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A Phenomenological Study of Indigenous Knowledge System (IKS) In Developing 21st Century Skills Among ECD Learners in Bulawayo Urban Primary Schools-Zimbabwe: ECD Teachers' Perceptions and Practices

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ABSTRACT

Integration of Indigenous Knowledge Systems (IKS) in developing 21st Century Skills among ECD learners in primary schools is a global phenomenon that has manifested differently across continents depending on each region's colonial history, heritage and ideological educational policies. This research study focuses on exploring the IKS in developing 21st century skills among ECD learners by examining ECD teachers' perceptions and practices regarding its integration. Using interpretivist research paradigm with qualitative approach and a hermeneutic phenomenological research design, semi-structured interviews and non-participant classroom observations were used to generate data from 15 criterion-based purposive ECD teachers in Bulawayo urban primary schools. Based on thematic analysis, the study revealed that ECD teachers perceived and believed that integration of IKS into ECD pedagogy in urban primary schools was difficult, confusing, impractical and impossible hence forced ECD teachers to use Modern Knowledge Systems (MKS). Results from the study disclosed that ECD teachers in urban primary schools were not confident with their implementation of IKS-based activities in the development of 21st century skills among ECD learners. Findings availed that ECD teachers in urban primary schools tried to translate IKS from indigenous language to English language during their lessons but was not effective to ECD learners. They also used Modern Knowledge Systems (IKS) like technology-driven resources such, structured educational games like shop corner play for numeracy, puzzles, art, blended and multimedia learning system in developing 21st century skills among ECD learners in Urban primary schools. The study revealed that ECD teachers in urban primary schools lacked knowledge about IKS-based activities, lacked training on IKS and lacked IKS resources in developing 21st century skills among ECD learners. Therefore, the study concluded that integration of IKS in developing 21st century skills among ECD learners in urban primary schools was not significantly effective. The study recommended that ECD teachers need to be cultural mediators not just implementers of Modern Knowledge Systems, there is need for ECD teachers to engage community elders as their IKS data base or IKS resource teachers. The study also recommended that there is need for the Ministry of Primary and Secondary Education to supply urban primary schools with standardized IKS resource kits not just laptops, and there is need for curriculum developers to simplify Heritage-based Curriculum by giving urban teachers clear examples of how to link IKS to 21st century skills not just theory, and by putting IKS in textbooks. There is need for teacher training institutions to make IKS a practical module not just theory. The study further recommended that IKS pedagogy model, as a teaching device, should be researched and designed to promote effective integration of IKS activities in developing 21st century skills among ECD learners in urban primary schools.

Keywords: Indigenous Knowledge Systems (IKS), teachers' perceptions, teachers' pedagogical practices, contextual and institutional factors, Urban Primary Schools, 21st-century skills among ECD learners**.**

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INTRODUCTION

The relationship between Indigenous Knowledge Systems (IKS) and formal early childhood education is a global phenomenon that has manifested differently across continents depending on each region's colonial history, heritage and ideological educational policies (Melis et al., 2025). Early childhood development (ECD) is widely recognised as the foundation on which lifelong learning, identity formation and skill acquisition are built. IKS can be understood as locally developed and transmitted bodies of knowledge, skills, values, beliefs and practices through which ECD learners understand their social, cultural and natural environments. Such knowledge may be transmitted through oral traditions, storytelling, songs, proverbs, games, rituals, observation, demonstration, participation and intergenerational interaction (OECD, 2019). In education, IKS constitutes a pedagogical resource through which ECD learners develop 21st century skills such as critical thinking, creativity, communication, problem solving, collaboration, digital literacy, and cultural awareness (Vincent-Lancrin et al., 2019). IKS is a legitimate and pedagogically rich resource capable of nurturing cognitive, socio-emotional, ethical, and ecological competencies in ECD learners (Shabalala, 2025). Consequently, education that builds on children's existing IKS can potentially make learning more meaningful, participatory and contextually relevant (Keane et al., 2021). However, the wholesale importation of Western-oriented curricula into African and other postcolonial education systems has marginalised IKS that communities have developed and passed down across generations (da Silva et al., 2023).

Norway's national framework plan for ECD formally requires that Sámi culture IKS be represented as a core value of pedagogical practice, and that all children develop respect for and solidarity with Sámi cultural diversity (Melis et al., 2025; Heim & Bergan, 2024). Comparative research across Asian countries shows that early childhood classrooms in the region reflected an integration of IKS to develop 21st century skills among ECD learners (Aditya et al., 2025; Biana et al., 2021; Gupta, 2014). Complementary classroom-based research in Filipino ECD centres found that integration of IKS as a medium of instruction, enabled ECD learners to relate personal experience to scientific concepts and to communicate their ideas with greater creativity and confidence (Oropilla et al., 2026; Biana et al., 2021). In Indonesia, Aditya et al (2025) discovered that such integration of IKS played an important role in shaping young children's character and cultural identity. However, the Asian evidence presents that IKS integration in ECD is widely endorsed in principle but its translation into consistent classroom practice remains uneven and highly dependent on individual teachers' training and access to culturally relevant materials (Nyori & Sharma, 2026).

Theoretically, this convergence of indigenous and contemporary pedagogy is well supported by Vygotsky's (1978) sociocultural theory which holds that cognitive development is mediated by cultural tools, language, and social interaction within a learner's immediate community. This framework is highly compatible with indigenous, community-embedded modes of learning such as storytelling, play, proverbs, and apprenticeship. Similarly, the philosophy of Ubuntu, rooted in African indigenous thought, align closely with the collective identity, communication and collaboration strand of 21st-century skills frameworks. Therefore, the potential relevance of IKS is particularly significant at ECD level because young children learn extensively through play, interaction, imitation, exploration and participation in social and cultural activities. Research among the Guji people of Ethiopia demonstrates that indigenous early childhood practices incorporate culturally embedded forms of care, play, learning and social interaction. Jirata (2019) found that children's cultural spaces constituted important contexts for learning and social participation, while also noting that relatively little research has documented how indigenous traditions shape early childhood care, play and learning in African contexts. This suggests that ECD learner's everyday cultural environments can represent important learning resources rather than being treated as separate from formal education. Akkari (2022) argues that African approaches to early childhood education need to respond to local interests and cultural realities rather than simply reproduce models developed elsewhere. Thus, critical thinking, creativity, communication, collaboration, problem solving, adaptability, responsibility and learner agency can be developed through culturally meaningful activities including storytelling, traditional games, community participation, indigenous language use, environmental observation and practical problem-solving.

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In Zimbabwe, the Ministry of Primary and Secondary Education introduced a Heritage-Based Curriculum that explicitly seeks to blend the transmission of IKS and values with 21st-century learning competencies, in support of the country's Vision 2030 aspiration toward a knowledge-driven, culturally grounded society (Kufarimani & Chitanana, 2025). The Heritage-Based Curriculum Framework 2024–2030 places emphasis on indigenous knowledge, heritage, values, competencies and applied knowledge and identifies ECD A and B as part of the Infant School Module (Bhowa & Aribino, 2026). The framework, therefore, provides an important educational policy focusing on the use of IKS in the development of 21st century skills among ECD learners (Chitamba & Chitamba, 2025; Wufa, 2026). Despite this apparent synergy, evidence from the region suggests that implementation of IKS in developing 21st century skills among ECD learners remain uncertain (Mkhwebane, 2024; Ogegbo & Ramnarain, 2024). Studies of teachers' engagement with indigenous-themed pedagogy in Zimbabwean primary schools show that while ECD teachers value the cultural relevance of such approaches, actual implementation is uneven (Kufarimani & Chitanana, 2025). Manzunzu (2022)'s research on ECD teachers' understanding and use of IKS found that teachers had mixed understandings of what constituted IKS and its incorporation into their pedagogical practices was often minimal and incidental. From Zimbabwean research, limited empirical attention appeared to have been directed specifically towards the intersection of IKS, ECD pedagogy and 21st-century skills development (Mavuru et al., 2024).

Consequently, there is a compelling rationale for investigating IKS as a potentially valuable resource for developing 21st-century skills among ECD learners in Zimbabwe. Indigenous storytelling, traditional games, riddles, songs, dance, indigenous languages, environmental knowledge, agricultural practices, crafts, community participation and intergenerational learning may provide authentic contexts in which children can communicate, collaborate, think creatively, solve problems, exercise agency and develop social responsibility (Mazambani & Tapfumaneyi, 2024; Mukanya, 2025). Therefore, it needs to be investigated empirically by examining what teachers understand as IKS, what they believe about its contribution in developing 21st century skills among ECD learners, how they integrate it into ECD programmes and the conditions that facilitate or constrain its integration (Manzunzu & Maera, 2024; Zhou, 2026).

Statement of the Problem

Although educational policy frameworks in many African countries formally endorse the integration of Indigenous Knowledge Systems into education, there is a concern on how IKS can nurture the 21st-century skills among ECD learners in urban ECD and primary schools (da Silva et al., 2023; Mkhwebane, 2024). In Zimbabwe, ECD teachers had mixed understandings of what constituted indigenous knowledge systems in developing 21st century skills among ECD learners and sometimes struggled to incorporate it into their pedagogical practices (Manzunzu, 2022). There is insufficient empirical evidence explaining how IKS can be deliberately mobilised to develop 21st-century skills among ECD learners in urban ECD centres and primary schools (Dzamesi & van Heerden, 2020; Manzunzu, 2022; Wufa, 2026). Despite the emphasis of the Zimbabwean Heritage-Based Curriculum Framework 2024–2030 on heritage and use of indigenous knowledge systems, the existence of this curriculum policy does not translate into effective development of 21st century skills among ECD learners in urban primary schools (Mavuru et al., 2024). Limited attention has been given to the intersection between IKS, teacher perceptions, actual classroom practices and the development of contemporary competencies such as creativity, critical thinking, communication, collaboration, problem solving, learner agency and social responsibility (Manzunzu, 2022). Integration of IKS into the ECD daily pedagogy and practice in urban areas remained symbolic rather than transformative (Shabalala, 2025). The proposed study seeks to address this conceptual, empirical, contextual and policy–practice gap by exploring how ECD teachers understand, perceive and integrate IKS and how these practices potentially contribute to the development of 21st-century skills among ECD learners in Zimbabwe.

General Objective

To phenomenologically explore the Indigenous Knowledge Systems in developing 21st century skills among ECD learners by examining ECD teachers' perceptions and practices regarding its integration.

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Specific Objectives

1. To assess ECD teachers' perceptions and practices regarding the integration of IKS in developing 21st century skills
2. To examine the contribution of IKS-based activities to the development of 21st century skills among ECD learners
3. To explore the challenges faced in integrating IKS into ECD programs aimed at developing 21st century skills
4. To propose strategies for effectively integrating IKS into ECD curricula to enhance the development of 21st century skills

Sub-questions

1. How do ECD teachers perceive and practice the integration of IKS in developing 21st century skills?
2. In what ways do IKS-based activities contribute to the development of 21st century skills among ECD learners?
3. What are the challenges of integrating IKS into ECD programs for 21st century skills development?
4. Which strategies can be recommended to strengthen the integration of IKS in ECD to support 21st century skills development?

CONCEPTUAL FRAMEWORK

A conceptual framework provides the analytical structure through which the major concepts of a study are identified, defined and related to one another. The conceptual framework brings together five interconnected constructs such as Indigenous Knowledge Systems (IKS), teachers' perceptions, teachers' pedagogical practices, contextual and institutional factors, and the development of 21st-century skills among ECD learners (OECD, 2019; Makuwira, 2018). IKS can be understood as knowledge, skills, values, beliefs, practices and ways of interpreting the environments that are generated within communities and transmitted across generations (Manzunzu, 2019). For ECD, IKS can include traditional stories, folktales, songs, dances, riddles, proverbs, traditional games, indigenous languages, crafts, environmental knowledge, traditional food production, cultural practices and community activities (Tonga Çabuk et al., 2024). These resources are potentially important because young children learn through concrete experiences, social interaction, play, imitation and exploration. This conceptual framework treats IKS as a pedagogical resource that teachers can intentionally mobilise to facilitate learning and developing of 21st century skills (Dzamesi & van Heerden's, 2020). When an ECD teacher asks children to develop strategies, negotiate rules, work together and explain their decisions, the IKS activity can become a context for developing communication, collaboration, problem solving and critical thinking. Evidence from Dzamesi and van Heerden (2020), found that IKS can be transformed into meaningful pedagogical practices. The results suggest that the relationship between IKS and learner outcomes is not necessarily direct but a process linking Indigenous knowledge → teacher interpretation → pedagogical integration → learner engagement → competency development. Thus, the framework positions the teacher as a mediating agent between IKS and the development of 21st-century skills (Manzunzu, 2019).

21st century skills are understood as contemporary competency commonly emphasises cognitive, interpersonal, intrapersonal and transformative capabilities among ECD learners. The OECD Learning Compass 2030 identifies competencies involving knowledge, skills, attitudes and values and includes constructs such as creativity, critical thinking, collaboration, problem solving, adaptability, curiosity, empathy, resilience, self-regulation and responsibility (OECD, 2019). The framework does not assume that all these 21st century competencies can develop equally through IKS. Instead, the study will investigate which competencies teachers perceive as being developed through IKS activities and how such development is reflected in classroom practices. IKS provides several potential contexts for creativity in ECD. Storytelling, traditional music, dance, drawing, crafts, imaginative play, riddles and traditional games can require children to generate ideas, experiment with possibilities and express themselves in different ways. Then, the IKS resource becomes a stimulus for creative production among ECD learners rather than an object of memorisation. The conceptual

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framework therefore proposes that: IKS resources + creative teacher facilitation → learner exploration and expression → creativity development. OECD evidence indicates that critical thinking and problem solving are among the 21st century competencies widely embedded in contemporary curricula internationally (OECD, 2020). IKS can potentially provide authentic situations through which young children reason about problems. Traditional riddles, puzzles, games, stories and environmental activities can encourage children to predict, classify, compare, explain and make decisions. The framework therefore conceptualises problem solving as a potential outcome of active engagement with IKS, rather than as an isolated skill taught through formal instruction. Indigenous storytelling, songs, oral narratives, riddles, proverbs and indigenous languages provide naturally occurring opportunities for children to develop communication skills such as listen, speak, interpret and express ideas.

This conceptual framework understands teachers' perceptions as their beliefs, interpretations, attitudes and understandings concerning what constitutes IKS; the educational value of IKS; the relevance of IKS to ECD; the relationship between IKS and 21st-century skills; the appropriateness of IKS for young children; and their own competence to integrate IKS. The conceptual framework therefore proposes that: Teachers' perceptions → influence the selection, interpretation and use of IKS → influence pedagogical practices → influence learner opportunities to develop 21st century competencies. Teachers' pedagogical practices refers to what teachers actually do when integrating IKS into ECD learning such as selecting Indigenous Knowledge resources; designing IKS-based learning activities; using indigenous stories and games; integrating indigenous language; using local materials; inviting elders/community members; facilitating traditional play; encouraging children's exploration; encouraging collaborative activities; linking IKS with curriculum concepts; and assessing children's learning during IKS activities (Dzamesi & van Heerden, 2020). The proposed framework also recognises that teachers do not operate in isolation. Their practices are influenced by the broader educational environmental or contextual factors including teacher training; professional development; availability of teaching and learning materials; curriculum requirements; school leadership; class size; time allocation; parental involvement; community participation; availability of indigenous knowledge holders; teachers' cultural knowledge; and institutional support. The framework further conceptualises the ECD learning environment as an important intervening context or culturally responsive ECD environment that includes: locally available learning materials; indigenous stories and games; culturally relevant displays; use of children's familiar languages; opportunities for outdoor learning; interaction with community knowledge holders; collaborative activities; and child-centred and play-based pedagogies. The OECD Learning Compass emphasises that competencies should be developed through learning environments that support learner agency rather than merely transmitting fixed knowledge (OECD, 2019).

THEORETICAL FRAMEWORK

This study is underpinned by an integrated theoretical framework comprising Vygotsky's Sociocultural Theory (1978) as the principal theoretical foundation, complemented by Bronfenbrenner's Bioecological Systems Theory and Bandura's Social Cognitive Theory. The three theories provide complementary explanations of how Indigenous Knowledge Systems (IKS) can be incorporated into Early Childhood Development (ECD) programmes to promote 21st-century skills, including communication, collaboration, creativity, critical thinking, problem-solving, cultural awareness and self-regulation (Rogoff et al., 2018; Makonye & Muchabaiwa, 2025; Schunk & DiBenedetto, 2020). Guided by Vygotsky's zone of proximal development during IKS-based ECD teaching, the teacher, parent, grandparent, craftsperson or community knowledge holder can act as a knowledgeable guide who supports children as they engage with culturally meaningful activities (Mejía-Arauz et al., 2018; Rogoff et al., 2018). For instance, when children participate in a traditional counting game, the teacher may initially demonstrate the rules, model counting strategies and guide learners through the activity (Smagorinsky, 2018; Veraksa & Sheridan, 2018). As children become more competent, the teacher gradually reduces assistance and allows them to organise the game independently. This process can strengthen numeracy, communication, collaboration and problem-solving (Care et al., 2018; Chalkiadaki, 2018). Similarly, children can develop creativity and critical thinking by listening to folktales and suggesting alternative endings, interpreting proverbs, comparing characters' decisions or discussing possible solutions to problems encountered

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in a story (Yunkaporta, 2019). Vygotsky's cultural tools such as language, symbols, stories, songs, artefacts and culturally familiar practices mediate ECD learners' understanding of their world (Rogoff et al., 2018). Teachers can use local languages alongside traditional games, riddles, folktales, songs and environmental knowledge, to create learning experiences connected to children lived realities. Learners can use familiar materials to classify objects, count items, construct models, explain observations and work collaboratively. Integrating local languages and familiar cultural experiences into ECD programmes can therefore provide meaningful starting points for developing communication, reasoning and literacy skills (Mejía-Arauz et al., 2018; Veraksa & Sheridan, 2018; Yunkaporta, 2019).

Based on Bronfenbrenner's microsystem principle, ECD learners may acquire indigenous knowledge through storytelling by grandparents, traditional games with peers, gardening activities, songs and interactions with teachers (Eriksson et al., 2018; Merçon-Vargas et al., 2020). These experiences can promote communication, cooperation, creativity and problem-solving (Eriksson et al., 2018). Mesosystem principle believe that effective IKS integration requires collaboration between ECD teachers, parents, grandparents and community knowledge holders (Makonye & Muchabaiwa, 2025). For instance, an ECD teacher may invite a knowledgeable community member to demonstrate traditional craft-making and subsequently organise classroom activities in which children design their own objects. Such partnerships help connect ECD learners' existing knowledge with structured learning experiences. Bronfenbrenner's ecosystems principle believes that institutional and community-level such as teacher-training institutions, school management structures, education authorities, resource allocation and the availability of culturally relevant teaching materials indirectly develop 21st century skills among ECD learners (Merçon-Vargas et al., 2020). However, where teachers lack training or resources to integrate IKS, opportunities to develop 21st-century skills among ECD learners may be limited even when local knowledge is readily available. Bronfenbrenner's macrosystem principle believe that the recognition or marginalisation of indigenous languages and knowledge within educational policy can influence teachers' willingness and ability to integrate IKS into ECD programmes (Makonye & Muchabaiwa, 2025). Thus, a supportive ECD curriculum should recognise culturally grounded learning while ensuring that children develop 21st century competencies relevant to contemporary social, scientific and technological contexts. Chronosystem principle advocates that ECD programmes should therefore preserve valuable cultural knowledge while enabling children to apply it creatively to present-day problems (Eriksson et al., 2018). Bioecological theory is significant to this study because it directs this research to investigate the contextual conditions that enable or constrain effective IKS integration. These include teacher preparation, school resources, parental participation, community involvement, curriculum policy and the recognition of cultural diversity (Makonye & Muchabaiwa, 2025). The theory also highlights that effective integration cannot depend exclusively on individual teachers. Sustainable practice requires alignment between classroom activities, home learning, community participation and institutional support (Eriksson et al., 2018). Accordingly, Bronfenbrenner's theory explains how the wider ecological environment shapes the opportunities available for teachers to integrate IKS and for ECD learners to develop 21st-century skills.

Bandura's Social Cognitive Theory complements the other two theories by explaining how ECD children develop 21st century skills through observation, modelling, imitation, practice, self-regulation principles (Schunk & DiBenedetto, 2025). Bandura believes that observational learning occurs when ECD learners acquire 21st century skills by watching the behaviour of others and observing its consequences. In an IKS-based ECD classroom, teachers and community knowledge holders can model traditional dances, crafts, storytelling, gardening, environmental conservation and cooperative games (Schunk & DiBenedetto, 2020). For instance, when an adult demonstrates how to make a simple object from locally available materials, ECD learners can observe the process, identify the materials required and attempt to reproduce or modify the design. Such activities may develop creativity, practical problem-solving, collaboration and communication (Schunk & DiBenedetto, 2020). Bandura also advocates that self-efficacy, motivation and persistence build an ECD learner's belief in their capability to perform a particular IKS task successfully (Schunk & DiBenedetto, 2025). In early childhood education, teachers can foster children's emerging confidence by introducing achievable IKS-based activities, providing constructive feedback and gradually increasing the complexity of tasks. For instance, an ECD learner who initially struggles to participate in a traditional counting game may become more confident after observing

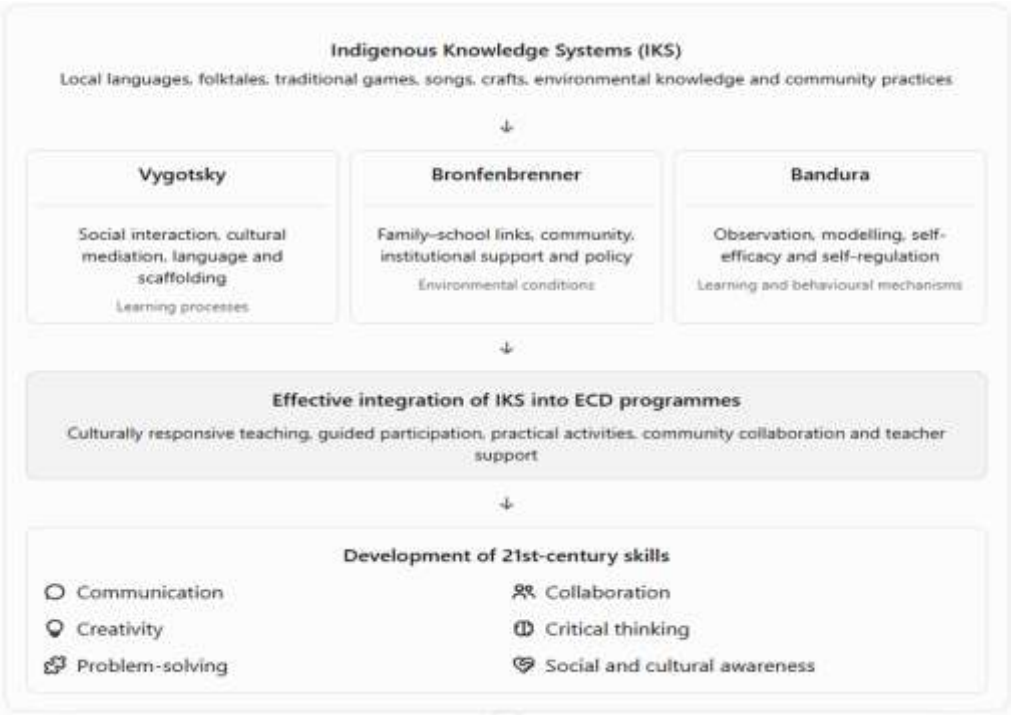
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peers, receiving teacher guidance and successfully completing several rounds. This experience may encourage persistence, willingness to participate and confidence in attempting more demanding activities (Schunk & DiBenedetto, 2020). Similarly, ECD teachers who believe they can integrate IKS effectively may be more willing to develop culturally relevant activities, collaborate with community members and adapt teaching methods to learners' needs. Conversely, teachers who lack confidence, pedagogical knowledge or institutional support may use IKS only occasionally or superficially. Bandura's self-regulation principle involves the development of capacities to guide one's behaviour, monitor progress and adjust actions towards a goal. IKS-based activities can provide opportunities for ECD learners to practise these capacities. For example, when ECD learners work together to construct a model using natural materials, they may need to plan their work, allocate tasks, manage disagreements, evaluate their progress and modify their approach when a problem occurs. With appropriate teacher guidance, these experiences can foster early problem-solving, decision-making, collaboration and persistence.

Synthesis of the three theories in explaining effective IKS integration

The three theories are complementary because they explain different but interdependent processes involved in integrating IKS into ECD programmes to develop 21st century skills. Vygotsky provides the central explanation of learning through social interaction and cultural mediation; Bronfenbrenner explains the environmental conditions that enable or constrain these learning processes; and Bandura explains how observation, modelling, motivation and self-efficacy support the acquisition and application of skills. As stated by figure 1, the framework illustrates that IKS does not automatically produce 21st-century skills simply because indigenous content is included in classroom activities. Its educational value depends on how teachers facilitate learning, the quality of interactions between ECD learners and knowledgeable adults, the availability of supportive environments, and opportunities for ECD learners to practise and apply emerging skills. This interpretation is consistent with research emphasising the importance of culturally situated and interconnected environments in early childhood development (McLinden et al., 2018; Negussie & Slater, 2018).

Figure 1. Synthetic theoretical framework for integrating IKS to develop 21st-century skills among ECD learners.



Source: Author's synthesis of Vygotsky's, Bronfenbrenner's and Bandura's theoretical perspectives (2026).

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The principal strength of this integrated framework is that it avoids explaining ECD learners' development of 21st century skills through a single theoretical perspective. Vygotsky's theory explains the social and cultural processes through which ECD learners acquire knowledge, but it offers less explicit detail about how broader institutional and policy conditions shape the implementation of IKS in developing 21st century skills among ECD learners (Mejía-Arauz et al., 2018; Veraksa & Sheridan, 2018; Yunkaporta, 2019). Bronfenbrenner addresses this limitation by locating ECD children's learning and development of 21st century skills within interconnected environmental systems (Eriksson et al., 2018; Merçon-Vargas et al., 2020). Nevertheless, an ecological explanation alone does not fully account for how ECD learners develop 21st century skills by observing others, develop confidence or regulate their behaviour. Therefore, Bandura's theory addresses these processes of integrating IKS in developing 21st century skills among ECD learners through observational learning, self-efficacy and self-regulation (Makonye & Muchabaiwa, 2025). Vygotsky and Bandura can allow this study to investigate teachers' perceptions of IKS or beliefs about indigenous knowledge, its educational value and their confidence in using it. In addition, Vygotsky and Bandura can allow this study to investigate teachers' IKS integration practices including storytelling, traditional games, modelling, scaffolding, practical activities and collaborative learning in developing 21st century skills among ECD learners. Bronfenbrenner and Vygotsky can allow this study to investigate home–school–community collaboration including how parents, elders, teachers and community knowledge holders contribute to integration of IKS in developing 21st century skills among ECD learners. All three theories can allow this study to investigate the development of 21st century skills or how ECD learners demonstrate communication, creativity, collaboration, critical thinking and problem-solving during IKS-based activities in classrooms. Moreover, all three theories can guide this study to investigate barriers to IKS integration and strategies for effective integration of IKS in developing 21st century skills among ECD learners.

The theories from this integrated framework also have limitations that the study should acknowledge. First, sociocultural explanations must not assume that all ECD learners within a community possess identical cultural knowledge or develop 21st century skills in the same way (Smagorinsky, 2018; Veraksa & Sheridan, 2018). Second, an ecological analysis can identify relevant contextual influences of integrating IKS in developing 21st century skills among ECD learners without necessarily demonstrating which influences have the strongest effects (Merçon-Vargas et al., 2020). Third, Bandura's emphasis on modelling should not reduce ECD learners to passive imitators; children should be encouraged to question, reinterpret and creatively adapt cultural knowledge to develop 21st century skills (Schunk & DiBenedetto, 2020).

Therefore, these limitations justify the combined use of the theories to inform an effective integration of IKS in developing 21st century skills among ECD learners. Together, they support an understanding of ECD leaners as active learners whose development of 21st century skills are shaped by cultural experiences, interpersonal relationships, environmental opportunities and personal agency. Impliedly, this integrated framework is particularly relevant because effective IKS integration needs to recognise the country's cultural and linguistic diversity while ensuring that indigenous knowledge contributes meaningfully to contemporary educational 21st century competencies. Overall, Vygotsky's Sociocultural Theory should serve as the principal theory, with Bronfenbrenner's Bioecological Systems Theory and Bandura's Social Cognitive Theory functioning as complementary explanatory lenses. The combined framework provides a coherent foundation for examining how teachers' perceptions and practices, culturally grounded learning experiences, community involvement and institutional conditions influence the development of 21st-century skills among ECD learners.

LITERATURE REVIEW

Perceptions and practices regarding the integration of IKS in developing 21st century skills among ECD learners

The integration of IKS into ECD programs is increasingly recognised as a means of making learning culturally relevant while developing 21st century skills such as creativity, critical thinking, communication, collaboration, problem-solving and adaptability (Schreiber & Kuppens, 2021). Evidence from Finland demonstrates that teachers' perceptions and preparedness remain important determinants of whether IKS is meaningfully

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integrated into ECD programs or not (Mattila et al., 2023). These findings suggest that positive perceptions alone may not translate into practice unless ECD teachers receive structured preparation and appropriate curriculum resources. Therefore, its contribution to 21st-century skills depends substantially on ECD teacher competence and institutional support (Mattila et al., 2024). Indian educational reforms introduced the National Education Policy 2020 for integrating IKS into ECD education (Rani, 2026). The implication is that ECD teachers need to move beyond merely presenting IKS as cultural content, but to employ inquiry, discussion, storytelling, experimentation and collaborative activities through which learners can develop communication, creativity, problem-solving and critical-thinking abilities.

Mkosi et al. (2023) observed that although African IKS had been incorporated into South African ECD curriculum discourse, there remained insufficient pedagogical strategies to assist teachers in implementing it effectively. In Nigeria, IKS in developing 21st century skills are closely associated with oral traditions, storytelling, songs, proverbs, indigenous games and community practices (Kolade, 2026). In Tanzania, Balilemwa (2026) reports that integration of IKS like indigenous play can support the development of creativity, problem-solving, cooperation, emotional regulation, language development and cultural identity among ECD learners. Nevertheless, the effectiveness of IKS practices in developing 21st century skills among ECD learners depend on teachers' understanding of how indigenous activities can be deliberately connected to curriculum outcomes (Mboya et al., 2021). Sigale and Arab (2024), studying pre-schools in Jigjiga Ethiopia, found that ECD teachers generally had positive attitudes towards IKS in developing 21st century skills, but its actual integration remained inadequate. Research in Ethiopia revealed that IKS can become a vehicle for developing 21st-century skills among ECD learners when teachers transform local knowledge into participatory activities involving observation, exploration, storytelling, experimentation and collaborative problem-solving (Tegegne et al., 2022). Inclusion of Indigenous Knowledge in the New Primary and Middle School Curriculum of Ethiopia 2023 requires a greater involvement of local stakeholders, teachers and community members in the implementation of IKS in developing 21st century skills among ECD learners (Sigale & Arab, 2024; Tegegne et al., 2022). Kenyan's compulsory national curriculum called for integrating IKS and mother-tongue instruction to make ECD learning meaningful and improve retention (Ng'asike, 2019). Moreover, rural Kenyan pre-primary schoolteachers use local materials, mother-tongue cues, movement and culturally grounded storytelling and inquiry but formal preparation for indigenous play pedagogy remains limited and uneven (Olao et al., 2025; Jumba & Mwiti, 2022). From the above studies across the world, teachers generally recognise the cultural and educational value of IKS in developing 21st century skills among ECD learners but actual classroom integration is less consistent than the positive perceptions would suggest. This convergence suggests that meaningful IKS integration for 21st-century skills development among ECD learners requires deliberate investment in teacher training, contextualised materials and community-based pedagogical models.

In Zimbabwe, the Curriculum Framework for Primary and Secondary Education 2015–2022 called for ECD learners to develop awareness of Zimbabwean heritage and encouraged learning about arts, crafts, music, dances, poems, rituals, cuisine and apparel rooted in IKS (Manzunzu, 2019). The framework also stated that 21st century skills among ECD learners should be informed by both IKS and other knowledge systems (Manzunzu & Maera, 2024). At ECD level, the 2015–2022 framework defined outcomes that included communication in the mother tongue, cognitive skills, working independently and collaboratively, and basic problem-solving abilities aided by the IKS based pedagogy (MoPSE, 2015; Manzunzu, 2022). The Zimbabwe Early Learning Policy (ZELP) of 2023 focuses on the development of early-learning competences and the integration of 21st-century skills among ECD A and ECD B learners (Gonye, 2024). The ZELP also identifies cultural competence and Indigenous Knowledge among the values underpinning early learning (MoPSE, 2024a; Gonye, 2024). The Zimbabwean Heritage-Based Curriculum Framework (HBCF) 2024–2030 further strengthens this ZELP direction by explicitly connecting heritage, IKS and Practices, competence development and preparation of ECD learners for 21st-century skills (Manzunzu & Maera, 2024; Mukanya, 2025). The Zimbabwe Education Act provides that the mother tongue should be used as the medium of instruction at ECD education level, while school curricula should, as far as possible, reflect the culture of the people associated with the languages used or taught (Manzunzu, 2022). This implies that IKS integration should not be restricted to a separate 'Indigenous Knowledge lesson' but indigenous language and cultural knowledge can potentially be embedded throughout

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everyday ECD learning to prepare learners for 21st century skills. Therefore, the 2015–2022 framework, ZELP and the HBCF 2024–2030 conceptualise ECD learning as play-based and child-centred which require every child to experience play-based learning through a responsive and child-centred curriculum to prepare Zimbabwean learners for 21st century skills (MoPSE, 2024; Zhou, 2026; Mazambani & Tapfumaneyi, 2024). This is important because IKS can be naturally integrated into play-based pedagogy where traditional games, songs, riddles, dramatic activities, storytelling, imitation, dance and locally available materials can all be incorporated into children's play to develop their 21st century skills (Pakombwele & Mapolisa, 2024). However, empirical research suggests that Zimbabwean ECD teachers' ability to translate these provisions into practice remains problematic (Zhou, 2026). Manzunzu (2019, 2022) found limited and sometimes incidental integration of IKS, while Manzunzu and Maera (2024) identified misconceptions about 21st-century skills and challenges associated with play-based pedagogy. Nevertheless, policy documents provide relatively broad directions rather than detailed pedagogical prescriptions explaining which IKS practices should develop which 21st-century skills, how ECD teachers should integrate them, how their effectiveness should be assessed, and what professional support teachers require for translating IKS into classroom practices that deliberately develop 21st-century skills among young learners.

Contribution of IKS-based activities in developing 21st century skills among ECD learners

Indigenous Knowledge Systems (IKS)-based activities provide an important pedagogical resource for developing 21st-century skills among ECD learners, particularly creativity, critical thinking, communication, collaboration, problem-solving, cultural awareness and adaptability (Sigale & Arab, 2024). Activities such as indigenous games, storytelling, songs, dances, riddles, traditional crafts, nature-based exploration and community participation are experiential and socially mediated, allowing young children to learn through doing, interaction and observation (Olao et al., 2025; Kolade, 2026). Evidence from Sámi education in Norway and Finland demonstrates that Indigenous activities can promote experiential, collaborative and environmentally responsive learning for ECD learners (Laiti and Määttä, 2022). At ECD level, IKS-based activities can create opportunities for communication, cultural awareness, observation, creativity and critical engagement with the natural environment (Keskitalo, 2025). The Indian Knowledge System framework promoted through the National Education Policy 2020 encourages culturally rooted and experiential approaches to learning for ECD learners (Majumder et al., 2026). Research argue that integrating indigenous knowledge, traditional crafts, environmental practices and community-based knowledge in the ECD classroom can create opportunities for creative and critical problem-solving rather than treating IKS merely as historical cultural content (Mandal, 2026). Similarly, evidence from India indicates that indigenous-based experiential learning can strengthen innovative thinking through active engagement with locally grounded knowledge (Majumder et al., 2026).

Evidence from African contexts indicates that traditional play can support children's physical, cognitive, social and emotional development, thereby providing a culturally grounded foundation for later 21st-century competencies among ECD learners (Ogunyemi & Henning, 2020; Tulu, Fereja & Nekatibeb, 2026). Findings from South Africa and Nigeria, indicated that traditional African activities such as rhymes, stories, music, dancing and traditional games can contribute to children's physical, mental, social and emotional development (Oyegoke et al, 2024; Ekeh, 2024; Ogunyemi & Henning, 2020). Evidence from Letsapa & Naidoo (2025) indicated that indigenous play provides a practical route for connecting culturally familiar experiences with classroom learning. Such activities can develop teamwork, communication, imagination, self-expression and social interaction, while simultaneously strengthening children's cultural identity (Ogunyemi & Henning, 2020). In Nigeria, indigenous play, storytelling, music and culturally familiar games provide opportunities for young children to learn collaboratively and creatively (Ekeh, 2024; Oyegoke et al, 2024). Research from Nigerian pre-primary education indicates that play can foster children's imagination, originality, curiosity, self-expression and confidence (Okujagu & Ejekwu, 2022). Balilemwa (2026) revealed that indigenous games require children to negotiate rules and cooperate with peers, storytelling develops communication and imagination, while traditional environmental activities encourage observation and problem-solving.

Nhase and Dube (2023) demonstrated that storytelling combined with inquiry-based approaches effectively develops scientific reasoning and problem-solving skills in early childhood classrooms. Serpell's (2019) found

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that indigenous games not only support young children's social and emotional development but also enhance their cognitive development, including numeracy skills. Across these diverse regions, IKS-based activities such as games, storytelling, proverbs, songs, and community-embedded practices function as authentic vehicles for cultivating problem-solving, collaboration, communication, creativity, and critical thinking in ECD learners. However, the available literature did not systematically examine how specific IKS-based ECD activities develop identifiable 21st-century competencies such as critical thinking, creativity, collaboration, communication and problem-solving. Furthermore, evidence on the contribution of IKS-based activities in developing 21st century skills among ECD learners remain uneven across countries.

Challenges of integrating IKS activities in developing 21st century skills among ECD learners

The integration of IKS into ECD programmes presents considerable potential for developing creativity, critical thinking, communication, collaboration, problem-solving, cultural awareness and adaptability. However, the literature indicates that translating this potential into classroom practice is constrained by curriculum, teacher, resource, institutional and sociocultural challenges (Mattila et al, 2023; De Beer & Kriek, 2021; Ndlovu, 2021; Kigozi et al, 2021). In Europe, particularly in Finland, one major challenge is the limited institutional representation of Indigenous knowledge within teacher education curricula (Mattila et al, 2023). Findings showed that, in ECD teacher education curricula, Sámi IKS were either absent or confined to optional spaces, leaving responsibility for Indigenous knowledge to individual teachers. Thus, ECD teachers were inadequately prepared, lacked confidence and pedagogical knowledge required to transform Indigenous stories, language, land-based activities and cultural practices into structured learning experiences that promote 21st-century skills (Mattila et al., 2024). Although India's National Education Policy (NEP) 2020 provides considerable support for incorporating Indian Knowledge Systems into ECD education, translating this policy ambition into classroom practice is complicated by inadequate teacher preparedness, limited operational guidance and insufficient contextual learning resources (Sharma et al., 2023; Rani, 2026). In Indonesia, Fathurrochman et al (2026) identified limited teacher capacity, insufficient time allocation and weak community collaboration as central obstacles to embedding local wisdom in elementary curricula.

Across the African contexts studied, policy frameworks tend to endorse IKS rhetorically without providing concrete implementation mechanisms. South African literature identifies curriculum ambiguity, inadequate professional development and tensions between intended and enacted curricula as significant obstacles to IKS integration in developing 21st century skills among ECD learners (De Beer & Kriek, 2021; Ndlovu, 2021). Kigozi et al. (2021) found that South African ECD teachers lacked the pedagogical grounding to implement IKS meaningfully in the classroom. Similarly, Hadebe-Ndlovu (2022) observed that foundation-phase teachers, despite being professionally qualified, lacked the specialised training necessary to use indigenous games to teach mathematics. In Nigeria, the integration of IKS into ECD is constrained by inconsistent curriculum incorporation, limited culturally relevant instructional materials and rigid standardised curricula (Ogunyemi & Henning, 2020; Tulu et al, 2026). Tanzanian ECD teachers experienced misunderstandings on the relationship between formal schooling and local cultural practices, as well as limited pedagogical knowledge about how to transform IKS into competency-oriented learning activities (Kiwia, 2024; Mtahabwa & Rao, 2018). In Ethiopia, the integration of IKS into ECD is affected by weak implementation structures, limited teacher preparedness and inconsistent curriculum contextualisation (Tulu et al, 2026; Sigale & Arab, 2024). Kenya's Competency-Based Curriculum provides an important policy context for localised and competency-oriented learning, but integration of IKS remains constrained by inadequate teacher preparedness, language issues and inadequate pedagogical scaffolding (Olao et al, 2025). In Botswana, a fundamental challenge is the historical dominance of Western epistemologies within ECD curriculum development and education reform (Machinya et al, 2026). Although studies increasingly acknowledge the value of IKS and identify barriers to its integration, relatively little empirical research examines how specific barriers affect teachers' ability to use IKS-based activities deliberately to develop identifiable 21st-century skills among ECD learners. This gap provides a strong rationale for investigating IKS integration within ECD programmes from the perspective of teachers' actual practices and the competencies they seek to develop.

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Empirical research gaps

The reviewed literature reveals an important theoretical gap. A considerable amount of scholarship examines IKS, decolonisation, Ubuntu, culturally responsive teaching or indigenous play separately, but fewer studies bring these perspectives together to explain the specific mechanisms through which IKS contributes to 21st-century competencies in ECD (Daries & Ebrahim, 2021; Padayachee et al., 2023; Seehawer, 2018). What remains less developed is an integrated theoretical explanation of how ECD teachers' perceptions of IKS influence their pedagogical practices, how those practices transform indigenous knowledge into learning experiences, and how those experiences contribute to specific 21st-century competencies among ECD learners. Much of the existing literature discusses the general developmental or cultural value of indigenous play and knowledge, while relatively fewer studies phenomenologically examine how specific IKS-based ECD activities develop identifiable 21st-century competencies such as critical thinking, creativity, collaboration, communication and problem-solving (Keskitalo, 2025; Majumder et al., 2026; Letsapa & Naidoo, 2025). This gap provides a strong justification for phenomenologically examining how ECD teachers select, adapt and implement IKS-based activities specifically to develop 21st-century skills among young learners. Existing research has established that IKS has potential educational value, but there is limited empirical evidence demonstrating which specific IKS practices are used by ECD teachers, how teachers perceive their pedagogical value, how those practices are implemented, and which 21st-century skills they are perceived or observed to develop among young children (Seehawer, 2018; Zukiswa & Mdodana-Zide, 2025; Letsapa & Naidoo, 2025). Another gap concerns the difference between ECD teachers' beliefs about IKS and what they practically do in classrooms (Kolade, 2026; Mwanza et al., 2025). Thus, the main question concerns the pedagogical mechanisms through which teachers transform IKS into intentional learning experiences that develop 21st-century competencies. This suggests the need for research combining teacher interviews, classroom observations and curriculum/document analysis. Such research gap can potentially contribute to the development of a contextually appropriate model linking IKS → culturally responsive pedagogy → play/inquiry/social interaction → 21st-century skills.

METHODOLOGY

Research Paradigm

This study was guided by interpretivist research paradigm which holds that reality is socially constructed and that meaning is best understood through participants' subjective experiences in their contexts (Creswell & Poth, 2018; Lincoln et al., 2018). Ontologically, interpretivist reality is multiple and relational. Thus, ECD teachers' understandings of IKS and 21st century skills (creativity, collaboration, communication, critical thinking) were shaped by their cultural, professional and urban school contexts. Epistemologically, generated knowledge or data was co-constructed through the researcher's interpretive engagement with ECD teachers' lived experiences and practices on integrating IKS in developing 21st century skills among ECD learners. Therefore, the researcher was part of the interpretive process, not a detached observer (Dibley et al., 2020). Interpretivism was appropriate because the study sought to understand how ECD teachers perceive, interpret and practise the integration of IKS to develop 21st-century skills among learners in Bulawayo urban primary schools (Creswell & Poth, 2018; Stolz, 2023). The paradigm is further justified by the context-dependent nature of Indigenous Knowledge, which was transmitted and interpreted through cultural practices, community interactions, language, storytelling, games and everyday experiences in ECD classrooms. Interpretivism enabled the researcher to understand how teachers attach meaning to these practices and how they perceive their contribution to learners' creativity, critical thinking, communication, collaboration and problem-solving skills. Consequently, the paradigm aligned the philosophical assumptions of the study with its central aim of understanding teachers' subjective experiences and the meanings they assign to IKS integration.

Research Approach

The study adopted a qualitative research approach because it sought an in-depth understanding of ECD teachers' perceptions, experiences and classroom practices rather than the statistical measurement of variables (Creswell

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& Creswell, 2018; Tracy, 2020). Qualitative inquiry allows researchers to investigate complex human experiences in their natural settings and interpret participants' accounts within their social and cultural contexts (Creswell & Poth, 2018; Creswell & Poth, 2024). This approach was suitable to the research on under-explored phenomena in which participants' voices, language and contextual realities were central. Little was known about how urban ECD teachers draw on IKS to develop 21st century skills, which made lived exploratory, inductive approach appropriate. This approach was also suitable because ECD teachers understood and implemented IKS differently depended on their cultural knowledge, professional training, curriculum interpretations, available resources and school contexts. Data were generated through in-depth semi-structured interviews, classroom observations and document analysis, allowing the researcher to compare teachers' expressed beliefs with their actual teaching practices using IKS in developing 21st century skills. The qualitative approach therefore provided rich contextual evidence of how IKS was incorporated into ECD activities and how teachers perceive its contribution to the development of 21st-century skills. It also allowed unexpected meanings and practices to emerge from participants' experiences rather than imposing predetermined explanations.

Research Design

The study used a hermeneutic phenomenological research design informed by van Manen's approach to interpreting lived experience (van Manen, 2023; Stolz, 2023). Phenomenology examines the essence of lived experience, while the hermeneutic strand emphasises interpretation, language and context in understanding that experience (Neubauer et al., 2019; van Manen, 2023). Unlike a purely descriptive phenomenological design, which prioritises describing experiences as reported, hermeneutic phenomenology emphasises interpretation of experiences within their historical, cultural, social and professional contexts (van Manen, 2016; Stolz, 2023). Thus, hermeneutic phenomenology sought to understand how individual ECD teachers experience a phenomenon and interpret the meanings embedded in those experiences. This design was appropriate because the study aimed to understand how ECD teachers experience IKS integration in urban primary schools, how they interpret its relevance to contemporary early childhood education, and how they enact it in classroom practice. Through in-depth interviews, classroom observations and relevant curriculum-document analysis, the researcher examined both the meanings teachers expressed and the meanings reflected in their teaching practices. Analysis involved repeated reading of interview transcripts and observation notes, identification of significant experiential themes, and interpretation of these themes in relation to the wider educational and cultural context (van Manen, 2016). The design was particularly valuable because it allowed the study to interpret IKS integration which was shaped by teachers' cultural identities, professional knowledge, curriculum expectations and the realities of urban schooling. It therefore enabled a nuanced understanding of the opportunities, tensions and challenges teachers encountered when using Indigenous practices to foster creativity, collaboration, communication, critical thinking and problem-solving among ECD learners. The hermeneutic phenomenological research design allowed the iterative movement between parts and whole of the data, and the interpretation of teachers' accounts within their classroom, school and sociocultural contexts (Dibley et al., 2020).

Sample

The study used a sample of 15 ECD teachers drawn from eight selected Bulawayo urban primary schools judged by the richness and depth of meaning or meaning sufficiency; when new interviews added no substantively new insight into the essential themes (Hennink & Kaiser, 2022; Vasileiou et al., 2018). Recruitment of participants continued until meaning sufficiency was judged to have been reached, with two further interviews conducted after no new themes emerged to confirm this (Guest et al., 2020; Hennink & Kaiser, 2022). The sampling process and rationale was documented in an audit trail to support dependability and transparency (Korstjens & Moser, 2018). The final sample size of 15 ECD teachers was guided by information power and the adequacy of the collected data. This was a reasonable sample size for a qualitative hermeneutic phenomenological study because the primary objective was to obtain rich, detailed accounts of teachers' lived experiences, perceptions and classroom practices rather than to achieve statistical representativeness. The researcher assessed whether the interviews and observations provided sufficient depth to address the research questions, while considering the specificity of the participants, the focus of the study and the quality of the accounts obtained (Wutich et al., 2024). Phenomenological research prioritises the depth and relevance of participants' experiences, with sample

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adequacy depending on the richness of the data and the focus of the research questions (Tomaszewski et al., 2020; Wutich et al., 2024). The sample of 15 ECD teachers allowed the researcher to explore similarities and differences in how teachers understand and integrate IKS to develop creativity, critical thinking, communication, collaboration and problem-solving skills among ECD learners. Participants were drawn from eight Bulawayo urban primary schools to capture variation in teaching practices, school environments and access to Indigenous learning resources.

Sampling technique

The study used criterion-based purposive sampling supplemented by snowballing sampling technique to select ECD teachers who had lived experience of the phenomenon, which is integrating IKS to develop 21st century skills among ECD learners. Snowball (referral) sampling supplemented this to identify information-rich ECD teachers whose IKS-based practices were not widely visible (Campbell et al., 2020; Parker et al., 2019). Within the purposive frame, the study varied urban primary school type (high-density, low-density, public, private), teacher experience and gender where possible, to capture diverse experiences of the same phenomenon (Campbell et al., 2020; Creswell & Poth, 2018). The researcher identified eligible urban primary schools and sought permission from the relevant education authorities and school heads. With assistance from school administrators, ECD teachers who met the inclusion criteria were identified and invited to participate voluntarily. Selection prioritised ECD teachers who could provide detailed accounts of IKS-related teaching experiences. Purposive sampling was appropriate in phenomenological research because participants were deliberately selected for their ability to provide detailed, meaningful accounts of their lived experiences rather than through random selection (Tomaszewski et al., 2020; Campbell et al., 2020). Purposive sampling allowed the study to include ECD teachers with different levels of teaching experience, professional training and school contexts, thereby enriching the interpretation of how IKS was understood and practised across Bulawayo urban primary schools (Campbell et al., 2020; Öhlén & Friberg, 2023). This technique is justified because not every ECD teacher was necessarily having experience of integrating IKS into teaching and learning. The researcher therefore needed participants who could explain how they understood Indigenous knowledge, how they incorporated it into classroom activities and how they perceived its contribution to developing 21st-century skills. Referral through trusted networks respects relational accountability and community trust in Indigenous research (Chilisa, 2020; Kovach, 2021; Smith, 2021). Snowballing was also useful where IKS practice was informal and known mainly through peer and education community networks (Parker et al., 2019).

Inclusion criteria

Participants selected were based on the following inclusion criteria:

- Be a qualified ECD teacher working in Bulawayo urban primary school.
- Had at least five years' experience teaching ECD A and B learners.
- Had experience integrating IKS into classroom teaching or be able to describe informed perceptions of its integration into ECD programmes.
- Willingness to participate in an in-depth interview and, where applicable, classroom observation.
- Provided informed consent to participate in the study.

Teachers who did not meet the eligibility criteria, declined consent or unavailable for meaningful participation were excluded.

Instruments

This phenomenological study employed semi-structured interviews and non-participant classroom observations to explore teachers' lived experiences, perceptions and practices concerning the integration of IKS into ECD

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teaching and learning. Semi-structured interviews were conducted with 10 purposively selected ECD teachers from urban primary schools in Bulawayo. The interviews used open-ended questions to explore teachers' understanding of IKS, their perceptions of its contribution to the development of 21st-century skills, their experiences of integrating indigenous practices into classroom activities, and the challenges they encountered. The interviews also investigated how teachers believe IKS promotes creativity, critical thinking, communication, collaboration and problem-solving among ECD learners. This instrument is justified because it allowed participants to express their experiences, beliefs and interpretations in their own words while enabling the researcher to probe significant responses for deeper understanding. As Kallio et al. (2016) explain, systematic development of semi-structured interview guides supports the credibility and consistency of qualitative data collection. The interviews were therefore suitable for understanding the subjective meanings teachers attach to IKS integration in the development of 21st century skills among ECD learners. Non-participant classroom observations were conducted with 5 purposively selected ECD teachers to examine how IKS is integrated into everyday teaching and learning activities. Using a structured observation guide, the researcher recorded relevant practices, including storytelling, traditional games, songs, riddles, indigenous play activities, the use of local materials, and opportunities for learners to demonstrate creativity, communication, collaboration and problem-solving. The observations also examined teacher–learner interactions and learners' participation in IKS-based activities. This instrument is justified because it enabled the researcher to examine teachers' actual classroom practices rather than relying exclusively on their interview accounts. Observation can reveal consistencies or differences between teachers' reported perceptions and their enacted practices, thereby strengthening the depth and credibility of the findings through methodological triangulation (Creswell & Poth, 2018). The combination of interviews with 10 ECD teachers and classroom observations involving 5 teachers provided complementary evidence of teachers' perceptions and classroom practices regarding IKS integration. While interviews established what teachers understood, believed and experienced, observations demonstrated how IKS was enacted in classroom settings. Together, these instruments supported a rich, contextualised understanding of the phenomenon under investigation in Bulawayo Urban Primary Schools.

Data Analysis and Presentation

Generated data was thematically analysed and qualitatively presented. Interim analysis was also employed which involved the cyclical process of generating data, analysing data, generating additional data, analysing those data and so on until data saturation (Creswell & Creswell, 2018).

Ethical Considerations

Informed consent, voluntary participation, confidentiality (through pseudonyms) and permission from the Ministry of Primary and Secondary Education and school heads were obtained. Trustworthiness was enhanced through triangulation, member checking of interview transcripts, thick description, and reflexive journaling to bracket the researcher's biases, a key phenomenological requirement. Together, interviews and classroom observation provided complementary data. Interviews revealed what teachers perceived and meant, while observation showed what they did. This combination yields a comprehensive, credible understanding of how IKS was used to develop 21st century skills among ECD learners in Bulawayo urban schools.

FINDINGS AND DISCUSSION

Teachers' perceptions and practices regarding the integration of IKS in developing 21st century skills among ECD learners in urban primary schools

Results from semi-structured interviews and non-participant classroom observations revealed that ECD teachers perceived and believed that integration of IKS into ECD pedagogy in urban primary schools was difficult due to their negative attitude and ignorance about researching and preparing oral traditions, storytelling, songs, proverbs, indigenous games and community practices. Results from non-participant observations reflected that ECD teachers in urban primary schools were not confident with their implementation of IKS-based activities in the development of 21st century skills among ECD learners. Participants indicated that integration of IKS into

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ECD teaching to develop 21st century skills in urban primary schools was a theoretical experience not practical activity since teachers did not have culturally structured curriculum resources such as oral traditions, storytelling, songs, proverbs, indigenous games and community practices. Findings also disclosed that integration of IKS in developing 21st century skills among ECD learners in urban primary schools was impossible and forced ECD teachers to use Modern Knowledge Systems (MKS) shunning the use of IKS-based activities. The study disclosed that integration of IKS-based activities into ECD programs in urban primary schools was also confusing and, intimidated ECD teachers due to their misconception, lack of training, lack of local materials and community-based pedagogical models, and poor involvement of local stakeholders and community members. Therefore, the above results imply that integration of IKS in developing 21st century skills among ECD learners in urban primary schools was not significantly effective. The following excerpts from the interviews confirm the above:

"……to be honest enough, integration of IKS into ECD teaching and learning in urban primary schools is very difficult due to teachers' ignorance about researching and preparing oral traditions, storytelling, songs, proverbs, indigenous games and community practices that develops 21st century skills among ECD learners".

"……..integration of IKS into ECD teaching to develop 21st century skills in urban primary schools are a theory not practical activity since we do not have culturally structured curriculum resources such as oral traditions, storytelling, songs, proverbs, indigenous games and community practices".

"……. ECD teaching and learning in urban areas is Western oriented curriculum hence makes IKS integration into ECD teaching impossible. Our ECD centres and primary schools are religiously expecting ECD learners to develop 21st century skills by using Modern Knowledge Systems (MKS) and makes teachers reluctant to use IKS as a teaching resource".

"….. to be honest enough, integration of IKS-based activities into ECD programs in urban primary schools is confusing and intimidating us due to our misconception, lack of training, lack of local materials and community-based pedagogical models, and poor involvement of local stakeholders and community members".

The above findings failed to concur with Rani (2026) that ECD teachers need to move beyond merely presenting IKS as cultural content, and to employ inquiry, discussion, storytelling, experimentation and collaborative activities easily through which learners can develop communication, creativity, problem-solving and critical-thinking abilities. Mattila et al (2023) revealed that positive perceptions alone may not translate into practice unless ECD teachers receive structured preparation and appropriate curriculum resources.

Findings from semi-structured interviews and non-participant classroom observations revealed that ECD teachers in urban primary schools used few cultural songs and indigenous games, coincidentally, because they did not have knowledge of oral traditions, storytelling, proverbs, riddles, dances and cultural practices. Participants indicated that they tried to translate storytelling, proverbs, riddles from indigenous language to English language during their lessons but was not effective to urban ECD learners. Results disclosed that ECD teachers used Modern Knowledge Systems (IKS) like technology-driven resources such (use of tablets, smart boards, e-books, interactive alphabet), structured educational games like shop corner play for numeracy, puzzles, art, blended and multimedia learning system (combining face to face with videos) in developing 21st century skills among ECD learners in Urban primary schools. Semi-structured interviews and non-participant classroom observations also revealed that ECD teachers in urban primary schools used Montessori based knowledge systems and, play-based and gamification system based on Modern Knowledge System activities such as building blocks, educational toys bought from shops, indoor play corners, hospital corners, shop corners, jungle gyms and trampolines. The following excerpts from the interviews confirm the above:

"……. truly speaking, we are using very few cultural songs and indigenous games because majority of us do not have knowledge of oral traditions, storytelling, proverbs, riddles, dances and cultural practices".

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"……. honestly speaking, we are trying to translate storytelling, proverbs, riddles from indigenous language to English language during our lessons but not effective to urban ECD learners".

"……..we sometimes use IKS activities blended with Morden Knowledge Systems to achieve meaningful teaching of urban ECD learners".

"……Due to little local learning materials in urban primary schools, we are using modern knowledge systems like technology-driven resources such (use of tablets, smart boards, e-books, interactive alphabet), structured educational games like shop corner play for numeracy, puzzles, art, blended and multimedia learning system (combining face to face with videos)".

"……we are using play-based and gamification system based on Modern Knowledge System activities such as building blocks, educational toys bought from shops, indoor play corners, hospital corners, shop corners, jungle gyms and trampolines".

"……we are using Montessori based knowledge systems such as practical life skills or activities like pouring, sweeping, buttoning".

The above findings failed to concur with African studies which revealed that inclusion of Indigenous Knowledge in the New Primary and Middle School Curriculum of Ethiopia 2023 required a greater involvement of local stakeholders, teachers and community members in the implementation of IKS in developing 21st century skills among ECD learners (Sigale & Arab, 2024; Tegegne et al., 2022). Kenyan's compulsory national curriculum called for integrating IKS and mother-tongue instruction to make ECD learning meaningful and improve retention (Ng'asike, 2019). Moreover, rural Kenyan pre-primary schoolteachers use local materials, mother-tongue cues, movement and culturally grounded storytelling and inquiry but formal preparation for indigenous play pedagogy remains limited and uneven (Olao et al., 2025; Jumba & Mwiti, 2022).

Contribution of IKS-based activities in developing 21st century skills among ECD learners in urban primary schools

Results from semi-structured interviews and non-participant classroom observations revealed that ECD learners in urban primary schools developed 21st century skills such as counting, digital literacy and fluent in English language speaking without effective creativity, critical thinking, collaboration, problem-solving, social interaction, cultural awareness and adaptability. This implies that urban primary school ECD teachers' use of few IKS activities along side with Montessori based knowledge systems and play-based and gamification system based on Modern Knowledge System activities (such as building blocks, educational toys bought from shops, indoor play corners and jungle gyms) did not effectively contribute to the development of core 21st century skills such as creativity, critical thinking, collaboration and problem-solving. Thus, integration of IKS in developing 21st century skills among ECD learners in urban primary schools was not significantly effective. The following excerpts from the interviews confirm the above:

…. few IKS-based activities in collaboration with Montessori based knowledge systems and play-based and gamification system are only developing counting skills, digital literacy skills and fluent in English language speaking skills without effective creativity, critical thinking, collaboration, problem-solving, cultural awareness and adaptability.

This failed to concur with various studies which indicated that IKS-based activities provided an important pedagogical resource for developing 21st-century skills among ECD learners such as effective creativity, critical thinking, communication, collaboration, problem-solving, cultural awareness and adaptability (Sigale & Arab, 2024; Olao et al., 2025; Kolade, 2026). Evidence from Sámi education in Norway and Finland demonstrated that Indigenous activities promoted experiential, collaborative and environmentally responsive learning for ECD learners which created opportunities for communication, cultural awareness, creativity and critical engagement with the natural environment (Keskitalo, 2025; Laiti & Määttä, 2022).

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Challenges of integrating IKS activities in developing 21st century skills among ECD learners in urban primary schools

Urban primary school ECD teachers who participated in interviews and non-participant observation disclosed that lack of knowledge about IKS-based activities, lack of training on IKS at Teacher educational institution, and lack of IKS-based curriculum offered by urban primary schools were some of the main challenges of integrating IKS activities in developing 21st century skills among ECD learners. Results also revealed that lack of IKS resources, high parental academic performance expectation about their ECD children, inadequate teacher preparedness on IKS integration, and language issues (use of English language instead of mother language) were the other challenges of integrating IKS activities in developing 21st century skills among ECD learners in urban primary schools. ECD teachers indicated that ECD teachers had challenges of translating storytelling, proverbs, riddles from indigenous language to English language for the benefit of Urban ECD learners. Results also disclosed that urban primary school EDC learners' poor IKS background knowledge, English spoken language dominance and parental pressure for early writing and speaking of English language by the children affected the effective integration of IKS activities in developing 21st century skills among ECD learners. Therefore, integration of IKS in developing 21st century skills among ECD learners in urban primary schools was not significantly effective. The following excerpts from the interviews confirm the above:

…….we are experiencing lack of knowledge about IKS-based activities, lack of training on IKS at Teacher educational institution, curriculum offered by urban primary schools, lack of IKS-based resources except Modern Knowledge systems, lack of IKS resource teachers in urban areas, high parental academic performance expectation about their ECD children, inadequate teacher preparedness on IKS integration, and language issues (use of English language instead of mother language) in the integration of IKS in developing 21st century skills among ECD learners in urban primary schools.

……. another problem we are encountering when integrating IKS into ECD teaching is poor translation of storytelling, proverbs, riddles from indigenous language to English language for the benefit of Urban ECD learners.

……. Urban primary school EDC learners' poor IKS background knowledge, English spoken language dominance and parental pressure for early writing and speaking of English language by the children is affecting the integration of IKS activities in developing 21st century skills among ECD learners.

This concurs with findings from various literature which indicated that integration of IKS into ECD classroom practice was constrained by curriculum, teacher, resource, institutional and sociocultural challenges (Mattila et al, 2023; De Beer & Kriek, 2021; Ndlovu, 2021; Kigozi et al, 2021). The literature also indicated that ECD teachers were inadequately prepared, lacked confidence and pedagogical knowledge required to transform Indigenous stories, language, land-based activities and cultural practices into structured learning experiences that promote 21st-century skills (Mattila et al., 2024).

CONCLUSION AND RECOMMENDATIONS

The study concluded that integration of IKS in developing 21st century skills among ECD learners in urban primary schools was not significantly effective. The study recommended that ECD teachers need to be cultural mediators not just implementers of Modern Knowledge Systems. This can be achieved using mother-tongue first then bridge to the use of English language, and, by creating IKS corners in urban classrooms such as traditional kitchen corner. The study further recommended that there is need for the parents to develop effective parental involvement in the integration of IKS in developing 21st century skills among ECD learners in urban primary schools. This can be achieved by supplying urban ECD teachers with IKS materials from rural homes and participating in Heritage Day at school. There is need for ECD teachers to engage community elders as their IKS data base or IKS resource teachers. There is also need for the Ministry of Primary and Secondary Education to supply urban primary schools with standardized IKS resource kits not just laptops. The study recommended that there is need for curriculum developers to simplify Heritage-based Curriculum by giving urban teachers clear

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examples of how to link IKS to 21st century skills not just theory, by putting IKS in textbooks and by developing assessment rubrics where creativity from IKS, oral storytelling is examinable. There is need for teacher training institutions to make IKS a practical module not just theory.

RECOMMENDATIONS FOR FURTHER STUDY

The study recommended that a more comprehensive study on how ECD teachers understand, perceive and integrate IKS and how these practices potentially contribute to the development of 21st-century skills among ECD learners in Zimbabwe should be executed nationally. The study further recommended that IKS pedagogy model, as a teaching device, should be researched and designed to promote effective integration of IKS activities in developing 21st century skills among ECD learners in urban primary schools.

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