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THE TECHNOLOGY IN INDIGENOUS PEOPLE'S CULTURE: A CASE OF NDEBELE CULTURE IN SOUTH AFRICA

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Abstract— The Ndebele people's culture has rich technological knowledge that could be integrated in Technology Education as a school subject and serve as a decolonial agent. The purpose of this study was to explore the technology of the Ndebele people in Mpumalanga of South Africa through the Ndebele Hut as an artefact. The study is part of the bigger project involving the University of South Africa (UNISA), University of Botswana (UB) and Chinhoyi University of Technology (CUT). Data were generated by photographing the artefacts, which were analysed ultimately. A tour guide led the research team as he explained the artefacts. Also, discussions were held with a group of Ndebele women and girls, who added to the explanation of the artefacts. Being a Ndebele Conceptual Framework guided the study. The findings show that the Ndebele Hut artefact is loaded with technology that links with the Ndebele culture. The findings also show the critical role that the Ndebele women play in the construction and decoration of the Ndebele Hut that could address gender issues in the subject and encourage girls to participate and excel. The study contributes the indigenous and gender perspectives of technology that can be integrated to decolonise Technology Education.
KeyTerms—Culture, indigenous people, Ndebele Hut, Ndebele women, technology, Technology Education.

I. INTRODUCTION

Indigenous people possess knowledge and skills that have sustained their livelihoods for centuries. One under-explored area is their technological knowledge, expressed through artefacts, and how it closely links with their culture. Hence, the study reported in this paper aimed to explore the technology of indigenous people and its links with their culture, specifically focusing on Ndebele people, especially women. The focus is framed in the decorative art of the Ndebele Hut – the Hut is used to broadly refer to all forms of the Ndebele house in its evolution. This paper treats the Hut as an artefact in line with the research project focusing on this aspect. The Hut and the pride this brings to Ndebele people culture is expressed through the concept of Sakhile thus:
As a young Ndebele woman in a world that is ever changing and globalizing, it is through self-reflection that I know I need to take ownership of celebrating and building my culture and heritage. Sakhile, is a female Ndebele name meaning "we built". The value of the name is deeply rooted in its expression of how our African cultures have come to be. The evidence of what "we built" has been and continues to be created and conserved through storytelling, art and architecture. Sakhile is inspired by the Sub-Sahara based Ndebele and Zulu ethnic groups who traditionally lived in dome beehive shaped structures called "Huts". The Sakhile house borrows its structural language of the indigenous huts, bridging the past and the present with a more modern, permanent, and sustainable selection of material translations and functions. Traditionally, Ndebele and Zulu tribes constructed their hut homes out of small tree trunks and branches that are placed in the ground in a circle. Construction techniques show that the branches are woven and tied with stripped bark to create a structural wall. Dry long grass is then used to thatch the roof tying the materials together. The vision of the Sakhile house is pure in its circular asymmetrical form and humble in its scale. The design is a threshold between traditional Ndebele ideologies, art, materials modern technology, celebrations of architecture, and culture interwoven to initiate the evolution of modern African architecture." [1, p. 115].

Ndebele Hut may mean nothing without painting its walls because doing this gives it an aesthetic finish and, most importantly, expresses *amasiko* (culture). Women do the painting. Painting, therefore, is an important activity among the Ndebele women, not just a physical activity; it parallels with the sociocultural essentialities of the people – gender- and age-based task allocation, women's caring for the house, expression of fertility, community status, political and family rights, subjectivity problems, a set of knowledge in which women are participants and producers, and a set of knowledge that escapes classical Westernised and patriarchal conception

of the feminine [2].

Researching the technology involved in constructing and painting the Hut will play a critical role in decolonising Technology Education (as a school subject, not educational technology). Decolonisation is an essential task in the current educational affair. This aligns with scores of scholars like [3], [4], [5], [6], [7], who decry the colonial onslaught on the African education system, claiming that it was condemned and viewed as primitive and backward, lacking a cultural framework to be based on. That is how they are viewed by the colonisers who aimed to discredit them in favour of the colonial system that, to date, is doing less to relate to the indigenous learners' worldviews. It is unimaginable that education can be culture-free [8]. The very fact that the colonisers imposed the colonial education systems onto indigenous Africans was intentionally an imposition of their culture onto the indigenous Africans' culture. Culture is the human-made environment framed in material and non-material products transmitted from generation to generation. Material culture includes objects related to people's lives, such as attire, food, games, etc. Non-material culture includes norms, values, beliefs, etc.

Considering the needed research on the technology involved in the Ndebele Hut, the questions being addressed are: 1) What is the technology expressed through Ndebele Hut as a decorated artefact? 2) How does this artefact (technology) express the Ndebele culture? 3) How can artefacts like the Ndebele Hut be integrated into Technology Education? The following section describes the Ndebele people and their culture as a foundation for understanding the topic.

II. NDEBELE PEOPLE AND CULTURE

Describing the Ndebele people and their culture will help to understand the significance of their art and technological practices and designs and how they link with their culture. In this section of the paper, I situate the description of the culture within the tribal factions of the Ndebele people and their struggle with colonial invasion. Ndebele people fall within the Nguni culture. According to Reference [9], during the 17th century, intense leadership disputes erupted in the territory of the present-day KwaZulu-Natal, causing the people to disperse. One group, called Matabele by the British, moved to Zimbabwe West [9], [10]. This is the second largest ethnic group in Zimbabwe (about 16%) after the dominant Shona group (about 71%) [11]. Two South African-based groups moved to the north (Mokopane in Limpopo Province) and south (Mpumalanga and Gauteng Provinces) [10], [12]. Fig. 1 shows the spread of these tribes in Zimbabwe and South Africa.

A remarkable dispersion story of the South African Ndebele groups is related by [9], linking it to the royal succession disputes and fights. According to this source, the Ndebele people's first Chief was Mafana, whom Mhlanga succeeded. Mhlanga's son, Musi, moved away from his family in the early 1600s and later became the mighty Zulu nation that settled in Gauteng. He was succeeded by his eldest son, Manala. However, his other senior son, Ndzundza, challenged Manala's Chieftaincy. However, Manala defeated him, and he fled to present-day Belfast with his followers. Two more factions, led by Musi's other sons, broke away from the Ndebele core, resulting in the Kekana moving northwards and settling in the region of present-day Zebediela, and the other section, under Dlomo, returning to the east coast from where the Ndebele people had come initially. The northern Ndebele people include Mghumbhani at Mokopane, Mtjhatjhani at Mashashane, Gheghana at Kekana and Langa at amaNdebele ka Langa.

By the mid-19th century, the Kekana further divided into smaller groups, which spread across present-day Mokopane, Zebediela and Polokwane. The superior and more dominant Sotho groups absorbed and caused them to undergo considerable cultural and social change. On the other hand, the Manala's and Ndzundza's descendants maintained a more distinctive cultural identity and language closer to the Zulu language of their coastal forebears. These sub-tribes live in Pretoria and Mpumalanga [13], [14], [2].

Fig. 1: The spread of Ndebele tribes

[15] [in 14] relates the core characteristics of the Ndebele people, among others, thus:

- Their painting shows detailed geometric patterns and colourful architecture;
- They paint their houses with unique colours and patterns (also prevalent among the Zimbabwe Ndebele people [11]);
- Men do the architecture and construction, whereas women do the painting;
- Women use everything around them as a source of inspiration;
- Their art created global awareness in the 1940s; and

- Dr Esther Mahlangu is the icon of the Ndebele art and is doing everything she can to uphold it.

These characteristics indicate that the Ndebele people's culture is conspicuously expressed through art. The painting work, in particular, was inspired by the struggle for the land, i.e., "black people resisted the attacks of white settlers' oppressive epistemological structures" [2, p. 269]. Reference [2] claims that women's murals involved illegal colours, toning their protest; the harvested clay comprised red, orange, black, brown, rust, beige, and khaki colours, including their mixture to get a desired colour. Hence, their mural expresses their resilience against colonial threats and protects their identity. Reference [2, p. 71] advances the political stance of Dr Esther Mahlangu thus:
We speak of the political character claimed by Esther Mahlangu, by allowing her painting practices to also be seen as art, an attitude that places a certain epistemology, commonly thrown to the margins, to take advantage of the power relations that cross the practices baptized by the language of "art".
Besides this, the paintings are symbols to communicate the group's experience and philosophy, linking it to its cosmology [16] and the rites of passage from childhood to adulthood [2]. In this sense, the painted walls communicate life's stages,
such as the birth of a child, thus referring to a symbol of fertility and status in the community as a mother; the marriage of a daughter; or the period of initiation of children, by displaying a deep network of complexity [2, p. 270].
Puberty is a critical stage of development, socialising children into acquiring social values [2]. The Ndebele people are also known for their beaded jewellery using various materials, such as glass beads, brass and/or copper [10]. There is notable technology behind the decorations on the walls of their Huts, e.g., design graphics and aesthetics – important concepts in Technology Education. Hence, this paper focuses on the technology used in Hut decorations and its characteristic attunement to the culture.

III. THE CONCEPTUAL FRAMEWORK

This study was framed within "Becoming a Ndebele" Conceptual Framework (BNCF). This framework depicts the construction of a Ndebele Hut. Reference [1]'s Sakhile is reverberated, expressing her passion and pride in culture. The Ndebele women play a critical role in Hut's construction and contribute their artistic skills to wall making and painting. From a technological point of view, the frame in Fig. 2 denotes the design and resources (knowledge, skills and resources).


Fig. 2: Becoming a Ndebele Conceptual Framework

The frame would be classified among the earliest designs in the evolution of the Ndebele Hut, and the top and walls would be made of grass. I chose this original design as it symbolises the Ndebele people's adherence to their *amasiko*. Adapting to the conventional lifestyle does not deplete their pride in their culture. Fig. 3 shows a later design with walls and the roof.


Fig. 3: Ndebele Hut with walls and roof

Usually, men do heavier tasks, such as building walls, constructing a timber roof frame and creating a grass thatch

cover. Women mix the clay mortar, which they use to build and decorate the walls. They plaster the walls, create homestead floor areas, and do light maintenance of the structure, including the subsequent application of decorative motifs to the walls. Children, especially girls, assist their mothers in this work, such as manufacturing grass ropes and gathering materials like cow dung, which will be mixed with clay (see Fig. 4).

Fig. 4: Collected cow dung kept wet in containers

Reference [11] attests that girls learn wall paintings from their mothers. According to Molife (2002), an eight-year-old may be noticed stirring paint in a container or a ten-year-old sketching in the sand, thus practising the mother's designs. The absence of men from rural communities has shifted their tasks – men have been absorbed into the cities in search of jobs [2].

IV. LITERATURE REVIEW

Following the BNCF, this literature review focuses on indigenous people's artefacts, indigenous technology and women's contribution to technological development.

A. Indigenous People's Artefacts

The discussion on artefacts in this paper is aligned with Ndebele culture. Artefacts are physical objects created and used by humans. Most importantly, an artefact is "a product and material object that reflects the cultural identity of a particular group of people" Thomas [in 17, p. 168]. The cultural expression does not start and end with artefacts but delves deeper into their interpretation, use and perception [17].

Artefacts are essential teaching resources from locally available and cheap materials [17]. In this paper, artefacts are viewed as vital expressions of the culture of a people, technology and a source of knowledge. They promote the sociocultural practices among indigenous people [2], e.g., the painting of Ndebele Huts.

Artefacts, such as tools, clothing, coins, and musical instruments, are critical, especially when written records are scarce. They help learners and researchers learn how people lived/live and express(ed) their knowledge. Furthermore, artefacts provide insights into the customs, preferences, styles, special occasions, and culture in which they were created.

Therefore, indigenous artefacts harbour a wealth of technological knowledge and skills for learners, e.g., blacksmith, material processing, engineering, textile, etc. Reference [18] exposits that Lesedi Cultural Village (situated between Johannesburg and Pretoria) provides experiences in, among other things, how artefacts are made, how houses are built, and how mural decorations are done.

The artefacts discussed in this section lead to a discussion on technology from an African indigenous perspective, portraying the technological artefacts to a greater extent.

B. Indigenous Technology

This section approaches indigenous technology from a general approach to provide a broader understanding. "There is a tendency to look at Africa as if it never possessed any science and technology before Europeans set foot on the continent" [19, p. 47]. Reference [20] draws our attention to the pre-colonial African indigenous technology where the Zimbabwe, Mozambique and South African borders meet: 1) marks of indigenous hunters' tools that are known in the local languages of Shona and Shangaan, such as vurha/uta (bow) made from giant raisin trees, 2) matlhari/miseve (arrows), mukwanga/banga (knives) and xihloka/demo (axes). This proves local people's depth of knowledge of raisin trees, technological resourcefulness, and blacksmith and engineering skills. In this knowledge and skills lies innovation that indigenous people had already produced then – innovation is not the language of the current times and conventional markets only. It is a misnomer that it is aligned with the West and its pioneers despite existing evidence of innovations by Africans in Africa and in Diaspora, e.g., the astronomer Benjamin Banneker, the Astronaut and Physician Mae C. Jemison, Pharmacologist Portia B. Gordon, Electrical Engineer Michael Spencer [21].

Reference [20] also accounts for goji or hunza (dug pits lined with poison-tipped stakes) to capture big animals. Citing Mavhunga, [20] claims that boys were trained to be artistic in animal tracking, shooting, trapping, and

making weaponry, as well as using trees to make poisons, medicines, food, etc. Growing up as a boy, I was trained to process boletswa (the fruit of a type of tree parasite), apply it on a stick, and tie it to any fruit tree branches. The fruit of this parasitic plant has sticky properties. A bird would be stuck on the stick until I catch it. However, indigenous people respected nature, e.g., hunters would never orphan an antelope fawn to preserve the species. According to [22] and [23], a tripartite relationship between human beings, nature and spirituality promotes this respect. Nature is a God-given resource that must be respected in this interdependence; otherwise, abusing it will be suicidal. Indigenous people respect nature as they are spiritually charged and guided. Caring about nature is thus not a Western practice – Western practice manipulates nature for financial gains, e.g., the confinement of animals in a game park or zoos. Indigenous people intermingle with animals and use them as totems, which helps deepen their knowledge of nature. For instance, they synchronise the calendar with animal behaviour and life, e.g., hunting impala is not allowed in November when antelopes give birth and nkokoni (wildebeest) in December [20]. The advancement of technology has afforded humans the cultivation of more food. In contrast, it has used more fossil fuel reserves, polluted the environment, and caused climate change [24]. This results in melting glaciers, rising sea levels, extreme and destructive rainfall and prolonged drought, calling for the integration of indigenous knowledge and technologies in search of viable solutions [24]. According to Imore et al (2021), this is because indigenous knowledge and technologies have proven to be effective in agroforestry, the use of sacred groves to conserve water, land, biodiversity resources, and practising conservation-agriculture. Reference [19] adds the technology of processing textile weaving, spinning, and dyeing, well-established in Nigeria, and the monumental structures of Great Zimbabwe. These technologies and science rely on natural resources with less or no addition of harmful chemicals. Historically, technology has roots in art(-efacts) [25]; hence, art exhibits technology, such as the Ndebele art.

C. Women's Contribution to Technological Development

Women, including rural women, have technological know-how. They excel in locally developed technology as they own and can better maintain it. Their technological contribution is evident in agriculture, food processing, family healthcare, livelihood management, and community development [26], [27]. The innovation and creative output from indigenous technological knowledge should be seen as a driver of economic growth, e.g., their products like banana wine and juice, sorghum beer and drink, fermented milk, crop production, fish farming, biogas energy production and indigenous vegetables [26], [27]. Reference [26] argues that rural women are custodians of much of indigenous technology, which was motivated by their traditional role in the homesteads and the migration of men to the cities for employment.

Reference [26] contends that technology can trigger innovation when founded on people's realities and lived experiences. This claim finds truthfulness in the technology described above. Thus, [26] claims that indigenous technology is rooted in a community or group of people, including many industrially advanced societies; they started with indigenous technology. Women have been part of such development. This indigenous technology differs from conventional industrial technology because the former is appropriate technology [28]. Appropriate technology focuses development on people rather than things, although the development of goods is the necessary appendage and questions the capital-driven and mass-producing Western sophisticated technology [29]. The concept of appropriate technology raises issues such as unemployment, population growth, social inequality, urbanization, etc [29]. Such technology promotes a per-indigenous approach to people's development, i.e., it makes indigenous people take the lead in technological development instead of a pro-indigenous approach, which places them behind [30]. Imported technology often leads to stunted growth of local industries [26], especially when it is merely adopted instead of adapted to suit local contexts; it is pro-indigenous. Considering the political and gender struggles that women are subjected to, especially in the science, technology, engineering, and mathematics fields [31], they become the main culprits of imported technology as it leapfrogs theirs. They have mainly resorted to traditional methods and techniques because modern or imported technology has proven unsustainable and costly in rural contexts, including its maintenance challenges [32], [26].

Regarding Ndebele people in technology, Dr Esther Mahlangu and Francine Ndimande are the icons of the Ndebele Hut's decorative art as a form of appropriate technology. They insisted that their learners first master clay pigments before using acrylic paint [2]. Knowledge and action are co-produced [2]. This happens within the framework that Ndebele women's paintings "tell the stories of a people, their political and moral organization, and, most importantly, the ways of life that are influenced by an education that goes beyond traditional habits of schooling and the school curriculum" [26, p. 264].

V. RESEARCH DESIGN

As stated in the abstract and introduction, this paper only reports part of the data from the artefacts collected in Kghodwana Cultural Village in Mpumalanga of South Africa in 2022, focusing on the Ndebele Hut's decorations. Additionally, discussions were held with indigenous knowledge holders (older women down to girls) at the Mthambotini village, who helped explain the artefacts. The study was part of the bigger three-year project (2022-

2024), including UNISA, UB and CUT. The research team consisted of six members. The work about writing for publication has been discussed and rationed between the team members – this paper is part of the plan. An indigenous tour guide led the team to view the artefacts and provided their explanation.
Data were collected by taking pictures of the artefacts with permission from the Cultural Village Authorities. As the team took pictures, it observed and conversed with the tour guide and among itself about the artefacts.
Artefact analysis is about understanding an object regarding the material used, construction, function, cultural representations, value, etc. Artefact analysis on the decoration of the Ndebele Hut included aspects beyond the indigenous technological knowledge to enhance the team's understanding. The team systematically analysed the Ndebele Hut's decorations to understand its physical, social, and cultural contexts and the expression of technology. The team had a Microsoft Teams-based meeting to execute this task following the development of the analysis tool.
Every researcher should try to convince readers of the rigour and trustworthiness of their study [33]. This study employed several strategies to ensure trustworthiness, including the team approach as co-researchers, engagement and communication methods that did not compromise mutual trust and open communication.
Ethical clearance to conduct the research was obtained from the University of South Africa where an application for the project was done.

VI. FINDINGS

A. Description of Ndebele Hut

The Ndebele Hut presents a colourful and aesthetically appealing design and decoration consistent with the culture itself – colours that the culture has chosen to identify with. This supports Ndou's (2021) list of characteristics – colourful architecture, uniqueness and patterns. Fig. 5b exhibits multiple colours, such as white, red/dark red, yellow to gold, sky blue, green, and pink. This attests to [2] observance of the complex colours, some of which defy political odds. It surfaced from the discussion with the Mthambotini group that the white colour is mostly used as the background to bring out the brightness of the mural, while the black colour is used as an outline. White colour is also used as an eraser to correct mistakes made using any other colour. The walls are painted with many symbols that synch with the theme of Graphics as a communication tool in Technology Education. Technology Education integrates parts of mathematics (especially geometry and calculations) and science (such as chemical reactions and material properties for intended purposes). These are conspicuous in the mural. These symbols come in different shapes and colours (Fig. 5b). The shape of the roof is conical (Fig. 3), contributing to its strength and resistance against unfavourable weather conditions. The structure in Fig. 5 illustrates the roof reinforcing techniques.

Fig. 5: Roof strengthening technique in Ndebele Hut

Many current Ndebele Hut designs follow rectangular shapes, suggesting the influence of modern house designs. The Ndebele Huts are mostly a conglomeration of units guarded by decorated walls to provide a home to the collective. The team observed this structural arrangement at Mthambotini and other places visited. As in other African indigenous cultures, the units are designated according to seniority from the Head's (Chief's) Hut and his wife or wives down to the units for boys and girls, as well as function units such as the kitchen. In this light, Becoming/Being a Ndebele is expressed and protected against forms of historical exclusion by colonial masters' invasion of their territories [34]. At Kghodwana, the team observed the evolution of the Ndebele Hut from the original structure and design to the modern type (see Figs 3, 6a and 6b). From a technological (material use) and scientific (temperature) point of view, the coolness of the Hut fades away as the height of the brick wall increases and the grass roof no longer extends closer to the ground.


Fig. 6a: Evolution of Ndebele Hut


Fig. 6b: Evolution of Ndebele Hut

B. Cultural Representation and Beliefs

The colours on the Hut's walls (Fig. 6b) give a symbolic meaning to the culture and philosophy of the Ndebeles [16], such as the status or power of the homeowners, offering of prayers, announcements of marriage in the home, or can even represent the current protest. The dominance of the pink colour signifies communication. The discussion with the Mthambotini group revealed that black is used minimally because it symbolises bad luck. Thus, the symbols and signs significantly influence culture [35]. Through them, Africans can reclaim their space in social, political, economic, or religious phenomena [35]. According to the tour guide, the small door in the designs of the Hut in Figs 3 and 6a has something to learn about health and security. The door forced one to bend and crawl in and out of the house, helping to exercise the backbone. Also, if an enemy wanted to come into the Hut, he/she was forced to do the same, and it was easy to hit him/her from inside the Hut.

At Mthambotini, the discussion took place inside one of the Huts in Fig. 6b. The team observed materials that were patterned with colourful beads [10], which matched the colours on the walls, e.g., calabashes, salt seller, spoons, etc. During the discussions, the team learned more about the cultural wealth and knowledge linked to colour use [18]. Therefore, the Ndebele people's use of colour extends beyond just decorating the Hut to expressing gender roles, age-task allocation, sociocultural dynamics, political stance, rites of passage, etc [2]. For instance, the woman's stylish treatment of colour and pattern transition in the painting may express fertility or celebration of graduation from initiation.

C. Technological Knowledge

The unique design and aspects informed by intuition creatively come through in the Ndebele Hut decorations. When the Mthambotini group was asked how they transitioned from one colour and pattern to the next, they explained that they did not know, but it came naturally and that the more they painted, the more they became creative. So, creativity is present in the Hut mural. It is augmented by tacit knowledge, i.e., knowledge, skills, and abilities an individual gains through experience but is often difficult to explain; it is personal, context-specific and hard to formalize and communicate [36]. Technology Education's conceptual knowledge (knowing that) and procedural knowledge (knowing how to) [36], [37] are also implied – learners can learn from the indigenous technological knowledge (conceptual) and practice its execution (procedural). In support of [38], indigenous people have long been in the habit of educating and teaching their members of society even before colonialism set in. This includes honing their creative skills, one of the most targeted outcomes in Technology Education. According to [20] and [19], the technology that indigenous people developed and used/use predates the colonial invasion of their places. The original harvesting and use of clay by the Ndebele people attests to this claim.

In Dr Esther Mahlangu's indigenous school, which the team visited in Mthambotini, poultry feathers and sticks were used in painting. As the group explained during discussions, clay was available in certain areas where they fetched and mixed it. These materials, plus cow dung, bendable or tender tree brunches, especially those from the poplar tree, poles for the roof structure, special grass, tree bark or thutsi to make a rope for tying the roof, and a wooden needle to weave this rope into the roof. Thutsi is a plant that grows about a metre high in mountainous places. It has a brushy black stem that looks like a root and sharp-pointed fibrous and hard green leaves. The Ndebele women cook the leaves to make them tender and flexible and weave them into a rope (Fig. 7).


Fig. 7: Cooking of thutsi

Currently, the women have converted to paint (acrylic) because of the confiscation of their land by the colonisers and the depletion of the clay resources. They are now forced to buy paint, which is expensive. So, the paint used in Fig. 6b is acrylic from suppliers.

VII. INTEGRATION OF ARTEFACTS INTO (TECHNOLOGY) EDUCATION

Like any other culture, indigenous knowledge is the bedrock of indigenous people's education. Against this backdrop, indigenous societies have long held to the type of education passed from generation to generation. The Mthambotini group consisted of girls learning the mural from the old women. This shows that an education already existed, rooted in African cultures. Actually, the colonisers did not introduce education in Africa, but a system called formal education, which undermined African education and referred to it as informal. [38] argues that the means of educating and teaching members of society existed before the introduction of classroom-bound colonial education.

Ndebele people are among the indigenous people who have remained resilient in teaching their children in their own way [38] to ensure the preservation and sustainable development of their culture, knowledge, and practices. Like many indigenous cultures, one significant feature of their education is experiential and not confined to the indoor teaching environment. The education is also more practical than the heavily bookish academic education. The research team learned about this experientiality and practicality from the meaning that surfaced from the artefacts as the tour guide and the Mthambotini group explained them. In this sense, [38, p. 2] argues: "Education cannot be merely confined to the classroom but should traverse different aspects of the individual's life outside the classroom".

The Ndebele Hut presents rich technological knowledge and resources. It can be used as a resource to teach Technology from reality-based and experiential, practical, illustrative and demonstrative approaches. To date, teaching is heavily classroom-bound, causing boredom in indigenous learners who should sometimes be taught in open environments with the aid of live resources. There is, therefore, a need to adopt a balance between indoor and outdoor teaching. In this sense, [38, p. 2] argues that "education should traverse different aspects of the individual's life outside the classroom". Technology Education is a practical subject that thrives on design, addressing human needs/wants, and investigating existing solutions (artefacts and designs). The Ndebele Hut is one of the culturally available resources that can make the subject alive and relevant to African learners. It is an example centring Africa in the learning of and about technology and extending it to other indigenous cultures as well. This strengthens [39's] claim that the curriculum needs to be decolonised. Ndebele people are particular about teaching their children in a way that does not "steal" them from their culture [38]. Indigenous people can be better served by education that is not foreign. The primitive view on indigenous people and their knowledge must be confronted.

Elders are the primary sources of knowledge. Dr Esther Mahlangu is the main icon who has advanced the understanding of the Ndebele people through her art. She is determined to offer her people, including the youth, an art education that does not advance their culture. Artefacts are lovely and diverse cultural expressions [40]. Reference [40] argues that imagination and culture should be prioritised to enable consideration and appreciation of the beautiful diversity created. Emphasis should be placed on the values, priorities, and needs of various cultures generated through the creative energy of their people instead of the form (e.g., machine, tool, artwork and music score) being a distinguishing criterion [40], [41]. Thus, ignoring the study of technology, especially from a multicultural view, blocks learners from engaging with an essential dimension of culture that affects them daily [40].

Furthermore, Elders are the living resources and can play a critical role in shaping Technology Education's content and teaching. The schools' and/or teachers' collaboration with indigenous people can make this realisable. Some knowledge, skills, materials and design aspects presented in this paper can be the starting point to decolonise the subject, e.g., design, art and painting for Design, Angle Calculations (Geometry and Trigonometry), Aesthetic (colour mixing and design), and Graphics; cooking of *thutsi* for Processing of Materials (changing properties of materials); clay, poultry feathers, sticks, etc for Materials and Manufacturing. Technology Education strives to use freely available resources. However, this aim is now offset by disorientation from using natural resources [42], turning to the expensive stuff bought from the shops, like when buying paint. Involving Elders in the subject can make learners like the subject and perform well. They play a particularly crucial role in sustaining indigenous knowledge, such as in Figs 8 (an Elder supervises the learner learning to paint), 9 (the learner paints the wall) and 10 (example of the syllabus).


Fig. 8: A teacher


Fig. 9: A learner in training

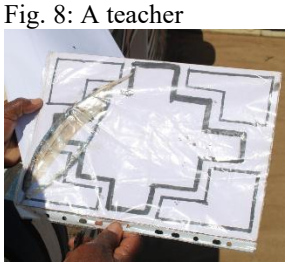
Fig. 10: Syllabus

Elders' involvement in the subject presents an opportunity for teachers and learners to collaborate with the community, turning what is outwardly a social occasion into a display of solidarity, reinforcing a sense of self-identity through participation in group activities. This shifts sociocultural practices to the classroom, thus making the subject and the curriculum relevant to local contexts [43]. A different understanding of the curriculum can be achieved when it is viewed as a process of "updating the potential of the classroom as a collective of forces" [44, p. 317]. Learning is always meeting with the other, with different, and inventing new possibilities [2]. Reference [2, p. 278] argues that this is:

a commitment to taking the risk of learning from the heterogeneities of the classroom, rejecting the discourse that 'Education for all' means the same education for all, in order to value the school as a social project and political …; but that everyone has access to education according to their needs, according to their differences.

This changes the narrative from a pure engineering perspective of technology to a sociocultural view espoused by [45]. Reference [45] vies for a balance between these two perspectives, i.e., tangible technology, which includes artefacts such as caps, tools and huts, and intangible technology, which provides knowledge, skills, ideas and so on [45]. He further claims that intangible technology includes social technology such as methodologies, techniques and songs, and communication technology, such as language, signs, symbols, etc.

Being/Becoming a Ndebele takes centre stage in the education of the young. Education is not culture-neutral [8]. This echoes [1's] expression about Sakhile. Although, considering the BNCF, Sakhile can have a general reference to the Ndebele people considering their collective organisation, the framework's emphasis is on feminism and the struggle against political disaggregation. The contribution of Ndebele women toward technological development cannot be undermined. Their contribution has seen them provide an artistic shelter to their families, protect their *amasiko*, and act as a buffer against colonial influence on the Ndebele knowledge and culture and gender-based ill-treatment [31]. They are the pride, model and motivation for African girls to learn Technology as a subject.

CONCLUSION

The study explored the technology of the Ndebele Hut decorations and its link to the culture of the people. This aim was achieved as the findings show the technology in question through the painting work on the Hut as an artefact. The decorations, colours, and shapes are described in terms of their connections with the culture and the technology they exhibit. The learnings from the findings are that the Ndebele Hut does not just end with the decorations or symbols painted on its walls. Rather, these decorations and symbols reveal the technology that can be integrated into the Technology Education themes and methods and strategies of teaching from an indigenous point of view. Also, the Ndebele women are central to the technology involved in the Ndebele Hut's construction and decorations. In this sense, the study contributes indigenous and cultural and gender perspectives of technology, which could immensely help decolonise Technology Education. This study shows the Ndebele people's resilience in preserving their culture and knowledge and teaching their people. It confronts curriculum conceptualisation and delivery from a Western perspective and accommodates indigenous learners' worldviews. In contexts such as South Africa, it is guarded by Constitutional principles and valuing indigenous knowledge systems. However, the challenge has been how these knowledge systems can be integrated. This study addresses this matter. Technology Education trains learners to design innovative and creative solutions to technological problems using reality-based scenarios and case studies. Learners practically engage in design activities and ultimately produce artefacts representing the solutions. The Ndebele Hut can be used in this instance. As education is linked to culture, the use of the Ndebele Hut provides one of the ways to teach and learn Technology as a subject

from a cultural perspective.

I recommend that educational stakeholders divorce themselves from viewing indigenous knowledge in undermining terms, accusing it of outdatedness, to treating it as credible knowledge worth learning about. Further research into the artefacts and other data types for indigenous people should be considered.

This study's limitation on artefacts as a form of data collection will be counter-acted by the broader study that was conducted as it used other methods such as interviews and document analysis.

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