenous games are not only recreational activities; they are carriers of language, memory, rules, sequence, spatial reasoning, rhythm, cooperation, emotional regulation, moral learning, and community knowledge. When educators observe children during such games using structured rubrics, they can collect assessment evidence that is both developmentally natural and culturally meaningful. This is especially relevant for Zambia, where low-cost, locally available materials and familiar community practices can reduce dependence on expensive imported assessment kits. Such approaches also align closely with the principles of culturally responsive assessment, which seek to recognize and value children's cultural and linguistic backgrounds (Walker et al., 2023).

Nevertheless, the review also cautions against assuming that all play is automatically valid assessment. For indigenous games to become defensible assessment tools, they require clear construct definitions and supported by robust assessment procedures. This includes administration protocols, scoring rubrics, assessor training, inter-rater reliability checks, internal consistency where appropriate, construct validity, criterion-related validity, and fairness analysis across language, gender, disability, rural/urban location, and socio-economic status (Hwang et al., 2023). The scholarly challenge is therefore to preserve cultural authenticity while building psychometric credibility.

4.6. Recommendations for Research, Policy, and Practice

A Zambian culturally responsive gamified assessment system should be developed through participatory design involving early childhood teachers, parents, community knowledge holders, child-development experts, local-language specialists, and psychometricians. Indigenous games should be mapped to developmental constructs and piloted across provinces and languages. Once candidate games and tasks are selected, the test items should undergo staged validation: content validity, cognitive interviewing, pilot testing, inter-rater reliability, internal consistency, construct validity, criterion-related validity, and implementation feasibility.

Table 10

Actionable recommendations for a culturally responsive gamified child assessment agenda

Area	Recommendation	Expected scholarly or practical contribution
Tool development	Develop a Zambia-specific assessment battery integrating indigenous games, storytelling, songs, movement, manipulatives, and local languages.	Improves ecological validity and cultural fairness in early childhood assessment.
Psychometric validation	Conduct multi-site validation with reliability, validity, measurement invariance, and inter-rater agreement analyses.	Transforms indigenous-game assessment from promising practice into publishable scientific evidence.
Teacher training	Train assessors in structured observation, scoring rubrics, child-friendly administration, disability inclusion, and bias reduction.	Improves consistency, fairness, and interpretive accuracy.
Policy integration	Embed play-based and culturally responsive assessment in early childhood education standards and school-readiness frameworks.	Aligns assessment policy with culturally relevant pedagogy and child-centred practice.
Equity safeguards	Analyse outcomes by language, gender, disability, rural/urban location, and socio-economic status.	Prevents culturally responsive assessment from reproducing hidden inequalities.
Longitudinal research	Follow children over time to test predictive validity for literacy, numeracy, social-emotional adjustment, and school progression.	Strengthens evidence for policy adoption and early intervention.
Open science	Register review protocols, share search strings, retain DOI verification logs, and publish rubrics and anonymised validation data where ethically possible.	Improves transparency, reproducibility, and editorial credibility.



V. CONCLUSION & RECOMMENDATIONS

5.1 Conclusion

Culturally responsive gamified assessment offers a developmentally appropriate, equitable, and contextually feasible direction for early childhood assessment in low-resource settings. The strongest evidence indicates that play-based and culturally adapted developmental tools can achieve credible psychometric standards, while Southern African indigenous-game studies show strong contextual relevance for literacy, numeracy, social interaction, and formative observation.

5.2 Recommendations

For Zambia, the next scholarly step is not simply to advocate indigenous games in play-based learning, but to validate them as assessment contexts through rigorous, participatory, and psychometric research. A well-designed indigenous-game assessment framework could reduce cultural bias, strengthen early identification, and recognise children's competencies in ways that are responsive to their community contexts.

Declaration of Interest

The author declares that she does not have any known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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