The Dyke

Supporting Innovation and Industrialisation that Begin in Early Childhood and Extend to the Future

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Abstract

This study explores the role of early childhood education in supporting innovation and industrialisation, with a focus on how these competencies can be nurtured from an early age and sustained into the future. Anchored in the Philosophy for Children (P4C) framework, the research examines how early learning experiences shape creativity, problem-solving, and self-reliance which are critical skills for future innovation and industrial development. Using a qualitative case study of Murewa district in Mashonaland east province of Zimbabwe, data was collected through in-depth interviews and observations. The study population included Early Childhood Development (ECD) learners, teachers, teachers in charge (TIC), and school heads. Simple random and purposive sampling techniques were used to select participants, ensuring broad representation and the inclusion of key informants with relevant experience and insights. Findings reveal that despite limited resources, there are promising where children engage in hands-on activities which lay a strong foundation for innovation and industrial skills. Fostering a culture of innovation from an early age significantly impacts children's cognitive and social development. The study's insights contribute to the development of policies and practices that promote innovation and industrialization in early childhood education, ultimately shaping the future of young learners in Murewa District and beyond.

Key Words: Early Childhood Development, Heritage-Based Education, Industrialisation, Innovation and Philosophy

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Introduction

Innovation and industrialisation are often viewed as domains reserved for advanced education and economic sectors, yet their foundations are laid in the early years of life. Innovation and industrialisation are essential pillars for national development and global competitiveness (Alharbi, 2023). In Zimbabwe, these concepts have been associated with higher levels of education and advanced economies (Murwira, 2019). However, research and practice now recognise that the foundations of innovative thinking and industrial skills can be best cultivated from Early Childhood Development (ECD) through play, use of local materials, and exposure to simple technology. The Ministry of Primary and Secondary Education (MoPSE) define ECD as the programmes for children (0-8 years), their parents and caregivers catering for the development and learning opportunities of children. According to The Science of Early Childhood Development (TSECD) (2007), the future of any society depends on its ability to foster the health and well-being of the next generation. ECD plays a crucial role in nurturing the curiosity, creativity, and problem-solving abilities that drive future innovation and industrial productivity (Nyarambi & Ntuli, 2020). Creating the right conditions in early childhood is cost-effective and crucial, as it lays the foundation for literacy and future academic success (Nyarambi & Ntuli, 2020; TSECD, 2007). ECD learners are passionate innovators who are keen to discover new knowledge (Nyarambi & Ntuli, 2020).

Background

The early years of life are a fertile ground for cultivating critical thinking, exploration, and practical engagement, all of which are essential to sustainable development (Khan, 2025). As early as infancy stage, young children start forming hypothesis for how the world around them works (Alharbi, 2023; Nyarambi & Ntuli, 2020). In fact, ECD learners are naturally inquisitive and they want to understand their environment. By embedding principles of innovation and basic industrial concepts into early learning experiences, children are empowered to develop skills that align with long-term national development goals (Alharbi, 2023; Khan, 2025). Industrialisation at this level is not about large-scale manufacturing, but about instilling the mindset of creating, improving, and using resources effectively (Alharbi, 2023). Fostering innovation and industrialisation from an early age is not only a pedagogical imperative but also a strategic investment for the future (Zulherma, 2019).

In the Zimbabwean context, the shift towards Education 5.0 model, anchored on teaching, research, community service, innovation and industrialisation, demands a rethinking of education from its foundational levels (Wuta, 2022). Education 5.0 which is heritage-based calls for learning approaches that are rooted in local context, culture, and indigenous knowledge systems, while preparing learners to think critically, innovate, and contribute to socio-economic transformation (Wuta, 2022; Zenda et al., 2024). Education 5.0, which was introduced by the Ministry of Higher and Tertiary Education, Science, Innovation and Technology Development (MHTESITD), aims to match the curricular and culture of Zimbabwean people through components of *Unhu/Ubuntu* and Heritage learning (Murwira, 2019; Wuta, 2022). The underlying principle of Education 5.0 as a scientific and development doctrine is that, education which does not produce goods and services is not relevant at all (Murwira, 2018). The philosophy answers to the calls of industries to produce well-rounded graduates with relevant knowledge and skills that address industrial needs (Murwira, 2019; Zenda et al., 2024).

Although Education 5.0 was originally introduced at the higher education level in Zimbabwe, its principle can be effectively implemented in early childhood settings through age-appropriate activities that promote creativity, problem-solving, and hands-on learning. Beginning in the early years is a fundamental moral responsibility and a critical investment in the nation's social and economic future (TSECD, 2007). Zenda et al. (2024) say Education 5.0 is focused on addressing skills, knowledge, values, and promoting learner-centred pedagogy through a system of specified critical outcomes, such as teamwork, critical thinking skills, and problem-solving skills. Acquiring such skills and turning them into character requires many years of hard work, hence the need to catch them young (Isiklar & Abali-Ozturk, 2022). Rich environmental experiences during the early years (0-5) boost synapse production, supporting brain growth and development (Nyarambi & Ntuli, 2020; TSECD, 2007)). Therefore, it is important to develop critical thinking and problem-solving skills in the first years of life (Isiklar & Abali-Orturk, 2022). Engaging young children in age-appropriate activities, such as building with blocks, creating models, making simple tools, and using technology will help lay the groundwork for a future generation equipped to drive industrial development (Alharbi, 2023; Khan, 2025).

This study was designed to critically explore strategies that can be used by ECD teachers in promoting innovation and industrialization in early childhood as a baseline measure to produce goods and services. The researcher was fascinated by the way children ask for explanations, this eagerness to know everything motivated this study to target ECD learners. The study explored the significance of integrating innovation-focused curricula in early childhood education, the role of supportive environments in nurturing creativity, and how these initiatives can extend into lifelong learning.

Precisely, this research investigated ways of promoting innovation and industrialisation, opportunities and challenges that are likely to be faced by ECD teachers in grooming young innovative learners. Early childhood is a time of great opportunities for learning and development (MoPSE, 2023). Therefore, introducing innovative practices in early years encourages children to develop higher-order thinking skills as they become imaginative and creative. This will be only effective if the teacher is well-groomed to relate the Education 5.0 concepts with the teaching and learning situation. Ultimately, the goal is to create ecosystems that not only support the individual child's development but also contribute to a thriving economy.

Despite the national push for innovation and industrialisation through Education 5.0 philosophy in higher institutions of learning, there remains a significant gap in integrating these principles at the ECD level. Innovation and Industrialisation were introduced at tertiary levels through Education 5.0, overlooking the critical foundational stage where creativity, problem-solving, and practical skills can be nurtured from early childhood. This lack of early exposure limits children's potential to develop the mindset and skills necessary for future participation in Zimbabwe's innovation-driven economy. This study establishes strategies that can used by teachers in promoting innovation and industrialisation in early childhood settings, and opportunities and challenges in its implementation.

Literature Review

How Philosophy for Children (P4C) works

The Philosophy for Children (P4C) is a term coined by Mathew Lipman (Fishman, 2008), and is a discipline which helps children become more intellectually curious, creative, innovative and critical thinkers (Isiklar & Abali-Ozturk, 2022; Lipman, 2003). It is an educational approach designed to cultivate

reasoning and reflective thinking among young learners (Lipman, 2003; Pourtaghia, 2014). At the heart of P4C is the belief that children are naturally curious and capable of engaging in philosophical thought when given the right environment (Isiklar & Abali-Ozturk, 2022). Peterson and Bentley (2015) say P4C is an approach to learning built around children's ability to develop philosophical questions, thinking and reasoning capacities through engaged in Community of Inquiry. They are taught to pose philosophical questions and explore their own ideas. P4C emphasises critical thinking, inquiry, and dialogue from a young age (Isiklar & Abali-Ozturk, 2022; Peterson & Bentley, 2015). Lipman argued that children are capable of philosophical thought and should be provided with opportunities to ask questions, reason, and engage in meaningful discussions (Isiklar & Abali-Ozturk, 2022; Lipman, 2003). P4C works through structured dialogue and shared inquiry (Lipman, 2003). These philosophical practices stimulate creativity, curiosity, and problem-solving skills which are core attributes needed for innovation and future industrial engagement (Alharbi, 2023; Pourtaghia, 2014).

Mathews (2003) argues that P4C has an impact on children's cognitive, social and emotional development. P4C is about children's learning to think better and communicate well with others. Therefore, early childhood is definitely a critical time for developing skills, hence the need to introduce P4C in early years (Peterson & Bentley, 2015).

Philosophy for Children in the classroom

P4C in the classroom creates a space where young learners are encouraged to think critically, creatively, and collaboratively. It involves engaging children in philosophical dialogue based on thought-provoking stories, real-life situations, or picture books (Lipman, 2003). Isiklar and Abali-Ozturk (2022) assert that P4C start with sharing a short story, poem, picture, object, or some other stimulus by the teacher, and the children then take time to think of their questions. Learners work in groups within a Community of Inquiry, where they engage in dialogues, ask questions, and collaboratively seek answers (Peterson & Bentley, 2015). In these discussions, learners are encouraged to ask questions, explore different viewpoints, and reflect deeply on issues that matter to them (Isiklar & Abali-Ozturk, 2022).

Learners can engage in philosophical activities during play as they carry experiments, and reflect on their experiences through questioning and discovery. Play is recognised as a crucial component of ECD, and innovative

educators use play-based activities to promote social, emotional and cognitive growth (Zulherma, 2019). This process nurtures reasoning, empathy, and communication skills among learners. Haynes (2016) asserts that P4C works in nine steps that can be followed in the teaching and learning situation.

Table 1: P4C Stages

Step	Description
Relaxed Democratic classroom	Create a comfortable, inclusive environment that encourages participation and respect.
Stimulate Creative Thinking	Use stimuli (e.g., stories, picture books, images to spark children's imagination and curiosity.
Children's Inquiry	Encourage children to ask questions, fostering curiosity and critical thinking.
Connecting Questions	Help children link their questions, identifying relationships and patterns.
Discussion Building	Facilitate discussions where children build on each other's ideas, promoting collaborative learning.
Teacher Facilitation	Guide discussions to ensure focus on lesson objectives and subject matter.
Summarising Ideas	Recap and consolidate children's understanding, highlighting key points
Evaluating New Ideas	Assess whether new ideas are well-supported, logical, and relevant to the discussion.

It is quite interesting to note that the above outline of the activities by the teacher and learners involved a great deal of children's participation. Learner-centred approach is one of the hallmarks of quality education in Zimbabwe (Zenda et al., 2024).

Philosophy for children and morality

There is moral decadence in the Zimbabwean society and the P4C like the Education 5.0 can be the starting point in reviving the philosophy of *Unhu/Ubuntu*/humanism. According to the MoPSE (2023), *Unhu/Ubuntu/Vumunhu*

is the concept and belief in a universal bond of belonging and sharing that connects all humanity. Education should be concerned with the development of character, and for this reason, virtues should form the basis of school-based moral education (Peterson & Bentley, 2015) Mahaye (2018) observed that education is an inner oriented process which enables learners to gain unity of self, unity of tribe, unity with nature, the development of social responsibility and the development of character as expected by their cultures.

In fact, the P4C approach can be used to explore and understand cultural values and traditions, and to promote respect and understanding for diverse perspectives (Pourtaghia, 2014). The P4C approach can help learners develop a strong sense of identity and self-awareness by exploring their thoughts, values and experiences (Mahaye, 2018; Peterson & Bentley, 2015). The child learns linguistic values, norms, and rules as they try to understand and give meaning to the world Therefore, if Philosophy for children is embedded in the school curriculum, it may go a long way in resuscitating African traditional moral values (Ndondo & Mhlanga, 2014).

Philosophy for Children and Creativity

Philosophy for Children plays a vital role in nurturing creativity by encouraging learners to think critically, explore multiple perspectives, and express their ideas through imaginative and open-ended dialogue (Isiklar & Abali-Ozturk, 2022). The ability to think critically and creatively is so important for dealing with the complex and unpredictable challenges of the future. Sutch et al. (2008) define creativity as a process which breaks down existing patterns of the mind and develop new ways of doing and seeing things. It is a way of thinking new ideas or approaches. Ndondo & Mhlanga (2014) asserts that young children are often 'fresh and inventive thinkers' and that childhood can be the best time to capture children's philosophical capabilities. The early years of life are critical for brain development, marked by rapid growth and malleability, playing a foundational role in the formation of intelligence (MoPSE, 2023; TSECD, 2007).

At ECD, children are still in the process of searching for knowledge about the things that many adults have not gave closer thought. Ari (2017 p.2) says:

> *…they learn to be creative and adventurous, to develop working theories about their world, and to make decisions about themselves as learners.*

Ndondo and Mhlanga (2014) alluded that it is possible for children to develop complex thinking, reasoning abilities, critical, caring and creative problem-

solving thinking. On the same note, Haynes (2016) implies that it must be tolerated and accepted that ECD children reason and philosophise at the level of their age and experience. Therefore, P4C promotes critical thinking skills through philosophical inquiry (Isiklar & Abali-Ozturk, 2022).

Philosophy for children and innovation

Philosophy for children nurtures innovation by encouraging young learners to think independently, question ideas, and explore creative solutions through dialogue and inquiry (Isiklar & Abali-Ozturk, 2022; Lipman, 2003). Innovation in early childhood involves developing and implementing new ideas, methods and technologies to enhance learning and development (Sutch et al., 2008). It is a means to introduce changes, new ideas or novelties which include imitation, invention, creative and imagination (Zulherma, 2019). Children search for knowledge and wisdom for innovation and skills acquisition, all which ensure economic growth and development. Children on their own are a society of thinkers who develop critical problem–solving ideas.

P4C is an educational designed to foster creativity and innovation. Through this method, children develop the confidence to express themselves, becoming creative scientists who raise new ideas that meet the demands of societies (Isiklar & Abali-Ozturk, 2022). The most important missions of P4C are actualisations of talents, developing innovations, creativity and providing dynamic, creative and efficient future human capital development (Lipman, 2003; Lipman, 2008). A child expresses his/her experiences, reflects, investigates, and experiments in ways that show logical innovative thinking (Isiklar & Abali-Ozturk, 2022). P4C has four components: increasing fluency of thinking, increasing flexibility of thinking, increasing innovation in thinking and increasing thinking elaboration (Lipman, 2003; Lipman, 2008).

Philosophy for children and industrialisation

Philosophy for Children lays a strong foundation for industrialisation in a rapidly evolving industry-driven world. This is because industrialisation in the 21st century requires individuals who are equipped with the ability to think independently, solve problems, and generate new ideas at an early age. Problem-solving, knowledge building, collaboration, expert engagement, self-regulation and the application of technologies are the learning outcomes of 21st century education (Alharbi, 2023; Zulherma, 2019). Technology will help and transform the classroom environment where students will play a role of an active learner

(Alharbi, 2023). Young learners can develop different perspectives and think more flexibly and effectively (Isiklar & Abali-Ozturk, 2022).

Early Childhood Development learners need an education for self-reliance, full of creativity and innovation (Isiklar & Abali-Ozturk, 2022), that equip them with competencies for community participation and industrialisation (Mahaye, 2018). Industrialisation requires a paradigm shift from theoretical exercises and abstract exam-centred knowledge to philosophical ideas and practices (Praxis) (Wuta, 2022; Zulherma. 2019). Therefore, the curriculum must include industry and community relevant concerns and requirements (Alharbi, 2023). Hummel (1993) propounded the importance of allowing learners to learn by doing. What this means is that the best way to learn something is through doing it. As such, Philosophy for Children is the key for transformative navigation and innovation for revolutionising the socio-economic and industrial development (Isiklar & Abali-Ozturk, 2022). Sustaining and developing innovation cycles in schools fosters an industrious classroom environment where learners actively create, test, and improve ideas (Sutch, 2008). However, Lipman often argued that teachers undertaking philosophical inquiry in the classroom need to be 'pedagogically' strong but philosophically self-effacing (Isiklar & Abali-Ozturk, 2022). This means teachers should skillfully guide discussions and encourage deep thinking, allowing learners to take ownership of their ideas and develop independent thinking.

Teacher competencies to promote innovation and industrialisation

Education 5.0 introduced by the MHTEISTD aims to equip teachers with relevant knowledge, practical skills, and innovative mindsets to effectively deliver learner-centred instruction and foster creativity, problem-solving, and critical thinking in the classroom (Wuta, 2022; Zenda et al., 2024). Khan (2025) argued that its general aim is to prepare individuals who are academically, socially, and emotionally conscious at all dimensions. The teaching aspect, promotes the teaching and learning using local environment, indigenous languages and seeks to make technology simple (Wuta, 2022). Nyarambi and Ntuli (2020) assert that, a teacher education, if it is rich, deep and positive, provides a critical foundation that may constructively influence children's experiences. Alharbi (2023) says the Education 5.0 is helping teachers to improve their teaching methodologies aligned with the international standards and market requirements. It also demands a teacher with improved teaching skills and teaching methodologies (Khan, 2025). Since early childhood is a critical period, there is need for proper training for those who provide early education

and early intervention (Nyarambi & Ntuli, 2020). The teacher must fulfill the requirements of a resource specialist because modern education more relies on the source of knowledge instead of just knowledge (Alharbi, 2023). The teacher must provide the knowledge and also help the students to utilize the passed-on information and knowledge.

The teacher acts as a facilitator and supports children in their thinking, reasoning, questioning, as well as speaking and listening skills. According to Khan (2025), the teacher should act as a mentor, shaping the students' behavior, expanding the needed work ethics, and provide leadership skills for continuous growth and development. Notably, the role of the teacher is to facilitate the student whenever some information is needed like a coach, leader or counselor, helping learners acquire the knowledge in a specific subject (Alharbi, 2023). ECD settings become incubators of future innovators when teachers create environments that encourage open thinking and engagement with real-world problems in age-appropriate ways. Early Childhood Development teachers are required to optimize the learning process, planning, teaching and evaluation that will increasingly shape their competencies (Khan, 2025; Zulherma, 2019). Creating inclusive learning environments that reflect diverse cultures, languages, and perspectives is a key aspect of innovation in early childhood education (Lipman, 2003; Lipman, 2008). The teachers need to be resourceful in creating stimulating environments and in providing appropriate teaching and learning media that support active engagement and exploration.

Methodology

A case study design using qualitative methods of collecting data was used in this study. Qualitative methods gave the researcher an opportunity to interview participants as well as being a participant observer (Chiromo, 2006). The study also used observations to provide information which may not have been brought forward during interviews. In this study, the population comprised of ECD B learners, teachers, teachers in charge (TIC) and school heads from three schools in Murewa district of Mashonaland East province.

The population was considered appropriate because it was easily accessible to the researcher as she was a teacher at one of the schools. From the target population, a representative sample was selected for the study. Robson (2011) views sasample, the researcher was able to see all the characteristics of the total population. A sample was appropriate because it allowed the researcher to deal with a small number that was a representative of the population. Participants

were selected from three schools. The sample of this study was made up of 135 people, 45 from each school.

Guided by key questions on how effective are teachers in supporting Innovation and Industrialisation to Early Childhood Development learners? What strategies are being used by ECD teachers to promote innovation and industrialisation in learners?

What the major challenges that are likely to be faced by ECD teachers in promoting innovation and industrialisation in learners are, and grounded in the Philosophy for Children (P4C). P4C emphasises critical thinking, creativity, and inquiry-based learning from an early age this study examines the strategies employed by teachers to support innovation and industrialisation in Early Childhood Development settings. The integration of innovation and industrialisation into Early Childhood Development is increasingly recognised as essential in laying a strong foundation for lifelong learning, creativity, and productivity.

It also explores the opportunities available for fostering these skills at an early age and the challenges that are likely to be faced in implementing such initiatives within the ECD curriculum. The study also provides insights into how early learning environments can be aligned with the goals of Education 5.0 to encourage learners to fully participate in innovation and industrialisation efforts.

This is significant to The Ministry of Primary and Secondary Education in providing valuable insights for formulating policies that promote innovation and industrialisation from the early years of learning. For teachers, practical strategies and guidance on how to nurture creativity, innovation, and problem-solving skills in young learners are suggested. This helps move learning from teacher-centred to learner-centred methods of teaching. Other stakeholders as key partners in education are hoped to gain awareness of their role in supporting children's innovation, and participation, in simple industrial activities at home and in the community. This also acts as a guide in monitoring the education of learners, and curriculum in general.

Findings and Discussion

Results that are presented in this section are from the data collected through the use of observations and interviews. The interviews and observations were designed for the purpose of finding answers to ways used by teachers

in supporting innovation and industrialisation at ECD B level. Firstly, the background information of participants is given followed by a detailed presentation of responses to the research questions.

Profile of the study's respondents

Table 1*: Age of respondents*

Age Range	Teachers	Teachers in Charge	School heads
30-39	4		
40-49	**3**	2	
50-59	2	1	2
60 and above			1
Total	9	3	3

Table 2: *Qualifications of respondents*

Qualifications	Teachers	TIC	School head
Diploma	4		
Bachelor's degree	4	3	3
Master's degree	1		
Total	9	3	3

Teachers, Teachers-in-Charge and School Heads were all interviewed to get an insight on the effectiveness of ECD teachers in promoting innovation and industrialisation in the teaching and learning process. One respondent said they (teachers) are very effective in supporting innovation and industrialisation by incorporating the Education 5.0, they learnt during training into the teaching and learning process. Teachers were interviewed to find their knowledge of the 5.0 philosophy. Most of the respondents indicated that they have heard of the Education 5.0 from the radio and other media platforms. On the whole, some teachers, mostly diploma holders, were not very conversant with the 5.0 philosophy. The reason being that the 5.0 philosophy was introduced in colleges and universities after they had left training. A teacher who was a holder of a postgraduate degree and two teachers who are studying at different universities had shown an understanding of the Education 5.0. This was because they were versed to the needs of the 5.0 philosophy during their undergraduate and postgraduate studies. They defined the Education 5.0 as

heritage-based education for creativity, innovation, entrepreneurship and industrialization. From the teachers' responses, it showed that they had an in-depth understanding of how to relate the 5.0 philosophy with the teaching and learning process.

Still on defining the 5.0 philosophy, two TICs and one school head as supervisors of teachers gave precise definitions of the education 5.0. This researcher suspected that they might have researched from the internet because the previous day they had requested to postpone the interviews since they claimed to be busy. All respondents agreed that teachers need to be well versed to the needs of the 5.0 philosophy for them to effectively support innovation and industrialisation in ECD B learners. The participants agreed that the Education 5.0 is vital in equipping ECD teachers with the requisite skills to support innovation and industrialisation in learners. Another participant indicated that, the 5.0 philosophy is very critical in helping teachers to unpack the Heritage-Based Curriculum introduced by the Ministry of Primary and Secondary Education. All the participants agreed that teachers need to be innovative and resourceful for them to be able to promote innovation and industrialisation in ECD learners. In concurrence, another participant added that teachers need to be aware that innovation is not only about the latest and greatest tools, but is about a mindset of finding ways of using the resources that are available. All respondents unanimously agreed that Education 5.0 is another way of making teachers productive.

The participants were further interviewed on how they were relating the education 5.0 with the teaching and learning process. Most respondents agreed that they were applying the needs of the 5.0 philosophy in their day-to-day activities with the learners. The respondents gave examples of what they were doing in their classroom which the researcher saw as very effective in promoting innovation and industrialisation. All the respondents agreed that all the Education 5.0 aspects of teaching, research, community service, innovation and industrialisation are very critical in supporting innovation and industrialisation in the classroom. Responding on how they related the **TEACHING** aspect in the teaching and learning process, the responses revealed that they made use of the local environment in the teaching and learning process. Another participant added that teachers also used the learners' mother language in the teaching and learning situation. This is in relation to what was stated in the literature review by Wuta (2022) that the Education 5.0 teaching aspect promotes the teaching and learning using locally available resources and the use of indigenous languages.

On the **RESEARCH** aspect, information gathered indicated that teachers as researchers identified problems in the context of their schools, classrooms and communities. They then proposed investigative methods appropriate to address such problems. Basing on the **COMMUNITY SERVICE** aspect, the study revealed that teachers as torch-bearers of societies played a critical role in the development of communities. They provided outreach programs and encouraged people to pursue education in and outside school. Participants' responses indicated that **INNOVATION** was very critical in the education of the learners. The participants were all aware that innovation in education means solving real problems in a new and simple way in order to promote equitable learning. Looking at the **INDUSTRIALISATION** aspect, the respondents agreed that young learners need to be nurtured in the manufacturing of goods and services at a tender age. Most respondents agreed that making simple play materials was definitely a part of industrialisation. The researcher noted that most teachers used locally available materials to make simple materials. For example, learners used old socks and plastic bread packs to make balls. The process was a key part of the industrialisation process, as it allowed learners to produce goods and services.

The observations made during the data collection revealed that teachers used various strategies to support innovation and industrialization. First and foremost, teachers prepared learner-centred classrooms with a variety of locally available resources. The learner-centred environments focused on knowledge transmission. Teachers enabled learners to engage in self-directed learning. Meaning learners were actively involved in their own learning. From the observations, the researcher noted that teachers communicated with the learners using their mothers' language although simple English was used. The use of 'ChiShona' helped learners to freely express themselves. Teachers provided various ways for children to interact with play materials. Teachers jointly created an enquiry-based learning. During the Mathematics and Science lesson, learners were given opportunities to experiment as they played with sand and water. They manipulated objects in a practical and play-way manner, which gave learners opportunities to experience the world around them. Through hands-on learning, learners were encouraged to make explorations. It has been noted that hands-on learning is vital part of childhood as it allowed them to learn in a natural way.

During the Visual and Performing Arts lessons, teachers teamed up and prepared what they called an "industrious classroom", where they made innovation as a part of everyday life. In an industrious classroom, learners designed and made simple play materials using locally available resources. The industrious classroom was innovative, inquisitive and reflective as teachers engaged learners in project-based learning. Teachers encouraged learners to complete their projects. They did not focus on quality of objects produced, but rather focusing on the idea of producing goods and services. Teachers used play-based learning methods such as games, singing and art practices. This helped peer to peer interaction. Although learners were a bit egocentric, they demonstrated high task persistence which enabled them get things done. Teachers encouraged turn taking and sharing of resources. Teachers used appropriate scaffolding techniques to assist learners when need arises. Teachers only guided and did not control the learners. Learners were given opportunities to ask questions and talk of new things they have encountered. Teachers encouraged innovative thinking by asking open-ended questions. The answers to these questions gradually yield the required solution to the initial problem. This helped learners to philosophically generate new ideas. It has been noted that the use of innovative teaching strategies in the classroom was very critical. Another teacher promoted innovation through music and dance. Learners sang and danced according to tune.

During an Art lesson, learners made black paint using charcoal and green paint using tomato leaves. They also made small round balls using old newspapers soaked in water. They would dry the balls in the sun then coloured them using different paints. Improvising their own materials helped learners to have sufficient play materials.

Common challenges faced by ECD teachers

The participants lamented few common challenges faced by ECD teachers who are trying to promote innovation, creativity and industrialisation in early childhood education. Most participants highlighted lack of time as many teachers feel like they don't have enough time to incorporate these topics into the curriculum. The participants were lamenting scarcity of resources such as technological tools since innovation is guided by technology. All the respondents agreed that teachers need such tools to search different topics on the internet. In addition, learners of today like to learn with social media and mobile devices yet most schools under the study didn't have such tools. Another respondent

was of the view that most teachers were not competent enough to fully promote innovation and industrialisation in ECD classrooms. On the same note, another participant highlighted that although teachers were trained, they lacked innovative skills. Participants agreed that teachers may not feel comfortable facilitating open-ended discussions or leading inquiry-based learning. Most respondents agreed that teacher pupil-ratio was another challenge.

Participants, responses evidently show that overcrowding in the classroom due to high teacher-learner ratio is a challenge that needs to be addressed for teachers to fully support innovation and industrialisation in the learners. Another challenge noted was that there was lack of support from parents and administrators. It was observed that most parents and school administrators were against teachers who engage learners in practical activities. They believed that engaging ECD learners in practical activities were a shear waste of time. They needed learners to be engaged in formal education such as reading and writing.

Al the participants agreed that, lack of support from communities, negative attitude of teachers, incapacitation of schools and inadequate resources that would promote innovation and industrialisation was a problem. Most parents were afraid of new developments in the school because they thought the activities may add extra costs on them. All the participants agreed that to solve the challenges, parental involvement and teamwork among teachers were important. In addition, the Ministry of Primary and Secondary Education need to give guidelines on how to support innovation and industrialisation in ECD learners.

Discussion

Findings demonstrate that ECD teachers can effectively support innovation and industrialisation in learners. The results of the study indicated that there are various strategies that can be used by teachers to promote innovation and industrialisation in ECD learners. Play-way methods which are learner-centred methods of teaching were regarded as the best methods to be used. Notably, the use of the learners' mother language was effective as learners freely expressed themselves. Teachers enabled learners to engage in self-directed learning. Meaning learners were actively involved in their own learning as they were given opportunities to make their own play materials. As already discussed, teachers provided various ways for children to interact with concrete objects in the environment. More specifically, teachers worked in teams to create an

enquiry-based learning. Teachers used appropriate scaffolding techniques to assist learners when need arises. From the observations carried, learners were given opportunities to ask questions and talk of new things they have encountered. Teachers asked learners open-ended questions and the answers to these questions gradually yielded the required solution to the initial problem. This helped learners to philosophically generate new ideas. It has been noted that the use of innovative teaching strategies in the classroom was very critical. Improvising their own materials helped learners to have sufficient play materials.

The study argues that the 5.0 philosophy is a relevant approach for the training of ECD teachers. The philosophy is based on the idea that teachers should be trained to foster different key skills in children which include critical thinking, communication, creativity, collaboration and character. The research findings revealed that relating the 5.0 philosophy with the teaching and learning in the classroom is one way of unpacking the Heritage-Based Curriculum which was introduced by the Ministry of Primary and Secondary Education. Therefore, teachers need to transfer what they learn during training to the classroom situation. The results indicated that all the Education 5.0 five missions of teaching, research community service, innovation and industrialisation are very critical in the teaching and learning of ECD learners. Teachers need to relate the aspects in the teaching and learning of ECD learners.

The implications of the findings are that, for industrialisation to succeed, teacher training colleges need to provide high quality and relevant education to their cadres. Young learners need to be nurtured in the manufacturing of goods and services at a tender age. The study showed that although they are trained, most of them do not have innovative skills to support innovation and industrialisation in ECD B learners as the Education 5.0 was introduced after they had trained.

Conclusion

The study concludes that there are various strategies that can be used by teachers to support innovation and industrialisation in ECD learners. Such instructional strategies included design-based and project-based learning. The strategies were very critical in promoting innovation and industrialisation in ECD learners. This helped to foster problem-solving, creative thinking and higher-order thinking skills in learners. As outlined in this paper, innovation and industrialisation begin in early childhood. ECD is a baseline measure to

produce goods and services. Teachers need to create an environment that is safe for taking risks and making mistakes. Teachers need to provide open-ended assignments and challenges that encourage creative thinking and problem solving. Learners need a lot of praises for their creative ideas rather than focusing on quality of goods they produced.

It has been noted that children are philosophers as they are naturally curious and eager to learn. The study indicated that ECD learners are passionate innovators who are keen to discover new knowledge. Children search for knowledge and wisdom for innovation and skills acquisition, all which ensure economic growth and development. Industrialisation requires a paradigm shift from theoretical exercises and abstract exam-centred knowledge to philosophical ideas and practices (praxis). The best way to learn something is by doing it. Hands-on learning is a vital part of childhood. The Heritage-based learning is critical in reviving the philosophy of Unhu/Ubuntu. The role of the teacher is to facilitate learners' abilities.

For teachers to effectively support innovation and industrialisation, they need to be well versed with the 5.0 philosophy. The heritage-based philosophy is the best approach to equip teachers with innovative and industrious skills. The philosophy seeks to refocus Higher and Tertiary Education system in Zimbabwe through teaching, research, community service, innovation and industrialisation. By conducting research, teachers can gain a deeper understanding of their own practice and make informed decisions on how to improve. This will help them improve their innovativeness to fully facilitate the teaching and learning process. As such, teacher training colleges play an important role in equipping teachers with prerequisite knowledge and skills for innovation and industrialisation. Teachers need a lot of training on research methods and being encouraged to see the value of research in their practice. In addition to providing theoretical knowledge, these institutions should offer opportunities for hands-on learning and practice. Colleges and universities that train teachers need to offer ECD teachers' opportunities to learn about creative and innovative teaching methods during their pre-service training, as well as throughout their carrier. The whole education system from early childhood to university level must play a critical role in promoting education that produces goods and services.

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