

Enabling Authentic Learning Experiences for Indigenous Knowledge Acquisition in a Digital Environment: A Case of Zulu Beading Practice

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Abstract

The Zulu beading practice is a well-known example of an indigenous art form that has been passed down through generations in traditional communities for cultural continuity. Research shows that Intergenerational Knowledge Transfer is a fundamental component of the epistemological system (Iseke & DesMoulins, 2015, p. 31). Elders impart knowledge using indigenous pedagogies, which promotes understanding and learning about communities and their local knowledge. With the increasing globalisation and modernisation of societies, social relationships, and cultural knowledge have become increasingly scattered. The contemporary generation often lives behind indigenous learning practices and adapts to new ways of learning in digital environments (Newman & Hatton-Yoe, 2008, p. 31). Consequently, there is a risk of traditional knowledge such as knowledge about Zulu beadwork becoming extinct when the knowledgeable elders pass away. Therefore, this indigenous knowledge needs to be documented and stored in the present digital learning environment where it can be retrieved and shared across generations. This study, therefore, explores ideas for enabling authentic learning experiences and accessibility of indigenous knowledge in a digital environment, with a focus on the Zulu beading practice. Using the Zulu beading practice, as a case study, the research investigates a potential digital learning environment to enhance the learning experience of cultural knowledge. The researcher also explores the potential of embracing digital learning environments to promote the continuity of traditional knowledge.

A qualitative research approach was followed to explore the documented experiences of teaching and learning Zulu beading in a digital environment. Furthermore, a literature review was employed as a research methodology to establish the existing traditional approaches followed to teach the artistry of Zulu beading to aspiring practitioners as well as the practices needed to teach Zulu beading knowledge and skills to these practitioners in the digital environment. The findings revealed that the Zulu beading artistry is tacit knowledge, which comprises the *Techne*, *Phronesis*, and *Episteme* as the three knowledge categories. To create an authentic learning experience, the three knowledge categories are taught holistically. Therefore, this study aims to use the research outcomes to suggest a learning management system that could help facilitate the authentic learning experience of learning Zulu beading knowledge and skills digitally. The process of enabling authentic learning experiences in a

digital environment requires the inclusion of indigenous viewpoints from knowledgeable elders who are skilled beadwork practitioners, linguistic engagement, and the integration of professional digital practices for developing learning solutions.

Keywords: Indigenous Knowledge Acquisition, Authentic Learning Experiences, Digital Learning Environments, Zulu Beading practice.

Declaration

I declare that this dissertation is my own, unaided work. It is being submitted for the Degree of Master in Digital Arts at the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination at any other university.



(Signature of candidate)

7th day of November 2024 at Braamfontein, Johannesburg.

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Chapter 1: Introduction to the research

Zulu beadwork serves as a powerful vehicle for maintaining traditional knowledge. The teaching and learning of Zulu beadwork transcend time and remain an integral part of contemporary society. It happens spontaneously in formal and informal spaces, including traditional or heritage settings that offer unique teaching opportunities and immersive learning experiences. A typical example of a heritage setting is the '*Golden Mile*', located in the city of Durban, KwaZulu Natal, which I had an opportunity to visit. During my visit, I was fascinated by the traditional knowledge-sharing practices that occur within the space that I observed. I witnessed several skilled beadwork practitioners interact with one another as they made traditional Zulu beaded forms. Moreover, I saw skilled beadwork practitioners communicate with consumers to explain traditional concepts and functions of beadwork in Zulu society. Through observation, I learned that each beadwork design told a unique story about the wearer's identity, spirituality, and social status. It became clear to me that distinctive patterns and a selection of colours are used to symbolically convey different messages about the status of the wearer. I discovered that the interpretation of these messages varied based on the cultural context. This cultural context aims to conserve traditional values and beliefs while fulfilling the functions of personal adornment in the Zulu society. In this light, it can be argued that the experience of visiting a heritage place remains significant in learning about the culture of the Zulu society and gaining access to traditional beadwork.

The value of sharing knowledge about Zulu beadwork in traditional or heritage settings provides an authentic understanding of Zulu art. Within these settings, the Zulu society continues to prioritise the dissemination of information that fosters an authentic understanding of the art through cultural practices. Generally, dissemination of information is facilitated by skilled beadwork practitioners who harness Zulu beadwork knowledge and pass it down from one generation to the next. These activities take place either in their homesteads or in community centers. When engaging in practice activities, skilled beadwork practitioners generously share their understanding of traditional concepts and techniques used to create Zulu artwork. The teaching of Zulu beadwork skills often begins with activities that require learning about different functions of beadwork in the Zulu society,

followed by basic skills such as stitching techniques, and gradually progresses to creating complex pattern designs that are unique to the Zulu culture. Therefore, learning about different functions and techniques of Zulu beading provides opportunities for aspiring beadwork practitioners to develop their skills, strengthen ties to their history, and learn traditional forms and patterns in relevant context. However, the learning processes occur in various ways within communities to maintain cultural continuity.

Research shows that indigenous knowledge systems are integrated epistemological systems taught through indigenous pedagogies that support and promote understanding of local communities and their inhabitants (Iseke & DesMoulins, 2015, p. 31). This applies to indigenous knowledge systems such as the Zulu beading practice, which comprises epistemological viewpoints that are related to people's understanding of the world they inhabit. These viewpoints are based on the daily realities of indigenous people living in traditional environments. As such, people's daily lives are heavily influenced by the customs and beliefs of their communities. For Zulu society, these epistemological viewpoints are connected to daily life learning pedagogies that support their cultural norms and traditional beliefs. These indigenous pedagogies are essential for the long-term survival of traditions in which knowledge exists. Through indigenous pedagogies, knowledge for both current and future generations is conserved. Therefore, understanding Zulu beadwork traditions through indigenous pedagogies enhances comprehension of community knowledge and promotes appreciation of traditional concepts.

Indigenous pedagogies occur in heritage or traditional settings known as "a sense of place" within the communities (McIntosh, 2008, p. 42). In the context of the Zulu beading practice, a sense of place is viewed as a traditional or heritage setting that facilitates and enhances best practices for transferring and conserving of traditional knowledge. The transmission of Zulu beading skills and knowledge in traditional or heritage settings involves intellectual activity such as individual consultations or attending workshops that support ways in which community knowledge is constructed and embodied in beadwork forms. By engaging in these intellectual activities, individuals can explore their philosophical thoughts using the art of the Zulu beading practice. These philosophical thoughts are significant in the Zulu beading practice they involve adapting traditional beliefs and customs. These traditional beliefs and customs can be used for individual judgment and reasoning in the process of creating

traditional Zulu beadwork (Nettleton, 2014, p. 344). Subsequently, adapting philosophical thoughts creates an epistemological system that fosters an understanding of the community's viewpoints, which are considered in the process of creating traditional Zulu beadwork forms.

In the process of beading, the Zulu society follows an indigenous pedagogical approach that creates meaningful connections to the customs and traditional values of a specific community. Teaching and learning Zulu beading skills and knowledge, therefore, involve optimising the community conditions to facilitate quality learning through authentic experiences. Optimising these conditions of a community interconnects the authenticity of teaching and learning to a location, experience, and the people who live in it as knowledge experts (Grenier, 1998, p. 1). Often, an elder of the family would pass down knowledge about Zulu beading to younger members of the family, allowing for adaptations of traditions (Newman & Hatton-Yoe, 2008, p. 31). Consequently, teaching and learning about Zulu beading skills and knowledge in traditional or heritage settings represent a profound connection to cultural history and indigenous ways of knowing. One can conclude that the process of learning indigenous knowledge about Zulu beading requires participation in activities guided by skilled practitioners, who are often elders living in traditional communities. However, due to demographic and societal changes in modern society, family alone no longer transmits this Intergenerational Knowledge but, is also shared by 'non-familial' individuals who understand the culture of a particular community (Newman & Hatton-Yoe, 2008, p. 31).

The shift in family structure driven by societal changes encouraged the development of knowledge transfer that considers the widespread of social groups in contemporary society (Newman & Hatton-Yoe, 2008, p. 31). As a result, geographic separation prompted communities to create opportunities in which intergenerational learning practices occur (Newman & Hatton-Yoe, 2008, p. 31). For this reason, contemporary society has necessitated the creation of modern intergenerational knowledge-sharing avenues with future implications for knowledge-sharing processes. As such, traditional methods of teaching and learning Zulu beading are informed by the change in societal structures. To this extent, the Zulu society has adopted modern intergenerational teaching and learning strategies that involve transmission of indigenous knowledge through a new 'extrafamilial' paradigm in modern society. The new 'extrafamilial' paradigm refers to individuals outside families who

are educated and share their wisdom related to indigenous knowledge of a community (Newman & Hatton-Yoe, 2008, p. 31). This adaptation of knowledge transmission by 'extrafamilial' has influenced development of education systems such as teaching aspiring beadwork practitioners at community centers. Doing so provides avenues that focus on maintaining the well-being of a community and preserving of traditional knowledge for future generations (Newman & Hatton-Yoe, 2008, p. 31).

Intergenerational learning activities led by 'extrafamilial' individuals therefore bring different generations together to share experiences that offer mutually beneficial learning. Thus, aspiring beadwork practitioners could understand their place within the community and strengthen their connection to their indigenous roots. While teaching and learning about Zulu beadwork in traditional or heritage settings is crucial for providing real-world learning opportunities and facilitating authentic learning experiences, several beadwork practitioners have demonstrated their enthusiasm for teaching Zulu beading skills by initiating in-person workshops in urban areas. A typical example of such a workshop was the beadwork master classes offered by the KwaZulu Natal Society of Arts (KZNSA) in December 2018 (KZNSA, 2018). This master class aimed to introduce concepts of traditional Zulu beadwork to eager creatives (the learners) basic beading skills that involve creating forms and patterns. The class provided a learning experience in which skilled beadwork practitioner generously shared knowledge about the history of Zulu beadwork and showcased beading techniques to the learners, museum staff, and art collectors who attended the workshop. During the lesson, aspiring practitioners discussed concepts, thought critically, brainstormed ideas, identified challenges, worked collaboratively, and explored procedures for creating Zulu beadwork forms and patterns. Therefore, participants were provided a platform to engage in Zulu beading practice beyond the traditional 'familial' mode of intergenerational learning for cultural exchange.

Overall, the workshop experience aims to raise awareness about the Zulu beading practice. It also allows access to expert knowledge for those who reside in urban areas as a glimpse of the past and inspiration for future practice. However, both individual training sessions and in-person workshops provide structured learning experiences. They are structured to enable aspiring beadwork practitioners to learn the basics of creating traditional beadwork that fosters communication, ornamentation, and the economic aspect of the Zulu beadwork. In

addition to understanding the design process for creating meaningful Zulu-beaded artifacts, aspiring beadwork practitioners can engage in hands-on experiences under the guidance of skilled beadwork practitioners. This hands-on approach to learning allows for a more personal and meaningful connection to the Zulu culture. Therefore, learning traditional knowledge about Zulu beadwork in a traditional setting not only enriches aspiring practitioners' perspectives on the process of beading, but also promotes cross-cultural understanding and a shared sense of community through practice. Therefore, acquiring knowledge of Zulu beading through cross-cultural practice fosters an appreciation of local and indigenous knowledge in an inclusive learning environment. However, this training method requires in-person interaction with skilled practitioners in a physical classroom. Consequently, the mode of learning that involves in-person interaction with skilled practitioners in a physical environment extends to the challenges raised in the study regarding the inaccessibility of practicing communities for the continuation of Zulu beadwork art.

Problem statement

In contemporary society, the rapidly evolving social changes created by generations of indigenous people migrating from their ancestral communities to urban areas to pursue better livelihoods continuously challenge indigenous cultural practices such as the Zulu beading tradition. In urban areas, where learning in digital environments is prominent, people adapt to modern lifestyles that sideline cultural practices that are embedded in traditional communities. Therefore, people's access to their traditional communities has shifted, thereby challenging access to the communal practice of Zulu beading. The 'extrafamilial' paradigm, which aimed to foster indigenous knowledge exchange and learning, to fill the "geographic gap" between older and younger generations, has been negatively impacted. If the knowledge of Zulu beading is not recorded in a retrievable format that can be shared within the current digital learning environment, it is deemed to become extinct when knowledgeable elders pass away. Consequently, the constant mutation of society calls for development of contemporary avenues for acquiring knowledge of knowledge on Zulu beading and position the future of this practice in the digital realm. Therefore, the 'extrafamilial' paradigm could be revitalised to meet the needs of the contemporary generation driven by the digital learning culture.

Revitalising the 'extrafamilial' paradigm of Intergenerational Knowledge Transfer could foster the continuation of culture, even if the contemporary world tries to locate them on "distinct orbits" (Kuyken, 2012, p. 365). Herein, "distinct orbits" hypothetically refer to different geolocations outside traditional communities in which people are located due to societal changes. It is against this backdrop that I embark on this research that explores the potential of digital learning environments to enhance learning experiences and provide remote access to the Zulu beading practice for those situated in "distinct orbits". This aims to provide access to Zulu beading expertise for the preservation of knowledge and encourage cultural continuity. The decision to explore digital learning is influenced by the contemporary generation adapting to modern ways of learning in digital environments and using technology for day-to-day interaction facilitated through the Internet (Panworld Education, 2017). Nowadays, the internet has provided easy access to information and learning resources that can be used for knowledge. With information accessible online, the contemporary generation can easily access web-based learning resources and engage in learning activities. Therefore, web-based learning continues to grow, thereby providing opportunities to foster the 'extrafamilial' intergenerational learning paradigm in the contemporary age.

As the world dives deeper into the age of the fourth industrial revolution (4IR), the development of teaching and learning technologies also influences how people learn in contemporary society. The progression of technology has brought about digital advances that can support teaching and learning needs in a digital environment. These digital advances present opportunities to enhance teaching practices that meet learner needs in the digital environment. Such teaching practices involve designing and developing simulations that promote learner understanding and engagement through authentic experiences that resemble real-world scenarios for understanding content in a digital learning environment. The South African education systems experienced a glimpse of this digital learning culture during the COVID-19 pandemic. The COVID-19 pandemic became effective when the South African president declared a *national* state of disaster and a *national lockdown that was instituted nationwide in March 2020 and lasted for 2 years*. The lockdown disrupted traditional face-to-face teaching and learning practices as all modes of in-person meetings came to a complete standstill, necessitating prompt adoption of teaching and learning strategies using 4IR technologies.

For instance, higher education and training sectors such as universities transitioned to digital learning environments using Learning Management Systems (LMS) to ensure curriculum completion within the academic calendar. Therefore, digital environments such as learning management systems have the potential to allow opportunities to successfully transition teaching and learning activities to continue online regardless of the “distinct orbit” (geolocations) in which learners are placed. In the same light, it can be argued that the Zulu beading practice could be transmitted through the digital environment using digital learning tools and resources. However, the facilitation of authentic knowledge-sharing processes in a digital learning environment is essential. Access to the Zulu beading practice in a digital environment could offer opportunities for aspiring beadwork practitioners to engage in authentic learning experiences to acquire knowledge within the culture of communal practice. Furthermore, enhancing traditional Zulu beading practice with modern teaching and learning in a digital environment could allow for greater accessibility to the Zulu beading practice for cultural continuity. Therefore, greater accessibility to the Zulu beading practice through a digital learning environment would provide a contemporary avenue for conserving knowledge and carrying heritage to future generations.

To date, digital learning resources that teach about Zulu beading skills and traditional knowledge for cultural continuity are lacking. Most digital resources found on social media such as YouTube are video tutorials focusing on techniques for making traditional Zulu beaded forms and patterns. The strategy for sharing these tutorial videos on the YouTube platform is to provide opportunities to learn and engage with knowledge related to Zulu beading practice beyond the constraints of face-to-face training. Through digital environments, aspiring beadwork practitioners can learn through digital resources via the Internet. Therefore, access to information on the internet has especially benefited those who were previously disadvantaged due to their geographic location. However, most of these video tutorials are passive and do not allow opportunities for students to interact with the content, resulting in a learning experience that is different from community practice. Furthermore, most scholarships found on the internet focus on the historical context of forms and patterns. These scholarships interpret cultural meaning associated with pattern designs and focus on understanding archived beadwork by the Zulu society. Rarely can one find digital learning

resources that focus on the holistic to approach Zulu beadwork education that supports the need for the continuation of the practice.

The lack of appropriate interactive teaching approaches affects the sustainability and cultural continuity of Zulu beading practice. Therefore, there is a need to address the gap between digital and traditional learning through the enhancement of authentic experiences in digital environments. However, it is important to note that the study does not attempt to recommend the replacement of traditional approaches for teaching and learning indigenous knowledge such as the Zulu beading practice. Rather, it promotes remote access to learning resources that provide an equivalent access to shared practice and similar learning opportunities as those physical training sessions. Aspiring beadwork practitioners can then access Zulu beading expertise remotely and design beaded forms that are unique to their identity.

Aim

This study aims to explore methodologies that will enable authentic learning experiences in a digital environment, without losing the authenticity of how knowledge is shared in the traditional sense.

Objectives

To achieve this aim, the study follows a qualitative approach to gather information on the traditions of Zulu beading practice. Consequently, the aim will be achieved through four objectives namely:

- 1) Research on Zulu beadwork as indigenous knowledge;
- 2) Unpacking the indigenous pedagogies for learning the art of Zulu beading in traditional or heritage settings;
- 3) Exploring and framing opportunities for enabling authentic learning experiences of Zulu beading in a digital environment.

Details on information that was collated and its relevance to the study are addressed in the overview of the coming chapters.

1.1. Overview of the upcoming chapters

Following the introduction and background sections, the *second chapter* on understanding the research methodology is presented. The research methodology section addresses the Zulu beading practice within the framework of indigenous knowledge systems. This includes a discussion on the art and tradition of beading in the Zulu society and the types of knowledge guiding the making of traditional artifacts. *Chapter 3* provides insight into the authentic framework for learning Zulu beadwork by unpacking pedagogical approaches to learning Zulu beadwork in traditional communities. The subsequent *Chapter 4* explores professional digital practices for designing authentic experiences for learning Zulu beading practice in a digital environment. Furthermore, the chapter makes recommendations on how authentic learning experiences could be enabled through the appropriate use of modern digital technologies. The concluding *Chapter 5* discusses recommendations for enabling authentic learning in a digital environment. Through the enabled environment, practicing communities would be provided opportunities to share knowledge across generations to come. These efforts will conserve cultural knowledge of Zulu beading within a digital environment. To address the philosophical discussions associated with the chapters in this study, the research follows a qualitative research methodology that supports the central arguments presented in each chapter.

1.2. Research methodology

In the quest for traditional knowledge related to cultural practices in the Zulu society, there is a saying “*Indlela ibuzwa kwabaphambili*”; this loosely translates to “*We seek guidance from those who came before us*”. The saying is a cultural proverb in the Zulu society meaning that people learn from those who possess a generational wealth of knowledge and have extensive expertise in a particular field (Stangen, 2021). Consequently, this study adapts this approach to explore how digital platforms could be used to share, teach, and learn Zulu beadwork knowledge digitally for greater accessibility and continuity of the art. In the context of Zulu beading practice, this means that both the knowledge holders of indigenous knowledge and the existing scholarship in the field of Zulu beadwork education would provide essential information to understand Zulu cultural practice. This information provides insight into the way forward on the future positioning of Zulu beading practice in the digital era. For this

reason, this study took a qualitative approach to investigate the criteria required for creating resources that will enable authentic learning of Zulu beadwork in digital environments.

To gain better insight into the culture of Zulu beading practice, the main body of this dissertation engages with existing literature to provide views on the theoretical aspect of traditional Zulu beadwork. This includes definitions of key terms relating to art as well as the practice of Zulu beadwork. Furthermore, the study extracts information from journals, books, and internet sites to highlight and foreground the relevance of the Zulu beading practice in contemporary society. This provides insight into constituents of the traditional knowledge required to establish authentic learning experiences. These experiences are vital in learning Zulu beading skills, as they would provide aspiring beadwork practitioners with relevant insight into traditional knowledge in the constantly changing society. In addition to the theoretical text, discussions on knowledge-sharing practices in traditional Zulu beading required an investigation of real-world experiences that are linked to the culture of communal practice. These experiences are significant in understanding pedagogical approaches to learning Zulu beadwork. This includes analysing the learner's journey to get a sense of the traditional teaching and learning process.

Due to challenges of access to the practicing communities during the early phases of this research, which overlapped with the COVID pandemic, gathering information relevant to Zulu beading practice was restricted to searching the internet. Through this search, an educational documentary titled *“Traditional Zulu Beading”* by Kulcha Kwest was identified as a relevant exemplar case study. This documentary provided insight into typical pedagogical approaches that a skilled practitioner would follow in teaching Zulu beadwork. Furthermore, the documentary provides insight into the learning journey that an aspiring beadwork practitioner would typically follow for the acquisition of knowledge about Zulu beadwork. Not only does the documentary capture the processes of teaching and learning and the learner journey, but it also includes interview segments with participants who reflected on the teaching and learning experience. These interviews highlight semi-formal discussions on their learning process, which subsequently provide information that is rarely recorded or documented in a written form. Therefore, individual viewpoints shared by interviewees in this educational documentary provided insight into the active processes of acquiring knowledge and skills of Zulu beading.

By analysing the educational documentary, the study aims to provide a real-life example that helps to understand how beadwork concepts and theories related are applied in practice. This analysis also includes factors and variable social interactions that influence knowledge transmission related Zulu beading and the learning outcomes. This includes an analysis of the learning journey to identify traditional strategies for teaching and learning within the culture of communal practice. The research later investigates how these teaching and learning strategies can be augmented in a digital learning environment. Through the case study, the possibility of intergenerational knowledge transfer in a digital learning environment will be explored. Ultimately, this exploration aims to provide insight into traditional strategies for enabling authentic learning experiences to address the possibilities of simulating similar learning experiences in a digital learning environment.

The information gathered from this research has been used to address both the traditional concepts and the application of procedural knowledge related to traditional concepts of Zulu beadwork. Knowledge collection has been done to provide comprehensive knowledge and present a discussion focusing on beading traditions in Zulu society and their indigenous ways of learning. This overview is significant for the study as each chapter focuses on traditional beading skills and knowledge as well as the impact it has on various communities within Zulu society. Additionally, the information has been used to analyse and interpret the findings of this study. By drawing on the findings, connections between the chapters were created to form a cohesive narrative that addresses the four objectives of this study, which focus on the cultural practice and traditions of beading. The study identifies a traditional framework for authentic learning, explores professional digital practices for learning in a digital environment, and later frames opportunities for enabling authentic learning experiences in a digital environment. Consequently, the information gathered has been used to provide a thorough exploration of Zulu beading by exploring its multifaceted nature. As such, the findings provide knowledge that serves as the foundation research base for the study.

Through exploration of the multifaceted nature of the Zulu beading practice using a qualitative research approach, this study aims to address different aspects that contribute to enabling authentic learning in digital environments. The decision to follow a qualitative approach has been influenced by the richness of the information obtained through archived resources addressing both the past and current contexts. As such, the research looks at Zulu

beadwork literature from a historical perspective to be cognizant of time and space. This is especially important for the stance of this research as the focus is on teaching and learning Zulu beadwork traditional knowledge and skills. Documentation of the Zulu beadwork traditional knowledge is constantly evolving but uses the past as a reference point to position the future of the practice. Therefore, the findings of this study are significant for identifying professional digital practices that can be used to access and maintain indigenous knowledge such as the Zulu beading practice without losing the authentic way of sharing the knowledge in a traditional sense. The position of Zulu beadwork as indigenous knowledge is explored in the chapter that follows.

Chapter 2: Zulu beadwork as indigenous knowledge

Zulu beadwork as indigenous knowledge is significant in the lives of indigenous Zulu people. For many centuries, Zulu beadwork has provided traditional communities with a means to communicate cultural information without written language. As with any creative practice, an underlying philosophy of education determines principles of knowledge. Therefore, to better frame my position on the Zulu beadwork philosophical knowledge, I refer to writers such as Peters, et al., (2005) who have explored the definition of philosophy. These writers state that philosophical knowledge generally addresses the nature of all possible knowledge that exists for teaching and learning (Peters, et al., 2015, p. 1). Peters, et al., (2015) state that these philosophies are determined by true beliefs of teaching and learning knowledge, thereby providing guiding principles for indigenous ways of knowing (Peters, et al., 2015, p. 1).

For this reason, the concept of indigenous education is frequently viewed as a field that draws on historical contexts and connects it to knowledge creators (Peters, et al., 2015, p. 1). This means that to gauge knowledge of Zulu beadwork, it would be important for aspiring practitioners to understand the historical context of communities as it provides a criterion for the constitution of knowledge. Therefore, the criterion of acquiring indigenous knowledge about Zulu beadwork determines how it is used and accessed within communities and what needs to be conserved for the sustainability of that knowledge. Hence, this chapter explores

the criterion for what constitutes as indigenous knowledge of Zulu beadwork by unpacking the art and traditions of beading.

Examining the role of Zulu beadwork within the Indigenous Knowledge System (IKS) framework allows for a deeper understanding of how this art form is passed down through generations while serving as a cultural conservation method. The Zulu beadwork IKS framework highlights conceptual ideas and creative techniques to create intricate designs and patterns that have been passed down for generations. This includes the association of beadwork craftsmanship with a community's theoretical notions such, as traditional beliefs and values. By understanding this connection, one can recognize the significance of Zulu beadwork beyond its aesthetic value. The Framework provides insights into this tradition's social, economic, and spiritual significance within Zulu communities. This holistic approach to teaching and learning Zulu beadwork that allows for a more comprehensive understanding of the complexities and richness of Zulu beading practices is explored in the next section.

2.1 The art of beading

As with any creative practice, understanding the traditions of beading requires knowledge of the historical context of the society from which the art originated. This is because beadwork is an art form that is rich in history and holds significance in communities of various ethnic groups for numerous cultural reasons. Among many ethnic groups, the art of making beadwork has been practiced for generations among communities within the Zulu society. Beadwork has been a part of Zulu culture since 2300 BC, when they began making beads out of organic materials including seeds, shells, and bones (Nettleton, 2015, p. 1). Later in the mid-11th century, the Zulu society started using glass beads, which emerged because of trade to Southern Africa from Europe, China, and India (Taylor, n.d.). As the beadwork became more accessible, it became valuable in creating cultural artifacts that served different purposes within Zulu society. This led to clans embracing new beading techniques and developing complicated shapes that embodied cultural beliefs. The process of creating traditional beadwork involves attaching beads to other objects using a needle and thread to create meaningful forms and patterns.

Common indigenous Zulu beading practices involve beading techniques such as stringing, off-loom bead weaving, wire wrapping with beads, and meticulous embroidery using colourful

beads (Vanbenschoten, 2019). The process of stringing beads involves adding beads to any type of material such as thread, leather, and beading wire thereby producing single or multiple strands that make a tailored wearable art form. On the other hand, off-loom beading involves using a needle and thread to stitch tiny beads together thereby creating an intricate chain or fabric of beads to make jewelry, embellish utensils, and other items. Bead embroidery involves stitching or sewing onto a fabric to make a quilt. Another technique that involves wrapping beads using wire instead of string is called wire wrapping (Vanbenschoten, 2019). Consequently, communities use specific beading practices to create intricate pattern designs and forms that function as cultural artifacts. This beading practice is a skill that involves the use of intricate techniques and materials to create unique and intricate artifacts. As a result, the process of making artifacts requires a specific method for completing a particular task for the execution of creative ideas when making Zulu beadwork.

Consequently, the art of Zulu beading is meticulous and involves a deep understanding of concepts, materials, tools, and techniques for creating beadwork forms and patterns. This is because this meticulous process of creating Zulu beadwork often begins with ideas that are then translated into tangible forms. Each step of the creation process is executed, from selecting the finest beads to perfecting the method of making traditional beaded forms. This intricate design process is often not formally documented as it is an active cultural practice that is shared verbally across generations. Despite the lack of documented knowledge about the Zulu beading practice, the guidelines for creating the Zulu artworks are aligned with Shepard's ideas of knowledge categories for the process of making craftsmanship. According to Shepard (2020), the process of making craftsmanship involves understanding three categories of knowledge namely *Techne*, *Phronesis*, and *Episteme* (Sheposh, 2020). The following sections discuss the characteristics of each category of knowledge transfer and their relevance to Zulu beadwork. The order of discussion of the three categories is guided by the order of the process followed to construct the artwork, which starts with the *Techne*, followed by the *Phronesis*, and lastly the *Episteme*.

2.1.1 Understanding the *Techne* knowledge of beading

The first step to creating traditional Zulu beadwork artifacts starts with understanding the art of *Techne*. The *Techne* concept describes knowledge relating to a skill or technique for a specific craftsmanship (Sheposh, 2020). Even though the concept is often associated with

practical skills, in the context of this study *Techne* refers to knowledge that guides people's understanding of principles for making artifacts with a particular objective in mind (Sheposh, 2020). In the case of Zulu beading practice, the *Techne* knowledge provides a theoretical component to art-making processes. The theoretical component enables creatives to judge actions for the application of foundational knowledge in a relevant context (Massingham, 2019, p. 1). This foundational knowledge provides individual judgment of actions for the application of knowledge (Massingham, 2019, p. 1). In the context of beading practice, *Techne* involves a theoretical component in which practical dimensions of judgments are applied in a relevant context. As such *Techne* supports community perspectives on indigenous ways of knowing by aligning the creation process with traditional knowledge. The community's way of knowing is underpinned by philosophies that are embedded in cultural practice. For this reason, indigenous people of the Zulu society adapt distinctive methods to encode useful traditional information within their beading practice.

To better frame my position on the relationship between the community's cultural norms and its traditional beliefs, I refer to writers such as Sewell (2005) who have explored the definition of culture in which they state that the concept of culture is distinguishable by two fundamentally different meanings of the term (Sewell, 2005, p. 39). Sewell (2015) states that the first meaning of culture refers to a theoretically defined aspect of social life extracted from the complex reality of human existence in which it is situated (Sewell, 2005, p. 39). However, the abstract categories of social interaction may include what is not culture such as economy, politics of identities, and other social factors (Sewell, 2005, p. 39). In contrast, the second meaning of culture refers to the concrete bounded by the world of beliefs and practices of a society (Sewell, 2005, p. 39). Therefore, culture is identifiable through sub-societal groups from which these beliefs and practices are adopted. In addition to common descent, elements of common culture include language, religion, customs, dress code, crafts, and many other elements that contribute to traditions that make up community knowledge (Reuter, 2003). As such, the value of beadwork in the Zulu society includes creating beadwork as a form of communicating artistic expression, and ornamentation of identities, and it extends to the economic empowerment of the Zulu society. Hence, cultural practices play a key role in the development and maintenance of cultures and contribute to the mediation of people's experiences and everyday life in any society (Chahine & Kinuthia, 2013, p. 4).

The structures of social systems provide opportunities for making meaning of Zulu beadwork within the frame of Indigenous Knowledge Systems. The body of knowledge builds up through generational experiences by people living in a particular environment ensuring that it is specifically adapted to the requirements of local conditions (CHM, 2013, p. 5). Hence, local knowledge is internalised through culture and adapted externally through trial-and-error experiments within the local conditions of a community. This knowledge includes a set of knowledge, skills, and traditional technologies that exist within local communities (Noyoo, 2007). Hence, knowledge is developed around the specific conditions of indigenous people in a particular geographic area (Grenier, 1998, p. 1). These conditions are common among the Zulu-speaking people in the wider region and make a community unique. Subsequently, they influence traditions adopted as customary practices by individual communities within the Zulu society and have continued to be followed to sustain knowledge. As such, the philosophies of indigenous knowledge support ways of knowing by providing theoretical concepts for contextualising information about the art of traditional Zulu beading.

The role of indigenous knowledge in communities promotes the Zulu cultural beliefs that are unique to specific communities living in a particular region. Consequently, the foundation of *Techne* knowledge ties Zulu beading processes into the philosophical thought of communities. These philosophical thoughts provide a conceptual understanding of beadwork that comprises intellectual work, which guides the Zulu society on what is important to know about beadwork. This includes how beadwork is created for cultural appropriation. These guidelines provide perspectives into best practices for creating traditional beadwork within a relevant context that supports the traditions of communities within the Zulu society. These philosophical thoughts embody theoretical concepts that provide conceptual knowledge comprising traditional Zulu beadwork, encompassing cultural standards integrated into traditional beliefs. In addition to a way in which the Zulu society uses knowledge for artistic expression, conceptual knowledge enables the Zulu society to create meaningful artifacts that are in line with various community traditions. Therefore, the process of creating Zulu beadwork forms and patterns involves the application of traditional knowledge in a tangible form. The procedure is linked to the second category of knowledge referred to as the '*Phronesis*'. Characteristics of this phase and its association with beadwork are explored in the section that follows.

2.1.2 Applying the *Phronesis* knowledge in beading

Generally, '*Phronesis*' describes the practical aspect of representing knowledge gained through the *Techne* phase (Sheposh, 2020). Hence, the *Phronesis process* is aimed at enabling people to make decisions necessary for the application of knowledge in particular situations (Sheposh, 2020). In essence, *Phronesis* presents a component in which the interaction between general (theory) and practical (judgment) is intertwined (Massingham, 2019, p. 3). This wisdom emerges from a cohesive relationship between community traditions and the individual input, to enable the application of knowledge in a relevant context. In the case of Zulu beading practices, the cognitive aspect of knowledge in the *Phronesis* stage is connected to the theoretical concepts presented in the *Techne* stage. Subsequently, the *Phronesis* phase links traditional knowledge about the function and purpose of Zulu beadwork. Therefore, the *Phronesis* phase is concerned with conceptualising the theoretical concepts and aligning them to the aesthetic criteria of traditional Zulu beadwork.

The broad description of the aesthetic standards of beading describes how artists portray their subject matter and *how* they express their vision (McArdle, 2022). Similarly, in order to practice beadwork, the Zulu society follows a unique vision of art that allows them to express themselves through visual communication. The artistic expression of Zulu beadwork follows the 'Zulu vision in art', which describes all manner of artistic expression and artistry unique to traditional forms created by artists from different communities within the Zulu society (Addleson, 1990, p. 60). The 'Zulu vision in art' is driven by many aspects such as humor, observation of nature, imaginative use of material, sense of rhythm, and the use of patterns and articulation of colour (Addleson, 1990, p. 60). Subsequently, influencing the artistic manner in which beaded patterns have been carefully approached, displays an intriguing expression of self and culture through design that makes the beadwork an aesthetic experience for those who perceive it.

To achieve the aesthetic experience, the Zulu society can create abstract patterns consisting of shapes representing simplified versions of real objects or use graphic shapes such as geometric patterns. The graphics used in Zulu beadwork may be presented in two-dimensional (2d) forms, which are flat shapes such as the geometric patterns embedded in Zulu beadwork, or in three-dimensional (3D) forms, which are solid shapes that present a sense of length, width, and height. Both the 2D and 3D forms are used to simplify aesthetic

ideas. The context of the Zulu beading involves the creative use of graphic aesthetic designs (Philips, n.d.). The use of geometric shapes for artistic expression is connected to the philosophical thoughts of a community, which aim to fulfill the ornamentation of the human body to represent the identities and culture of the indigenous people in Zulu society. Therefore, identities and culture are a reference point for creating traditional beadwork artifacts. As a result, the approach to adapting visual communication follows the broader vision of South African art characteristics, which is a very expressive culture that reflects a group of creatives.

Groups of South African creatives often come from a common background and collaborate on producing distinctive work that is in line with the experiences and views of their particular society (Jager, 1987, p. 209). These experiences and views draw on the personal, emotional, or social opinions of artists to inspire forms and concepts that are translated into aesthetic or visual language (Jager, 1987, p. 212). Therefore, what is perceived as art is a form of communication (in the Zulu society) where visual expression is realised through *Phronesis* as a practical presentation of knowledge. This is because *Phronesis* enables the Zulu society to apply traditional knowledge practically through the beading practices. The approach to designing Zulu beadwork patterns and forms intends to meet traditional needs outlined in *Techne* knowledge. As such, the creation of beadwork employs a methodical process that is driven by theoretical concepts (the *Techne*, outlined in the previous section) and the need to address practical communication demands (the *Phronesis*). However, the art and design of Zulu beadwork may intersect as they both embody some form of creativity such as the finer aesthetic details.

The finer details of the aesthetic criteria contributing to creating messages are communicated through a visual language. This language focuses on the design of Zulu beadwork patterns in a specific context that supports the traditional beliefs and values of varied communities within the Zulu society. By adopting the three concepts of Zulu beading namely; communication, ornamentation, and the economic aspect of beadwork, the Zulu society follows a unique artistic style associated with a particular community. These artistic styles describe how artists portray their subject matter and *how* artists express their vision (McArdle, 2022). For this reason, artists express and depict their visions Zulu beadwork in many ways. Therefore, knowing the aesthetic criteria of Zulu beadwork helps to understand

processes for designing patterns that function as visual communication. However, there is a way in which the Zulu society applies knowledge for artistic expression. This process involves referencing traditional beliefs for the creation of beadwork that supports communication, ornamentation, and economic aspects of the Zulu society. This design process is connected to the second category of knowledge described as the '*Episteme*', which focus on mastering the beading process. The next section delves into the characteristics of the *Episteme* phase and its connection to the Zulu beading practice.

2.1.3 Mastering the *Episteme* knowledge of beading

By definition, *Episteme* refers to the scientific knowledge gained from observation and literary study (Sheposh, 2020). This category of knowledge acquisition refers to the professional application of knowledge distinguished by the sound capacity to apply concepts in good practice (Massingham, 2019, p. 3). Good practice involves complex decision-making, which is supported by a variety of contexts highlighting significant intentions and values of its function (Massingham, 2019, p. 3). In this study, the concepts discussed by Massingham refer to the traditional approaches of creating beadwork as cultural artifacts. The Zulu society uses *Episteme* knowledge to conceptualise the design of artifacts when making traditional beaded forms. Therefore, *Episteme* knowledge is attained by creating intricate Zulu beadwork patterns and forms. During practice, communities develop techniques and procedural knowledge for completing sophisticated Zulu beadwork forms and patterns. In the process of making beaded artifacts, the Zulu society adopted the practice of using codification, geometry, and algorithms to create their traditional beadwork forms. As such, the creation of Zulu beadwork follows Ethnomathematics in art making.

Ethnomathematics is a concept that draws on the belief that indigenous people have been accumulating knowledge through history and traditional activities to respond to their needs (Chahine & Kinuthia, 2013, p. 2). Research by Chahine & Kinuthia (2013) shows that *Ethnomathematics* guides the beading process to create meaningful artworks in the Zulu society (Chahine & Kinuthia, 2013, p. 1). The concept of *Ethnomathematics* reported by Chahine & Kinuthia (2013) refers to the rhetoric art process of persuasion through communication that interplay among mathematics, cultural anthropology, education, and politics (Chahine & Kinuthia, 2013, p. 1). Thus, rhetoric art is an established discipline that

focuses on persuasion, which is used in constructing scientific knowledge, both in its oral and written forms (Chahine & Kinuthia, 2013, p. 1). Therefore, the art of Zulu beading falls under the category of rhetoric art as it involves a form of scientific knowledge used in the creation of forms and patterns. The scientific knowledge embedded in the practice of beading includes cultural aspects such as jargon, codes, symbols, myths, and even specific ways of mathematical reasoning (Chahine & Kinuthia, 2013, p. 1). As a result, this scientific knowledge contributes to the mathematical reasoning of the beading procedure that refers to the rhetorical art of the Zulu society.

Generally, rhetoric art uses the logic of cultural mathematics that encompasses vocabulary, grammar, and syntax to express the meaning of beadwork patterns (Walsh & Billig, 2014). Subsequently, the rhetoric art process requires people to be articulate in the art of beading to produce meaningful artworks. In the case of using rhetoric art to create traditional Zulu beadwork, the art of Zulu beading refers to visual communication codified through geometric shapes or colours and context for symbolic meaning. However, a deeper understanding of mathematics is also reflected in the fundamental nature of Zulu beading practice when creating patterns and forms. For instance, indigenous people follow a particular beading technique to complete a pattern that requires counting beads and following a particular algorithm to create the artwork. Indigenous people could do this without writing; it was practiced among cultural groups to master precision. To achieve similar beading techniques, the Zulu society adopts the *Ethnomathematics* concept by examining mathematical ideas that exist in beading practice within the culture of communal practice.

According to Chahine & Kinuthia (2013), the Zulu society adopts *Ethnomathematics* as technology for the practice (Chahine & Kinuthia, 2013, p. 3). *Ethnomathematics* can be applied to adapt cultural ideas implemented by indigenous people within local environments (Chahine & Kinuthia, 2013, p. 3). The *Ethnomathematics* used by the Zulu society capitalise on the riches cultivated from cultural practices and heritages. This includes traditional belief systems that support the idea that all people are capable of doing mathematics from their unique and personal perspectives (Chahine & Kinuthia, 2013, p. 3). Therefore, indigenous communities in Zulu society use unique mathematical and practice systems developed by the society to create beaded artworks. Examples of mathematical ideas in indigenous communities include symmetry for patternmaking in the Zulu society. The symmetry for

pattern making is based on the history, structure, mode of expression, and dissemination of knowledge mathematics related to beadwork within the Zulu culture. Therefore, when creating forms for communication, the Zulu society refers to the common descents of *Ethnomathematics* knowledge, which involves encoding colours among other things, to communicate meaning.

The process of creating beadwork for communication involves using number systems, folk games, puzzles, kinship relationships, divination systems, and symmetric strip decorations incorporating their natural mathematical patterns (Chahine & Kinuthia, 2013, p. 3). As a result, the connection to *Ethnomathematics* deepens the understanding of the Zulu beading procedure and considers the cultural differences and political dimensions of mathematics for creating patterns and forms (Chahine & Kinuthia, 2013, p. 2). As a result, the *Ethnomathematics* presented in Zulu beading practice is an inherent component of indigenous knowledge systems defined by the knowledge holders who are indigenous people from Zulu society. Therefore, *Episteme* knowledge is essential for completing beadwork forms that function as cultural artifacts supporting communication, ornamentation, and economic aspects of Zulu society.

Considering the topics covered in this section, the concepts of *Techne*, *Phronesis*, and *Episteme* provide a methodological framework for understanding knowledge in various knowledge domains of beading in Zulu society. *Techne* emphasises philosophical thoughts that provide a conceptual understanding of beadwork, which comprises intellectual work that guides the Zulu society on what to learn about beadwork. *Phronesis* highlights the practical application of *Techne* knowledge in a relevant context and ethical decision-making. Whereas *Episteme* focuses on scientific knowledge for creating Zulu beadwork forms and patterns. The context presented in the *Phronesis* phase is particularly used to convey the artistic expression of a message through symbolic communication within a relevant context that improves the livelihoods of the Zulu society. This context includes 1) contextualizing Zulu beadwork in communicating messages, 2) making ornaments to represent individual identities and culture and 3) adding economic value to improve the livelihoods of indigenous people in the Zulu society. Therefore, the three categories of knowledge (*Techne*, *Phronesis*, and *Episteme*) constitute a criterion for creating traditional Zulu beadwork that fosters creativity and innovation of traditional knowledge.

By recognising the interconnections of the three categories of knowledge, the Zulu society creates meaningful artifacts that align with community traditions. Hence, embracing a holistic approach that integrates the three categories of knowledge namely *Techne*, *Phronesis*, and *Episteme* leads to a nuanced perspective on the multidimensional complexities of knowledge on Zulu beading and application of knowledge in different contexts. However, there is a way in which the Zulu society applies the framework for artistic expression to create meaningful artifacts. Therefore, the next section explores how communities adapt the framework to create beadwork that serves different functions in Zulu society, by examining the traditional of beadwork.

2.2 Beading threads of traditions through art

For many centuries, the methodological framework of Zulu beading (discussed in section 2.1 of this study) as an indigenous knowledge system has been significant in the lives of indigenous people of the East Coast of what is now titled Southern Africa. The beads are of value in creating intricate beaded forms for threading cultural aspects of the Zulu society. In the Zulu society, the methodological framework for Zulu beading can be seen as the driver of cultural practice when creating artifacts that function as symbols of communication, ornamentation to express identity, and a tool for economic empowerment. Therefore, Zulu beadwork fundamentally serves as an avenue to communicate messages among community members in the Zulu society. Second, Zulu beadwork is used for ornamentation to promote the social status and social standing of the wearer in Zulu communities. Lastly, the economic value addition aspect of Zulu beadwork improves the livelihood of indigenous people in their communities. The value of these three functions of beadwork in Zulu society fosters the continuation of the beading practice for the sustainability of the Zulu beadwork indigenous knowledge. The following sections describe how Zulu society that has adapted the methodological framework of beading to create artifacts that serve communication, ornamentation, and economic value. Therefore, this study has designed a Zulu beading methodological framework that comprises the *Techne*, *Phronesis*, and *Episteme* as the three categories of knowledge that provide traditional communities with means to communicate cultural information in the absence of written language.

2.2.1 Beadwork as a form of expressive communication

Beadwork plays a key role in the development and maintenance of cultures. To date, Zulu beadwork as a form of expressive communication is significant in Zulu society. It has provided traditional communities with a means to communicate cultural information in the absence of written language. Hence, Zulu beadwork speaks across time and space by employing a symbolic language, which makes use of colour and patterns (Graffini, 1995, p. 1). The Zulu society practices traditional beading to foster the adaptation of ideas beyond the natural and socio-cultural environment (Chahine & Kinuthia, 2013, p. 4). However, there is a particular way in which the Zulu society creates beadwork to convey specific messages and provoke specific emotions.

To ensure that beadwork forms align with traditions, the Zulu society refers to *Phronesis* knowledge, which focuses on applying the relevant aesthetic criterion to communicate messages based on traditional concepts presented in the *Techne* phase. The Zulu society can use standardised colours for communication. Therefore, interpreting and decoding beadwork messages is complicated by the wealth of proverbs rich in linguistic logic and metaphors embodied in the culture of a community. However, each piece has a different message that depends on the combination of markings and symbols combined presented in it. In addition to using shapes, colour contributes to making sense of the message being communicated through symbolic meanings. As a result, the Zulu society creates beadwork patterns that incorporate the art of encoding messages through graphic shapes and colours as a method of displaying human expressions.

To archive symbolic communication, the Zulu society refers to the *Episteme* phase for completing artifacts. The *Episteme* phase involves the idiomatic language of beads and its infusion with the philosophy of Zulu beading codes (Graffini, 1995, p. 5). Many colours and forms are used to create the vocabulary and grammar of that code. The colours are arranged into "families," where each family denotes an idiomatic word. The context of the bead arrangement largely determines the latitude of its meaning. As the beads are a work of art, artistic demands can precede over the messages' primary purpose (Graffini, 1995, p. 5). This is because the use of colours and forms has no fixed definition in Zulu society. However, the beadwork colours are purposefully coded to convey meaning, and the meanings of the

messages are intended to be decoded by the receiver of the beadwork or the spectators (Graffini, 1995, p. 5). This intricate design process of beadwork can be seen as 'puzzles' presented in a pattern to communicate relevant messages through visual communication as an implicit rather than texturally coded language (Graffini, 1995, p. 5).

To decode the mysteries of the beadwork 'puzzles', one must understand associations of colours within a particular community within Zulu society. This includes understanding the traditions and functions of the beadwork of a particular community within the Zulu society. In this instance, indigenous people from the Zulu society refer to traditional methods for creating Zulu beadwork forms as visual communications representing an intercultural visual language (Chahine & Kinuthia, 2013, p. 10). The system for visual communication serves as a mode of information dissemination, an embodiment of thought and belief systems drawn from lived experiences (Chahine & Kinuthia, 2013, p. 10). As such, the codification of colour and shapes is done according to the system that enforces rules for its use. This enables the Zulu society to implement this logical reasoning for embedding meaning in beaded artworks. Without this understanding, it is not easy to decode or decipher the message. *Ethnomathematics* capitalizes on the richness cultivated from cultural practices, heritage, and beliefs connected to indigenous knowledge and a community's way of knowing. As such, the arrangement of graphic shapes can be used to communicate symbolic communications, where the meaning of messages can be decoded by understanding the context and the purpose of Zulu beadwork within communities.

The aesthetics of Zulu beadwork play an important role in designing traditional beadwork that align with the traditions of a community. Therefore, the Zulu society follows a system of highly developed procedures that focus on the encoding of colour to complete beadwork forms and patterns that adorn human bodies. This includes the choice of material for completing beaded forms. In conjunction with the physical and material texture of the pattern, Chahine & Kinuthia (2013) suggest that interpreting the asymmetrical arrangement of colours explains the vertical or horizontal symmetrical arrangement of colours conveyed by Zulu beadwork messages (Chahine & Kinuthia, 2013, p. 10). The synergy of texture, geometric patterns, and colour combinations, therefore, provides information that is visually synchronized and transmitted as a message to the viewer as symbolic patterns (Chahine & Kinuthia, 2013, p. 10). Common symbolic patterns are often constructed from the triangle. Therefore, the

triangle is a basic template unit used to create a signature pattern that beadwork creatives can use to experiment and explore the symmetry of patterns (Chahine & Kinuthia, 2013, p. 10).

When beadwork is used to communicate, *Techne*, *Phronesis*, and *Episteme* are used as a methodological framework for creating beadwork forms that convey the intended messages. The *Techne* knowledge involved in creating beadwork for communication purposes is an integral part of traditional beliefs and values of the Zulu society. The process of creating traditional Zulu beadwork as the language of communication, through *Phronesis*, guides the ability of Zulu beadwork to serve as a cultural unit attached to beaded artifacts. The creation of traditional Zulu beadwork is done through *Ethnomathematics*, which is a traditional method of encoding colour as a symbolic form associated with making Zulu beadwork. Therefore, adapting the three categories of knowledge (*Techne*, *Phronesis*, and *Episteme*), enables a framework that provides traditional communities with means to communicate cultural information in the absence of written language.

2.2.2 Expressing identities through beadwork ornamentation

Beadwork has remained significant for its role in expanding cultural identities by communicating information about the identity of wear without written language. To archive this communication, the technique of ornamentation refers creatives to common descents of traditional knowledge that make up individual and collective identities. The common descents of traditional knowledge refer to processes of creating beadwork for ornamenting human bodies. According to Boram-Hays (2005), beadwork was originally adopted as bodily adornments worn by men and women (Boram-Hays, 2005). The adornments signify the social class, political connections, tribal identity and cultural beliefs of the wearer. In some cases, the adornments are worn throughout an entire stage of life to communicate personal, and social information about the changing status of the wearer within their local communities (Boram-Hays, 2005). In the Zulu tradition, different adornments exist for male and female bodies within traditional communities (Nettleton, 2014). In addition to wearing adornments, male and female wearers can wear beadwork with traditional attire to express their identity by wearing traditional costumes, thereby communicating identities through nonverbal communication. It is important to highlight that communication and adornments are

intertwined. Therefore, traditional costumes contribute to a coded form of expressing identities.

For instance, Zulu beadwork attires and body ornaments are used in traditional ceremonies, marriage celebrations, and rites of passage from childhood to adulthood. An example of the rite of passage is usually *umemulo* (the puberty ceremony), where the Zulu girls perform and signal, symbolising their entry to womanhood (Mntambo, 2020). Beadwork is also worn during Zulu reed festivals like *Umkhosi Womhlanga* (Reed dance), showcasing culture and heritage. These cultural events, including dance, music, art, and craft, serve as communication channels for sharing knowledge (Nkosi, 2019, p. 1). The beadwork tradition continues as living art that is still largely popular in many traditional communities in the Zulu society. This cultural information is crucial for conserving practices and connecting with roots to ensure that knowledge is inherited for cultural continuity and adaptation. Therefore, the value of the beading practice in Zulu society has remained a significant tradition that supports the creation of artifacts for both ritual and functional purposes throughout the years. This means that beadwork worn in ritual and celebration events contributes to traditional costumes adapted to traditions in the Zulu society.

Therefore, the beadwork practices are derived from traditions acquired through behaviour and are concerned with making meaning of beadwork coupled with traditional outfits to represent the identities of the wearer. According to Boram-Hays (2005) states that traditional outfits are a 'coded sensory system of nonverbal communication that aids human interaction in space and time' (Boram-Hays, 2005, p. 38). This means that the traditional attires represent history and the era in which the wearer has existed as well as the position of the individual within that society. Ideas of how people are relating to others are included in the garments and ornaments, thereby representing the dynamic complexities of identities through artistic expressions. The use of beadwork as a signifier is directed at the spectator to communicate the identity and status of the wearer. (Boram-Hays, 2005, pp. 38-40). This allows people to connect with their culture and represent a sense of belonging within the community (Fashion revolution, 2017). By wearing traditional clothes, indigenous people can highlight individual identities in line with community beliefs. Boram-Hays (2005) states that identity is important because it gives people an idea of who they are and how they relate to others in society and the world they live in (Boram-Hays, 2005, p. 38).

It is, therefore, important to note that the articulation of Zulu beadwork is not simply an attraction of colour but also speaks of the ethnic identity of a culture and region. Therefore, the formulation and articulation of identity through beadwork is complex at the level of the individual identity as well as the community in which an individual originates. This is because the identities of individuals within their communities are simply not static and definite but are rather complex and flexible as they represent dynamic people relative to society's progression. According to Hall (1994), the culture of a society is linked to people's identity as an ongoing 'production' that is never complete (Hall, 1994, p. 222). The "production of knowledge is always in process and always constituted within and not outside representation" (Hall, 1994, p. 222). Therefore, people's identities make up an important part of the self-concept. These identities are broken down into three main categories, which are personal, social, and cultural identities (Libraries, n.d.). These categories are distinguishing features that inform perspectives of people's identities. Hence, for an individual to identify as one that belongs to a specific culture, they must first discover their interest and then choose a purpose for living in line with the family and community values.

At the same time, people's interactions with each other in their communities help shape and establish their identities (Boram-Hays, 2005). In other words, individual identities are also tied to cultural identities and influence each other. The formulation and articulation of identities through beadwork is therefore complex for both individual and community identities. The significance of personal circumstances and community beliefs has proven to be particularly relevant to what has already been addressed in this study. Therefore, the role of traditional beadwork is to expand these identities to communicate information about the identity of the ornament in the absence of the written language. The common descents of *Techne* for ornamentation of human bodies involve personal and family values as well as how individuals identify themselves within the varied groups of the Zulu society. To some extent, beadwork artifacts are not fully determined by community traditions but also adhere to the personal circumstances of their use or function. For this reason, the artistic expression of identities through beadwork demonstrates the adaptability of the art. As such, Zulu beadwork connects traditional beliefs to art by providing a means to express cultural beliefs that facilitate community identities. The power of art to convey cultural values and maintain community

identities through symbolic representation that serves the purpose of adorning human bodies.

To archive symbolic representations for adorning human bodies, the *Phronesis* of ornamentation refers to the creative process of making beadwork that aligns with the aesthetic criterion and embodied knowledge to meet the needs for creating ornaments as a form of communication as well as representing individual and collective identities within the Zulu society. As a result, communities draw inspiration from the '*Zulu vision in art*' to create beadwork styles that represent individual and collective identities. For instance, the use of colour combinations is identifiable according to geographic regions connected to a local community such as the Umzansi style from the Msinga area in KwaZulu-Natal (KZN). This style could be easily distinguished using a combination of colours such as light green, white, red, and dark blue (Boram-Hays, 2005, p. 41). The Umzansi style therefore exhibits the cultural beliefs of the Msinga area amongst many different communities in KZN. Hence, beadwork styles were developed to foster unique cultural identities for regional communities through creative practice. Thus, the formulation of symbolic meaning is closely linked to the culture of a community. This means that only those who understand the culture can decode this symbolic representation to interpret messages. Not only does colour communicate a message but also the colour combinations are unity to a community; they formulate identities unique to a community. As a result, the Zulu society draws from traditional concepts of ornamentation to create meaningful artworks to adorn male and female bodies.

To adorn human bodies, the Zulu society uses beadwork that can be worn with traditional attire to express their identities. This is accomplished by dressing traditionally to complete the look through nonverbal communication. The relationship between adornments and communication is therefore vital in creating beadwork that represents identities. According to Boram-Hays (2005), traditional outfits are a 'coded sensory system of nonverbal communication that aids human interaction in space and time' (Boram-Hays, 2005, p. 38). This means that traditional attires represent history and the era in which the wearer has existed as well as the position of the individual within that society. Ideas of how people relate to others are included in the beadwork design. Consequently, the Zulu society follows an inclusive approach by representing diverse identities through artistic expression, and as such, using Zulu beadwork as a signifier is directed at the spectator to communicate the identity

and status of the wearer. (Boram-Hays, 2005, pp. 38-40). This provides opportunities for people to connect with their culture and represent a sense of belonging within a community (Fashion revolution, 2017).

By wearing traditional clothes, indigenous people can display individual identities in line with community beliefs. Boram-Hays (2005) states that identity is important because it gives people an idea of who they are and how they relate to others in society and the world in which they live (Boram-Hays, 2005, p. 38). In this regard, it is important to note that the articulation of Zulu beadwork is not simply an attraction of colour but also speaks of the ethnic identity of a culture and region. Ethnic identities are signified by factors such as shared historical experiences, myths, a common culture, and a link to a geographic location, which the group may or may not inhabit at the time (Reuter, 2003). Hence, the construction of these identities has given the Zulu-speaking people a visible presence in the wider region, which is represented through beaded adornments that serve to communicate multiple voices that make up the Zulu society. Therefore, Zulu beadwork styles and traditional attires have evolved into an important part of culture and identity of a variety of communities within Zulu society.

Similarly to the process of creating beadwork for communication, the Zulu society refers to the *Episteme* phase for completing artifacts. This is because the concept of ornamentation involves the use of colours and shapes to represent human bodies and communicate a message about the wearer. As discussed in the previous section of this study, the Episteme phase involves the idiomatic language of beads infused with the philosophy of Zulu beading codes (Graffini, 1995, p. 5). Many colours and forms are used to create the vocabulary and grammar of that code to formulate regional styles. The colours are arranged into "families," where each family denotes an idiomatic word that represents community identities. The context of the bead arrangement largely determines the latitude of its meaning about the status of the wearer. As the beads are a work of art, artistic demands can take precedence over the messages' primary purpose (Graffini, 1995, p. 5). This is because the use of colours and forms has no fixed definition in Zulu society. However, the beadwork colours are purposefully coded to convey messages about the status of the wearer, and the meanings of the messages are intended to be decoded by the receiver of beadwork or spectators (Graffini, 1995, p. 5). The intricate design of a pattern communicates relevant messages through visual

communication as an implicit rather than textually coded language (Graffini, 1995, p. 5). This means that Zulu beadwork styles can be seen as symbolic communication presented in the form of a pattern to communicate relevant messages about the wearer.

In addition to using colours, the *Episteme* of ornamentation involves using graphic shapes such as triangles to simplify ideas. For example, the signature pattern of a triangular shape is a general representation of the father, mother, and child unit, whereby the way the triangle is placed communicates different messages (Tinte, 2016). If the 'triangle' points down, it represents an unmarried woman, whereas a triangle pointing up represents an unmarried man. Two triangles joined at the base represent a married woman and two triangles joined at the points in an hourglass shape represent a married man (Tinte, 2016). This means that the symbolic interpretation of the triangle is assigned according to its angle and direction. The standard use of the triangle, therefore, provides guidelines for representing simplified versions of visual language to communicate ideas (Moulton, 2022). Geometric shapes in triangle patterns significantly represent male-female relationships and social interaction through visual language. In some cases, there is added meaning where beads are used for eloquent communication to express feelings during romantic relationships (Biyela, 2015, p. 469). As such, the meaning of visual language is not standard across all communities within Zulu society but can be tailored according to the communication demands of the wearer. Therefore, the combination of both shapes and colours is of value in communicating messages using beadwork.

In this case, of using beadwork for ornamentation, *Techne*, *Phronesis*, and *Episteme* are used as a methodological framework for creating beadwork forms that convey intended messages. The *Techne* knowledge for creating beadwork for communication purposes is an inherent component of traditional beliefs and values of the Zulu society. The process of creating traditional Zulu beadwork that serves communication purposes through *Phronesis* guides how beadwork serves as a cultural unit attached to beaded artifacts. The creation of traditional Zulu beadwork is done through *Ethnomathematics*, which is a traditional method of encoding colour as a form of symbolism associated with making Zulu beadwork. Adapting the three categories of knowledge (*Techne*, *Phronesis*, and *Episteme*), enables a framework that provides traditional communities with means to ornament human bodies without of written language.

2.2.3 Beadwork as a tool for economic empowerment

Zulu beadwork is sold as authentic souvenirs in community centers and tourist hubs. This is evident in cases where some indigenous people in contemporary Zulu society create traditional beadwork for income-generating purposes and promote creativity in Zulu society. A typical example of the tourist hub for purchasing Zulu beadwork is *Durban's Golden Mile*, located along the beachfront in KwaZulu-Natal (KZN) province. People who usually buy this beadwork are educated on the meaning and color found behind the colours, and shapes found on the necklaces, pendant anklets, belts, and many other dazzling works of art they have purchased. Some consumers who buy these souvenirs share them as special gifts to their relatives and friends (McIntosh, 2008, p. 42). What makes these souvenirs special is the personal experience attained from visiting the heritage site, which adds value to people's perspectives and meaning of the Zulu people (McIntosh, 2008, p. 42). Therefore, the explained economic value of Zulu beadwork provides an income and supports the livelihoods of many skilled practitioners who create these traditional beaded forms.

The *Techne* of creating beadwork for economic empowerment refers to the process of beadwork to contextual understanding of the value that it adds to consumers. According to McIntosh (2008), understanding what makes authentic souvenirs special starts by recognising the personal value attained from visiting the heritage site, and therefore an argument for the development of cultural tourism can extend beyond economic growth to consider how people need heritage to add perspective and meaning to their lives (McIntosh, 2008, p. 42), including their loved ones. McIntosh (2008) continues to say that, "cultural heritage is typically recognized as having major educational relevance and as a key predictor of 'sense of place,'" whereby individuals feel a special connection to a location in which local knowledge and interpersonal connections are meaningfully maintained (McIntosh, 2008, p. 42). Therefore, consumers purchase authentic souvenirs as they cannot be found anywhere in the world. As such, the beadwork sold in heritage sites serves as traditional beadwork that provides a means to improve livelihoods. However, the Zulu society follows a particular process when creating beadwork forms.

To archive this, the *Phronesis* of creating beadwork for income-generating purposes usually follows the *Isimodeni* styles that meet the consumer demands of contemporary society. The *Isimodeni* style therefore represents a combination of different regional styles and the influence that communities have on each other. The creators of traditional beadwork that employs the *Isimodeni* style follow design criteria that are embedded in different community styles for creating traditional forms and patterns that are of value to tourists who visit the area. As such, the Zulu society refers to the aesthetic criteria of beadwork to reflect on conceptual ideas that meet the needs of modern society. They execute design decisions that inform the function of beadwork. The design processes of creating traditional Zulu beadwork for income-generating purposes follow discrete methods from different cultures. However, these beaded forms are unique in their own right.

Zulu beadwork forms usually present a contemporary take that follows a particular style referred to as *Isimodeni*, which shifts from the selling of material culture to a process of responsive product development in which traditional wear or the latest fashion trends are met (Gatfield, 2019, p. 128). What makes them unique is their ability to contain diverse perspectives in a single beaded form by referencing colour connotations from different cultures. As such, they incorporate different community styles for artistic expression. For instance, the beadwork found in *Durban's Golden Mile*, which is located along the beachfront in KwaZulu-Natal (KZN) province is made of unique styles. In this area, bead workers sell adornments made in the *Ndwedwe* or *Isinyolovane* styles, which make use of the dotting of multi-coloured beads on a black field (Gatfield, 2019, p. 129). The *Isinyolovane* is then slowly “merged” through contact with what was identified as the *Nongoma* style, characterised by triangular rhomboid themes (Gatfield, 2019, p. 129). Both the *Isinyolovane* and *Nongoma* styles have slowly begun to blend used as the aesthetic basis for beadwork as well as other craftsmanship such as the rickshaw puller's carts. Thus, societal factors contributed to the artistic factor of *Isimodeni's* beadwork style through reference to culture and appropriation of relevant communities in the Zulu society.

Similarly to the *Episteme* for communication and ornamentation, the Zulu society refers to the *Episteme* phase for completing artifacts. This is because the concept of creating beadwork involves using colours and shapes to represent human bodies and communicate a message about the wearer. As discussed in the previous section of this study, the *Episteme* phase

involves the idiomatic language of beads infused with the philosophy of Zulu beading codes (Graffini, 1995, p. 5). Many colours and forms are used to create the vocabulary and grammar that is coded to formulate regional styles. These colours are arranged into "families," where each family denotes an idiomatic word that represents different regional styles. The context of the bead arrangement and the colours used largely determines the unique styles adapted from the Zulu tradition. As the beads are a work of art, artistic demands can precede over the messages' primary purpose (Graffini, 1995, p. 5). The regional styles and beadwork forms have no fixed definition for beadwork that is sold as authentic souvenirs. However, the regional styles are purposefully coded to convey artistic messages to those who buy the artworks, and the meanings of the messages are intended to be of personal value, including visiting the heritage site. The intricate design of a pattern communicates the traditions of the Zulu society through visual communication. This means that the combination of Zulu beadwork regional styles can be seen as a form of artistic communication to represent the culture of the Zulu society and its application in a non-traditional context.

In addition to using colours, the Zulu society's adaptation to the *Episteme* of ornamentation involves using graphic shapes such as the triangle to simplify ideas. For example, the signature pattern of a triangular shape is a general representation of the father, mother, and child unit, whereby the way the triangle is placed communicates different messages (Tinte, 2016). However, when creating bead forms, the Zulu society refers to the mathematical application of creative patterns in beadwork transforming them into meaningful thoughts that facilitate cross-community communication. Therefore, the application of concepts including the beading process incorporates both the mathematical application and critical thinking skills embedded holistically in the beading process in a comprehensive way to complete beaded forms (Chahine & Kinuthia, 2013, p. 10). This is done through visual metaphors consisting of material texture, colour, shapes, and symmetry to create a message that communicates meaning. The various methods of promoting mathematical explanation are influenced by regional styles and the indigenous ways of knowing (Chahine & Kinuthia, 2013, p. 4).

Considering the topics covered in this section, the overall (*Techne*, *Phronesis*, and *Episteme*) are significant in understanding the culture of communal practice and the process of creating traditional beadwork. Knowledge is gained through three categories of knowledge transfer namely the *Techne*, *Phronesis*, and *Episteme*; they enable the Zulu society to create

meaningful beadwork forms, within the relevant context. *Techne* knowledge ties beading processes into the philosophical thought of communities. These philosophical thoughts provide a conceptual understanding of beadwork with intellectual work that guides the Zulu society on what to learn about beadwork. Whereas the *Episteme* knowledge focuses on providing indigenous people with procedural knowledge for making beads. This procedural knowledge is attained by providing opportunities to complete tasks for creating Zulu beadwork forms and patterns. The *Phronesis* phase is particularly used to convey the artistic expression message through symbolic communication within a relevant that improves the livelihoods of the Zulu society. This context includes 1) contextualizing Zulu beadwork in communicating messages, 2) making ornaments to represent identity and culture and 3) adding economic value to improve the livelihoods of indigenous people in the Zulu society. Therefore, the three categories of knowledge (*Techne*, *Phronesis*, and *Episteme*) constitute a criterion for creating traditional Zulu beadwork that fosters creativity and innovation of traditional knowledge.

2.3 Positioning the future of the Zulu beading practice

In light of what has been discussed in this chapter, it has been established that the Zulu society utilises beadwork to combine traditional practices with contemporary symbolic communication in a relevant context. Despite living in a modern society, the traditional use of beadwork has a huge cultural impact on Zulu society. It facilitates communication, represents identities, uses customs, and upholds the Zulu culture and customs. Thus, knowledge-sharing practices are essential for conservation as they build up the continuation of traditions for future generations. The holistic approach ensures that the cultural heritage of beadwork knowledge is passed down effectively to future generations while also allowing for creativity and evolution within the craft. By conserving and celebrating heritage, indigenous people from the Zulu society ensure that culture is carried forward to future generations for adaptive use of heritage. The Zulu society uses beadwork to connect their cultural beliefs to art and creations that represent community traditions. This promotes a sense of identification and pride and ensures the continuity of indigenous traditions in the continuously evolving world. Therefore, Zulu beadwork is a deeply connected art form with a rich history, cultural heritage, and deep connection to the people within its practicing communities. Furthermore, the Zulu society uses beadwork as a significant method for

transmitting cultural information, which is crucial for adapting traditions. Thus, knowledge can be inherited by the next generation when aspiring beadwork practitioners are provided with the knowledge necessary for cultural continuity.

The facilitation of intergenerational transfer through communal practice therefore promotes systematic knowledge transfer that is relevant to all generations. This intergenerational approach to knowledge transfer ensures cultural continuity by addressing the underlying needs of the ever-changing societies to meet the needs of the contemporary generation. Therefore, intergenerational knowledge transfer within communities helps to keep the elder generation informed about current events and the younger generation rooted in the past of their culture, with a “modern twist”. Herein, the “modern twist” refers to the contemporary take on art making that incorporates both modern techniques and customs and traditions from the Zulu society. By enhancing traditional teaching and learning with the changing needs of the contemporary generation, indigenous people can provide opportunities for greater accessibility to the Zulu beading practice. Greater accessibility to the practice therefore allows avenues to conserve knowledge on the Zulu beading practice and carry heritage to future generations of beadwork practitioners for the sustenance of culture.

Access to beading expertise avails opportunities for aspiring beadwork practitioners to acquire traditional knowledge and beading skills through an Intergenerational Learning Paradigm that reflects the culture of communal practice. Adaptation of the intergenerational learning paradigm in a digital learning environment would encourage teaching and learning practices to conserve knowledge and sustain communities. These teaching and learning practices are comparable to ways in which knowledge is transferred for acquisition purposes. As indicated by Shulman, it is insufficient to learn for the sake of knowledge and understanding alone but one also learns to engage in practice (Shulman, 2005, p. 18). Therefore, constructive alignment of teaching and learning practices of indigenous knowledge involves optimising the conditions in which experiences occur for quality learning. This involves creative approaches to ensure the successful transfer of knowledge about beadwork practice. The next chapter explores traditional teaching and learning practices for the acquisition of this beadwork knowledge in practicing communities. Based on the literature findings of this study, I have designed a methodological framework, which I will use to structure and discuss the findings of the study. The framework focuses on enabling indigenous

pedagogies for the conservation of the Zulu beading practice in a digital environment. It comprises two components that focus on two components namely; 1) Understanding principles of indigenous learning, and 2) Pedagogical approaches to learning Zulu beading.

Chapter 3: Traditional pedagogy of Zulu beading practice

Conserving traditions embodied in the Zulu beadwork art through epistemological access to the beading practice has remained significant in the continuation of the art in Zulu society. Consequently, communities foster traditional intergenerational knowledge transfer paradigms that play a significant role in indigenous communities. Traditionally, the intergenerational knowledge transfer is achieved through a “Familial” paradigm, where the family passes down knowledge across generations. However, the transmission of intergenerational knowledge has also extended to the “Extrafamilial” paradigm, which aims to foster indigenous knowledge exchange and learning, to address the “generational gap” between older and younger generations. By adapting both the “Familial” and “Extrafamilial” paradigm, the Zulu society disseminates information that fosters an authentic understanding of the Zulu beadwork art through cultural practices. As a result, community members could acquire indigenous wisdom regarding the artistry of Zulu beading practices. Pedagogical strategies in which ideas, facts, and principles are shared could contribute to enhanced Zulu beading practices.

In the same light, teaching the concept of indigenous pedagogy follows the pedagogical strategies by recognizing the different experiences that bring communities together to learn in local communities (Edwards, 2021). Therefore, the point of departure to conserving the artistry of Zulu beading in a digital environment starts with recognising traditional pedagogical approaches for Zulu beading. Consequently, this chapter investigates pedagogical approaches to teaching Zulu beadwork to establish methods of enabling holistic learning experiences that incorporate the three categories of knowledge namely the *Techne*, *Phronesis*, and *Episteme* in the culture of communal practice. The methods are determined by exploring four areas of learning which are; 1) Understanding principles of indigenous learning, 2) Exploring a paradigm for intergenerational learning, 3) evaluating pedagogies for fostering intergenerational learning within the culture of communal practice; 4) Exploring the use of

language as a tool for pedagogical engagement. The subsequent sections discuss detailed information on each area of learning and its connection to Zulu beading pedagogy presented in this chapter, starting with establishing the framework for enabling learning of Zulu beading. Furthermore, the exploration of strategies for transmitting knowledge on the artistry of Zulu beading is explained.

3.1 Understanding principles of indigenous learning

Understanding the principles of indigenous learning provides insight into best practices for the transfer and conservation of traditional knowledge. In the same manner, teaching the intellectual work on Zulu beading involves applying concepts from the principles of learning to acquire the relevant knowledge. However, effective pedagogy generally focuses on encouraging learners to understand information rather than the teacher simply delivering knowledge. The foundations of the knowledge concepts (explicitly the *Techne*, *Phronesis*, and *Episteme*) and significance of the Zulu beading practices context (namely communication, ornamentation, and economic aspect) are based on the principles of indigenous learning. As such, the Zulu society draws from the principles of indigenous learning to implement instructional strategies that are aligned with the culture of communal practice. Therefore, the next section explores the principles of indigenous learning to provide insight into what needs to be learned and how it should be learned to determine the learning scope of the Zulu beading practice for cultural conservation.

For this section, the study draws information from *the document created by the First Nations Education Steering Committee (FNESC)*, which reveals the First People's Principles of Learning to drive the process of learning indigenous knowledge. The First People's Principles of Learning, therefore, underpins the nine principles that explain indigenous people's approach to learning (First Nations Education Steering Committee, 2014). These nine principles of learning, align with indigenous pedagogical approaches to teaching Zulu beadwork, support, involve, recognize, and embed processes of acquiring new traditional knowledge. Therefore, this section draws upon the nine principles to determine the scope that supports indigenous people in creating meaningful and engaging learning experiences for aspiring beadwork practitioners. The paragraphs that follow describe the characteristics of each principal and its relevance to learning the Zulu beadwork indigenous knowledge.

The first principle of learning is to support the “well-being of the self, the family, the community, the land, the spirits, and the ancestors’ as aspects of learning (First Nations Education Steering Committee, 2014). In traditional communities, the well-being of the self is supported through intergenerational knowledge systems, which constitute a learning paradigm that supports individual needs. Consequently, the well-being of self is supported through the diversity of learning styles amongst individual learners. This is because, individuals possess unique knowledge acquisition abilities, making it important to acknowledge the significance of experiences learned from practice activities (García-Bullé, 2018). Therefore, indigenous approaches to learning perceive each learner as one who comes into the world with specific gifts that can be nurtured as he or she grows older, thereby fostering lifelong experiences.

Chrona (2016) states that nurturing one's gift encourages one to take responsibility for their learning and those within their network to acknowledge the strength of their learning gifts so that they can flourish (Chrona, 2016). Indigenous communities nurture people's gifts by strengthening by following a systematic approach to learning within the culture of communal practice. For instance, communities follow a systemic approach to enhance learning experiences that encourage choices of learning about specific Zulu beadwork forms and patterns. Through this learning process, learners can establish their strength to access ideas and develop abilities to understand knowledge (Chrona, 2016). Consequently, the acquisition of the specialised knowledge applied in Zulu beading practice can be referred to as subject-specific disciplinary knowledge, which links to the second principle of learning.

The second principle of learning recognizes that learning is “holistic, reflexive, reflective, experiential and relational (focusing on connectedness, reciprocal relationships, and a sense of place)” (First Nations Education Steering Committee, 2014). Through this principle of learning, indigenous people can incorporate community and individual views into the engagement with information (Edwards, 2021). This social approach to learning results in practice activities suitable for local conditions that meet community needs without affecting the stability of the indigenous learning system (Magni, 2017, p. 437). It follows the alternative approach of presenting a collaborative practice, which presents generations of creative thoughts as a holistic model for lifelong learning within communities. Consequently, approaches to sharing beadwork practices strive to create a holistic learning environment

that provides community members with information on the beading practices needed to master the relevant skills. Knowledge-sharing practices can continue when those who have recently acquired new skills share knowledge with others in their network subsequently providing opportunities for indigenous learners to interact and consume content in relevant cultural settings through social interaction. This influence is linked to the third principle of learning, which recognises the effects indigenous knowledge learners have on the broader learning community.

The third of the nine learning principles recognises that learning involves “recognizing the consequences of one’s actions” (First Nations Education Steering Committee, 2014). In support of this principal learning, Jager, (1998) suggests that participating in practice activities can give merit in becoming critics of their community (Jager, 1988, p. 203); the exchange of knowledge through individual participation contributes to the development of other community members. For instance, people’s engagement in Intergenerational Knowledge Transfers results in an active cultural practice to foster beadwork traditions in Zulu society. This practice is inherited from traditions that are accepted and respected as the culture of a community by its members. Hence, the knowledge shared is valued and considered as the point of truth. The validity of knowledge on Zulu beadwork promotes cultural rules to maintain the originality of knowledge and benefit the community. Therefore, the kind of content taught during practice contributes strongly to an individual’s learning outcomes. This influence is linked to the fourth principle of learning, which recognises the impact that indigenous knowledge learners have on the broader learning community.

The fourth principle recognises that learning involves generational roles and responsibilities (First Nations Education Steering Committee, 2014). This principle of learning focuses on the idea that teaching and learning are the responsibility of all members of a community (Chrona, 2006, p. 13) whereby all members of indigenous communities are responsible for knowledge sharing. Consequently, individuals are availed opportunities to develop their learning skills through teaching practices such as being able to demonstrate and explain concepts to other learners. For instance, the Zulu beading practice fosters participation in teaching practices such as intergenerational knowledge systems that encourage individuals to develop skills and knowledge of beading. As a result, both aspiring and skilled beadwork practitioners are expected to teach to become experts. For this reason, different members of a community

have traditional ecological knowledge but the quality of indigenous knowledge that individuals possess varies according to different social connections (Grenier, 1998, p. 1). Therefore, understanding ideas of traditional ecological knowledge emphasizes generational roles and responsibilities and is subsequently connected to the fifth principle of learning, which recognises the significance of this knowledge-

The fifth principle recognises that learning acknowledges “the role of indigenous knowledge in communities” (First Nations Education Steering Committee, 2014). Through the sharing learning initiative, indigenous communities offer knowledge on Zulu beadwork that embraces cultural beliefs. These beliefs are unique to specific communities living in specific regions. Consequently, the foundation of this principle ties knowledge into the indigenous way of knowing and consequentially aligning effective teaching and learning practices that are relevant to learning communities (Edwards, 2021). Therefore, knowledge sharing is essential in the Zulu beading practice as knowledge preservation builds up communities rich with indigenous knowledge for the next generation to continue with traditions. Thus, sustainable practices aim to protect the knowledge of local communities without compromising the future generations’ abilities to meet their needs (Noyoo, 2015). This understanding of the role of indigenous knowledge in communities links well with the sixth principle of learning, which highlights how conceptual ideas are transmitted and processed by indigenous knowledge learners for knowledge acquisition.

The sixth principle recognises that learning is “embedded in memory, history, and story” (First Nations Education Steering Committee, 2014). In agreement with this principle of learning, Grenier (1998) states that indigenous knowledge is stored in indigenous people’s memories and cultivated through traditional activities (Grenier, 1998, p. 2). In support of Grenier’s (1998) argument, Lalrinzuali & Lalbiakdiki (2015) explain that embedding knowledge in memory allows opportunities for imagination as well as reasoning with the ability to think in a coherent and critical learning environment to solve problems (Lalrinzuali & Lalbiakdiki, 2015, p. 31). As a result, traditional knowledge learners taught through communal practices carry conceptions coupled with sensory memories that contribute to cognitive and behavioral responses to knowledge (Thomas, 2010, p. 503). In the case of the Zulu beading practice, learning communities can recount human histories through social encounters, rituals, and narratives that contribute to the Zulu culture. Therefore, the imagination aspect of the

learning process is crucial information for learning as it provides indigenous people with methods that can be used for learners to make sense of traditions related to Zulu beading. This approach to learning connects learning to the seventh principle of learning.

The seventh principle of learning recognises that “learning involves patience and time” (First Nations Education Steering Committee, 2014). In this regard, the acquisition of knowledge encourages self-initiated activities and focus on personal development through authentic experiences that occur in learning environments. For instance, the techniques of beading generally require dedicated time and practice for the *Episteme* phase, which involves following the procedure for creating beaded forms. As such completing beadwork forms might take time. However, the duration for completing forms would depend on the type of form or pattern that needs to be created. If this is done in a traditional learning environment such as homesteads, learners may be required to complete the beadwork in their own time and space. Hence, the process of learning to make beadwork forms may require one to practice and explore beyond the learning environment. It is important to note that the process includes the exploration of knowledge linked to individual identity and the learning journey. Hence, the eighth principle of learning addresses the exploration of an individual’s identity in both the community and learning environment.

The eighth principle recognises that learning requires exploration of one’s identity (First Nations Education Steering Committee, 2014). Hall (1994) suggests that individuals’ identity such as belonging to a specific culture is characterised by identifying their interests and their choice of a purpose is aligned with family and community values (Hall, 1994, p. 222). This means that understanding self-knowledge is essential for pedagogical strategies governing the teaching of Zulu beadwork. People with a learning identity see themselves as learners and seekers and they engage in life experiences with a learning attitude; they believe in their ability to learn. However, life experiences related to Zulu beading are linked to the type of knowledge that is shared in relevant contexts for individuals to benefit from the learning process. This sensitivity to the type of information that is shared for relevant experiences links to the ninth principle, which is the last principle of learning.

Lastly, the nine principles of learning acknowledge that “learning recognises some knowledge to be sacred and that it can only be shared with permission and/or in certain situations” (First Nations Education Steering Committee, 2014). Such knowledge is linked to spirituality and is

perceived as sacred and seeking this knowledge is seen as a spiritual quest (Canadian Council on Learning, 2009, p. 29). In beadwork practice, knowledge linked to spirituality is often shared in certain scenarios with people who must undergo a process. For instance, tradition creates distinctive beaded ornaments, which are part of their identity but are also used in their work (Katsande, 2014). As such, beadwork colours are usually chosen in connection to spirituality and in line with an individual's characteristics and the nature of their work (Katsande, 2014). As a result, an integral part of the indigenous learning process is knowing that some places of knowledge might be sacred and only shared in certain situations.

In light of what has been discussed in this section, it is evident that the nine principles of indigenous learning provide guidelines for the acquisition of knowledge within the culture of communal practice such as the Zulu society. To truly understand and appreciate the art of Zulu beading, aspiring practitioners may be required to engage in activities that refer to the nine principles of learning to construct knowledge relevant to Zulu traditional beadwork. Based on the findings presented in this chapter so far, one can argue that the principles of indigenous learning are deeply rooted in cultural traditions, oral histories, and religious and spiritual beliefs of indigenous people in their traditional communities. Through the nine principles of learning, the Zulu society can adopt a holistic approach to learning that encourages unity and interconnectedness of individuals, and the community's way of knowing. Therefore, the nine principles of learning promote the conservation of the Zulu beading practice through cultural traditions. As such, the principles of learning are at the center of learning as they offer educational perspectives, which guide intergenerational knowledge transmission of *Techne*, *Phronesis*, and *Teche* beading expertise.

Certainly, the nine principles of learning guide the learning process on what to do and how they do it for cultural appropriation within communal practices. The information that needs to be learned includes traditional beliefs that are in line with societal norms of communal practices. By incorporating indigenous learning principles into educational practices, communities can enrich the learning experiences for indigenous knowledge learners. This means that adhering to the principles of learning in a digital learning environment could align pedagogies with the scope of learning. Aspiring practitioners would be availed an opportunity to learn Zulu beading skills embracing the *Techne*, *Phronesis*, and *Episteme* knowledge within the relevant contexts. However, as with any knowledge transfer system, there is a particular

way in which information is imparted during the learning process to ensure the acquisition of knowledge occurs. Therefore, the next section explores the paradigm for Intergenerational Learning.

3.2 A paradigm for Intergenerational Learning

The intergenerational learning paradigm for the Zulu beading practice is an integral part of indigenous knowledge systems that has remained significant in Zulu society. As a result, communities are encouraged to disseminate knowledge on beadwork amongst community members and people within their networks. For this reason, the Zulu society employs practice strategies for the conversation of knowledge to ensure cultural continuity. Resultantly, community members are allowed to learn indigenous knowledge, which they can use to adopt new ways of thinking. Cultural practice helps the Zulu society to conserve the culture and traditions of a community. The scope of traditional knowledge related to norms is defined through activities that take place within a particular environment and meaning generated from participation (Sewell, 2005, p. 41). Community members can acquire knowledge and engage in practice activities within traditional communities to produce beadwork. The beadwork produced is disseminated through the three functions that improve the livelihoods of the Zulu society namely communication, ornamentation, and economic value addition. Therefore, the Zulu society prioritizes sharing skills that align with the function of Zulu beadwork (communication, ornamentation, and economic benefits).

For the conservation of knowledge, traditional communities rely on intergenerational modes of learning for sharing indigenous knowledge (Grenier, 1998, p. 1). Knowledge about Zulu beadwork is positioned for future generations by passing down knowledge and techniques across generations through oral traditions such as storytelling, demonstrations, and hands-on practice. These oral traditions are designed to facilitate the transmission of knowledge about the theoretical aspects of Zulu beadwork and the process of marking artifacts. Knowledge is shared across generations living in a particular environment about the nature of traditional practicing communities as these communities maintain livelihoods, knowledge, beliefs, values, languages, and institutions within their traditional settings. Generally, the process entails the transfer of cultural knowledge by elderly practitioners. This vast knowledge of Zulu beadwork history and technique is usually drawn from extensive experience that the elders acquire through engagement with the practice from their

upbringing and practical experience in beading. Elders of a community have normally transferred beadwork skills across generations, within a community setting.

Herein, the term 'elder' refers to skilled practitioners who are individuals with special skills and training related to the Zulu traditional beadwork. Therefore, elders are holders of knowledge and are recognized skilled practitioners with a superlative degree of Zulu beading experience. They teach traditional knowledge related to Zulu beadwork through verbal communication and demonstration of tactics such as tutoring, coaching, and mentoring aspiring practitioners within their local communities (Rupcic, 2017, p. 139). The elders disseminate knowledge about beadwork within their networks and among community members to allow them opportunities to access indigenous knowledge. While the process promotes intergenerational learning, community members can also reflect on cultural traditions and apply the learned knowledge to adopt new ways of thinking. Therefore, elders play a crucial role in teaching the art of Zulu beadwork across generations in the community. Intergenerational learning ensures that the cultural heritage and techniques of beading are conserved and continued. The elders transfer the intellectual knowledge of traditions of beadwork that comprise both the theoretical and practical concepts of Zulu beadwork.

Vansina (1985) indicates that these components are based on the history of traditional knowledge that has been passed down from the older to the younger generation (Vansina, 1985, p. 3). Gaining an understanding of the theoretical and practical concepts of Zulu beadwork encourages the Zulu society to engage in ongoing cultural practice that leads to the progressive transfer of knowledge. The transmission process of knowledge about Zulu beading encourages social interaction among generations of aspiring beadwork practitioners for the acquisition of knowledge within communities. Sewell (2005) states that the category of social life has been conceptualized in many ways that are distinguishable based on interactions of a population (Sewell, 2005, p. 40). This means culture is learned behavior within a particular society, which embraces meaning (Sewell, 2005, p. 41). Through culture, societies can devote time specifically to the production, sharing ideas, and using this meaning.

For instance, indigenous people from the Zulu society foster relevant beading practice activities for conservation and culture continuity. These activities often occur in local communities for the adaptation of ideas through social interaction. Therefore, the idea of culture is based on social formations that make up groups of social structures dedicated to

types of activity (Sewell, 2005, p. 41). In essence, the scope of culture is defined through activities that take place within a particular environment and meaning generated because of participation (Sewell, 2005, p. 41). These practice activities provide opportunities to enhance people's lives and the prosperity of communities through cultural practice. As a result, the ecosystem facilitates social interaction between one or more groups of organisms in their physical environment (Robert, 2014). This means that the geo-location in which communities live binds them together.

However, what binds communities together varies according to sub-cultures within the same society including the knowledge developed around the specific conditions of indigenous people in a particular geographic area (Grenier, 1998, p. 1). These conditions are common amongst the Zulu-speaking people in the wider region and make a community unique in society. The traditions adopted influence customary practices by individual communities within the Zulu society and are followed for the sustenance of knowledge. Therefore, practices such as Zulu beadwork have remained significant in promoting local knowledge to ensure the accurate transmission of traditional information for cultural continuity. Zulu beadwork practice is, therefore, ecological in as it forms a complete system for the regulation of social systems. Thus, the regulation of social systems is guided by structures that govern a community's way of knowing.

However, understanding self-knowledge is essential for pedagogical strategies when teaching Zulu beadwork. People with a learning identity see themselves as learners, seek and engage in life experiences with a learning attitude, and believe in their ability to learn. However, life experiences related to Zulu beadwork are linked to the type of knowledge that is shared in relevant contexts for individuals to benefit from the learning process. The sensitivity to the type of information that is shared for relevant experiences links to philosophies of indigenous knowledge, which is the last principle of learning. The exchange of intergenerational knowledge fosters mutual respect and understanding between different age groups for the sustenance of culture. For instance, aspiring beadwork practitioners may request skilled beadwork practitioners for training in a particular beaded form to represent a particular stage of life. Therefore, people can seek knowledge that aligns with their identities. However, the authentic learning experiences of the Zulu beading practice are linked to the type of knowledge that is shared by individuals in the culture of communal practice. Sensitivity to this

exchange of intergenerational knowledge transfer fosters mutual respect and understanding between different age groups for the sustenance of culture.

Subsequently, social interaction has remained a key role in ensuring the cultural continuity of traditional knowledge and skills related to Zulu beading. Through social contact, communities can harness information and develop a new collective understanding of Zulu beadwork. Furthermore, social connection promotes the sharing of ideas and knowledge transmission through meaningful dialogues. As a result, the intergenerational knowledge transfer method aims to foster the growth and development of indigenous knowledge within Zulu society through a paradigm that promotes the sharing of knowledge about traditional beadwork in local communities. According to Newman and Hatton-Yoe (2008), the intergenerational knowledge transfer paradigm involves three aspects, which are 1) benefits, 2) reciprocity, and 3) empowerment (Newman & Hatton-Yoe, 2008, p. 33). This intergenerational knowledge transfer paradigm aligns with indigenous pedagogical approaches to teaching Zulu beadwork, supporting, involving, recognizing, and embedding processes of acquiring new traditional knowledge. The characteristics of each paradigm and its relevance to Zulu beadwork are explored in the section that follows.

3.2.1 Benefits of Intergenerational Learning

Generally, the benefit of learning through intergenerational learning refers to the immediate as well as long-term effects of learning traditional knowledge. The knowledge can be gained by both the young and older generation within the practicing communities. Newman (2008) states that the benefits of learning for older learners may include gratification for their contribution to the community and a deeper understanding for young learners (Newman & Hatton-Yoe, 2008, p. 33). For younger learners, benefits may include increased self-confidence and a deeper understanding of older people (Newman & Hatton-Yoe, 2008, p. 33). Lastly, the benefits for both generations may include enhanced knowledge and skills, as well as the development of a meaningful and trusting intergenerational relationship (Newman & Hatton-Yoe, 2008, p. 33). Hence, the benefits of intergenerational learning provide opportunities for different generations to learn from each other by engaging in viable teaching and learning activities. As such, engagement in intergenerational knowledge-sharing practices has a positive impact on everyone who is involved in the teaching and learning process within the culture of communal practice.

In the case of beading practice, intergenerational knowledge transfer also can benefit older learners by introducing them to new ideas, technologies, and contemporary perspectives. The learning process for older learners is achieved through practice activities that enhance their knowledge and understanding of traditional Zulu beadwork. In addition to the enhanced knowledge, Newman and Hatton-Yoe (2008) state that, the social interaction between older and younger generations fosters meaningful relationships and reduces feelings of isolation experienced by older learners during practice (Newman & Hatton-Yoe, 2008, p. 33). This means that older learners may feel a sense of companionship through social connectedness during learning. Therefore, engaging in knowledge-sharing activities between older and young people can enhance the learning experiences for both generation during the practice during the beading practice. By engaging in personal experiences with the younger generation, the older generation may experience a sense of accomplishment by transmitting new or enhanced knowledge and skills to the younger generation (Newman & Hatton-Yoe, 2008, p. 33). Therefore, successful knowledge transmission maintains links between the younger and older generations. This approach to knowledge-sharing enables the transmission and conservation of traditions of Zulu beadwork.

According to Newman and Hatton-Yoe (2008), intergenerational learning allows the younger generation to connect with older skilled practitioners in the community for wisdom and guidance (Newman & Hatton-Yoe, 2008, p. 33). In the context of Zulu beading practice, skilled beadwork practitioners or elders possess a wealth of knowledge and life experiences that the younger generation can learn for knowledge acquisition. Thus, interacting with skilled practitioners provides access to valuable insight, advice, and guidance to aspiring beadwork practitioners. Aspiring practitioners having access to skilled elder practitioners provides a support structure as a form of mentorship to help the younger generation make informed decisions when creating traditional Zulu beadwork forms and patterns. According to Newman and Hatton-Yoe (2008), the mentorship model helps the younger generation acquire skills to overcome obstacles that may arise during their developmental process (Newman & Hatton-Yoe, 2008, p. 33). The mentorship opportunity enables the younger generation to develop a deeper understanding and appreciation of culture through interactions with elders who are skilled beadwork practitioners. Interacting with elders enables aspiring beadwork practitioners to validate information as the point of reference. Mentorship provides an

opportunity for the younger generation to access generation authentic resources for learning traditional Zulu beadwork knowledge.

The benefits of an integrational approach to learning therefore encourage both the young and older generations to continuously acquire new knowledge and skills in various life stages. This lifelong learning opportunity promotes the development of a growth mindset throughout life stages. The benefit of lifelong learning is to provide opportunities for aspiring beadwork practitioners to grasp relevant knowledge throughout their entire lives. Lifelong learning is done to ensure that the future generation can continue the cultural practice through lifelong teaching strategies. As such, lifelong teaching and learning strategies foster appropriate opportunities for learning through modes of intergenerational knowledge transfer. This mode of knowledge transfer aligns with the cultural beliefs of ever-changing societies. The acquisition of knowledge is enabled through activities that are self-initiated and focused on personal development. Therefore, authentic experiences occur in learning environments, requiring exploration beyond those environments. Through this exploration, community members of the Zulu society can maintain a deeper understanding of Zulu beading for adaptation and continuation of the practice.

In addition to providing opportunities for lifelong learning, the benefit of Intergenerational Knowledge Transfer helps to bridge knowledge gaps that might occur during practice. Subsequently, opportunities to mend learning gaps allow for mutual learning activities in which indigenous people create connections and meaningful relationships between the young and older generations (Newman & Hatton-Yoe, 2008, p. 33). Contributions from both the young and older generation provides different views based on experiences and needs to meet cultural demands. The range of diverse voices from both the young and older generations add to the richness of knowledge that sustains communities and the relevance of Zulu beading practice in contemporary society. Therefore, one could argue that the benefits of intergenerational knowledge transfer involve the role of the elder (teacher) as well as the young generation (the learner) for cultural continuity.

The mutual benefits of intergenerational learning therefore incorporate community and individual views into the engagement with information (Edwards, 2021). This social approach to learning results in practice activities suitable for local conditions that meet community

needs without affecting the stability of the indigenous learning system (Magni, 2017, p. 437). It follows the alternative approach of presenting a collaborative practice, which presents generations of creative thoughts as a holistic model for lifelong learning within communities. Consequently, approaches to sharing beading practices strive to create a holistic learning environment that provides community members with information on beading practices needed to master relevant skills. Authentic sharing practices can continue when those who have recently acquired new skills share knowledge with other people in their network. Authentic sharing provides opportunities for indigenous learners to interact and consume content in relevant cultural settings through social interaction. The validity of knowledge is crucial, as it influences the learner's understanding of the content. Consequently, these roles encourage reciprocity obligations discussed in the section that follows.

3.2.2 Reciprocal obligations of Intergenerational Learning

To ensure cultural continuity, the second component of intergenerational learning covered by Newman and Hatton-Yoe (2008) is reciprocity, which ensures cultural continuity (Newman & Hatton-Yoe, 2008, p. 33). According to Newman and Hatton-Yoe (2008), reciprocity within intergenerational learning refers to the transmission and exchange of knowledge and skill across generations in a local setting (Newman & Hatton-Yoe, 2008, p. 33). Similar to the benefits of intergenerational learning, reciprocity has a different impact on the young and older generations. For the younger learner, a transfer of traditions, values, and culture across their lifetime is valuable. Whereas for older learners, a transfer of new values, insight into traditions, changing social structures, and new technologies of contemporary society is valued (Newman & Hatton-Yoe, 2008, p. 33). Therefore, the practice of exchanging information mutually benefits participants who are involved in beadwork teaching and learning activities. The reciprocity nature of social relationships allows all individuals to assist each other in the learning process and achieve the desired learning outcomes. The desired learning outcomes differ according to individuals' needs, in different stages of life and are based on what people desire to learn. In this regard, reciprocity fosters both the younger and older generations to understand, empathise, and acknowledge perspectives and experiences from each other. This encourages active engagement and participation in learning processes for knowledge acquisition.

In the context of Zulu beadwork, communities engage in reciprocal obligations to teach and learn from each other. The reciprocal obligations promote personal growth in mastering beadwork expertise and applying knowledge in various situations and contexts (Newman & Hatton-Yoe, 2008, p. 33). The responsibility for teaching each other fosters the development of critical thinking skills, oral communication as well as leadership skills to attain a high level of becoming an expert in traditional Zulu beadwork. Subsequently, having expert knowledge enables the transmission of traditional knowledge on Zulu beadwork for authentic peer learning (Newman & Hatton-Yoe, 2008, p. 33). In this study, authentic peer learning refers to the reciprocal nature of interaction between the younger and older generations. The reciprocal nature of interaction influences the quality of knowledge passed down from one generation to the next. Hence, participants who engage in reciprocal activities must be knowledgeable and well-equipped for sustainability and conservation of knowledge about Zulu beading practice. Conservation of knowledge in its authentic form is therefore important for cultural practices such as Zulu beadwork as this knowledge is not recorded currently in retrievable formats but shared oral tradition.

The role of reciprocity in indigenous communities is crucial for empowering aspiring Zulu beadwork practitioners with relevant knowledge to become experts in the field. The importance of becoming knowledge experts is connected to empowerment, which is the third aspect of intergenerational learning discussed by Newman and Hatton-Yoe (2008). This approach to knowledge sharing focuses on the idea that teaching and learning are the responsibility of all members of a community (Chrona, 2006, p. 13). The responsibility of a teacher relies on all members of indigenous communities by providing opportunities for individuals to develop their learning skills through teaching practices such as being able to demonstrate and explain concepts to other learners. As individuals develop their skills and knowledge in a particular field, they become experts and are expected to teach knowledge gained to others within their network. Grenier (1998) indicates that different members of a community have traditional ecological knowledge and the quality of indigenous knowledge that individuals possess varies according to different social connections (Grenier, 1998, p. 1). As such, healthy social connections are fundamental to learning and contribute to the sustenance of indigenous knowledge of Zulu beadwork in their communities. Therefore,

understanding ideas of traditional ecological knowledge emphasizes generational roles and responsibilities.

3.2.3 Empowering generations through intergenerational learning

During practice, the Zulu society shares relevant knowledge to empower community members through joint learning experiences. The goal of empowering generations is to ensure relevant skills and wisdom are shared across generations. Sharing relevant skills and wisdom fosters lifelong learning and cultural exchange within traditional communities, with the realisation that anyone who knows beading will become a teacher one day as part of their reciprocal obligations. Keeping this in mind, the Zulu society ensures that knowledge-sharing practices incorporate relevant information that people need to invest in their learning, perform beading tasks effectively, and feel more confident in their abilities to teach others Zulu beading skills. The inspiration to learn for self and the responsibility to learn for others encourages people of all ages to believe in their potential and ability to acquire traditional Zulu beading skills and become experts.

To support teaching and learning practices, the Zulu society follows teaching methods that involve explaining instructional approaches for the acquisition of knowledge on Zulu beading. In the teaching process, when learners (aspiring beadwork practitioners) are empowered using appropriate teaching methodology, they feel a sense of competence in enabling opportunities for others to learn from their knowledge of Zulu beading. When the elders share their wisdom, experiences, and expertise with aspiring practitioners, they pass down knowledge and instill a sense of pride and identity embodied in Zulu beadwork forms and patterns. Therefore, both skilled and aspiring beadwork practitioners can participate in teaching and learning activities with a specific focus on their heritage and ways of knowing. The state of empowerment through intergenerational learning is crucial for the continuation of the Zulu beading practice. It supports personal and community goals of conserving knowledge. Therefore, the achievement of desired learning outcomes influences the empowerment of individuals.

According to Newman & Hatton-Yoe (2008), when individuals feel empowered, they are more likely to be motivated to participate in educational activities that support their learning journey (Newman & Hatton-Yoe, 2008, p. 31). Often, people's motivation to learn indigenous knowledge sparks their interest to participate in educational activities and explore traditional

concepts beyond cultural practice (Newman & Hatton-Yoe, 2008, p. 31). For instance, an aspiring beadwork practitioner who is a fashion designer might explore contemporary trends of beadwork that fit the context of the contemporary world and adapt it to their practice when designing patterns for specific clothing items. Therefore, learning outside traditional or heritage settings provides opportunities to enhance understanding of concepts and to adapt ideas in line with modern methods of Zulu beading that align with the practices of the contemporary. Therefore, exploring knowledge beyond the traditional or heritage settings shifts the mindset that learning is not limited to a formal classroom. It encourages aspiring beadwork practitioners to explore and pursue their interests that extend to other possibilities of knowledge beyond the classroom. This promotes lifelong learning opportunities in line with the changing society.

Consequently, the teaching methodologies of intergenerational knowledge transfer are significant for achieving the goal of indigenous knowledge education, which aims to promote the development of required skills and traditional knowledge on Zulu beading. Through intergenerational modes of learning, aspiring practitioners are guided and empowered by the Zulu beading teaching and learning practices. Guidance is provided to aspiring practitioners as a form of training to diagnose learning difficulties and transmit values and sociocultural norms. As such, within intergenerational learning, there is an intentional empowering process that involves basic principles of teaching such as mutual respect, critical reflection, and caring for indigenous knowledge as a resource that guides ways of knowing within a community (Newman & Hatton-Yoe, 2008, p. 31). This involves the empowerment of learners through social interaction in practice activities that promote customs to guarantee equitable access to traditional knowledge as a resource (Newman & Hatton-Yoe, 2008, p. 31). Such equitable access to traditional knowledge creates synergy between individuals, communities, and knowledge systems. Subsequently, the approach to creating synergy between individuals, communities, and knowledge systems inspires and empowers tendencies for communities to grow together.

Through intergenerational modes of knowledge transfer, communities create a lifelong learning foundation in which members are empowered to interact and participate in teaching and learning activities. The teaching and learning interaction between individuals in traditional communities is designed to match the required expertise and establish a common

ground for sharing traditional knowledge on Zulu beading practice. To establish this common ground, communities adopt intergenerational knowledge transfer techniques as a vehicle for empowering generations of beadwork practitioners within communities. The adaptation of intergenerational knowledge transfer techniques allows for the 'systematic transfer of knowledge, skills, competencies, norms, and values between generations, both traditional and modern cultures' (Newman & Hatton-Yoe, 2008, p. 31). Through this systemic transfer, communities grow their competencies and relate with each other through collaborative learning activities. In the context of Zulu beading practice, the systematic transfer of traditional knowledge and beading skills empowers aspiring beadwork practitioners to take charge of their learning by developing skills that are beneficial for their education. Skilled practitioners are provided the opportunity to lead the conversation and share their expertise with aspiring beadwork practitioners. Nevertheless, the significance of intergenerational knowledge transfer for the continuity of Zulu beading practice has proven to be particularly relevant to what has already been addressed in this study. The primary goal is to explore traditional strategies for the conservation of artistic knowledge in Zulu beading.

To date, adaptation of intergenerational knowledge transfer through a paradigm is significant in Zulu society as it supports cultural continuity. The transfer of knowledge through the intergenerational learning paradigm (benefits, reciprocity, and empowerment) is beneficial for communal learning as it provides opportunities to align knowledge with the shared goal of both the young and older generations in Zulu society. Consequently, a collaborative system made up of cultural practices that contribute to the teaching and learning practices of Zulu beading is created. The wisdom and experiences of older generations guide the learning community by supporting practicing communities in navigating the complexities of traditional knowledge-related beadwork in the modern world. Through the exchange of information, both skilled and aspiring beadwork practitioners respect their mutual reciprocal obligations by sharing knowledge and working together to achieve a collective purpose for the benefit of each other's teaching and learning outcomes. As such, intergenerational learning is effectively implemented across multiple societies through a collaborative strategy. These learning experiences are immersive and provide opportunities for communities to revitalise the Zulu beading practice, which is a fundamental aspect of cultural continuity.

The significance of intergenerational knowledge transfer on Zulu beading implies that engagement in the culture of communal practice is fundamental for enabling authentic learning experiences. The culture of collective practice for the acquisition of knowledge is similar to what DuFour (2004) refers to as a professional learning community (DuFour, 2004). DuFour (2004) states that a professional learning community enables a formal environment that is focused on learning among community members rather than teaching (DuFour, 2004). The focus of education within learning communities is not on teaching students, but on ensuring people learn to achieve success in knowledge acquisition and sharing across different generations through collaboration (DuFour, 2004). Consequently, collaboration promotes a sense of belonging and encourages continuous growth among community members. Through communal practice, communities are empowered with the opportunity to share traditional knowledge and skills while improving social interaction with other individuals who participate in Zulu beading practice. Therefore, access to shared skills facilitates generational ideas to deepen understanding of the Zulu beading practice.

The culture of communal practice is therefore captivated through formal and informal opportunities that happen naturally within the culture of communal practice. By communal practice, this study refers to the interaction between a group of learners and the teacher for learning organically. As defined by Wenger (2008) communal practice involves participation by a group of people who meet regularly for the development and share the capacity to create as well as use knowledge in a relevant context (Wenger, 2008, p. 1). This group is not bound to a physical space but is rather seen as one that shares a common interest; in this case, the common interest would be learning beadwork. This interaction is dynamic and addresses dynamic ways of knowing in practice that require participation to engage in the process of creating, refining, communicating, and using knowledge in an appropriate context (Wenger, 2008, p. 1). The interaction is mostly informal and distinct to a group of people who share a common interest. These shared interests direct strategies that foster relevant learning experiences within the culture of communal practice. Therefore, most interactions that take place happen in a familiar setup where people experience a sense of belonging in a community driven by the desire to learn from each other (Wenger, 2008).

For this reason, communities are indebted to ensure that there are systems in place to enable the cultural continuation of traditional practices through cultural norms that serve as

knowledge conservation methods. Conservation of cultural information consequently conserves identities of communities, fosters creativity and innovation of knowledge on the art, and contributes to the economic empowerment and sustainability of indigenous cultures. By fostering culture, communities can ensure that practices are not lost but passed on as time progresses. Most importantly, both the current and future generations can continue to connect with their roots and heritage. Therefore, cultural information communicated through beadwork is significant as it provides practicing communities with the necessary knowledge for cultural continuity. By maintaining the development of this knowledge, indigenous people can conserve their culture and share their wisdom and skills with younger generations. The knowledge-sharing process is significant as it fosters a sense of continuity and strengthens community bonds such as social relationships among community members. Therefore, the next section explores indigenous strategies for fostering learning within the culture of communal practice.

3.3 Fostering Intergenerational Learning in the Zulu culture of communal practice

In traditional communities, the intergenerational learning of Zulu beading follows strategies that bring experiences into learning. These strategies involve ways and means to engage diverse indigenous knowledge learners in active and meaningful learning experiences for the acquisition of new skills and traditions of a particular community. To truly understand and appreciate traditional beadwork, communities engage in activities that are deeply rooted in the cultural experiences and traditions of the Zulu society. Learning about beadwork within indigenous communities provides indigenous learners with unique and authentic experiences for knowledge acquisition. These experiences are immersive and allow for a deep understanding of the cultural significance and techniques involved in creating traditional artifacts that align with society (Velden, 2018). Approaches to learning about Zulu beadwork in traditional communities involve social interaction as well as hands-on and immersive experiences for people to learn beading skills.

In the same manner, the process of acquiring new knowledge on Zulu beadwork is closely linked to Houwer's along with his fellow co-authors' (2013) definition of learning, in which they state that the very basic functional definition of learning refers to a change in behaviour that is due to experience (Houwer, et al., 2013, p. 631). This is connected what has already been discussed in the previous chapter two of this study, in which Frese (2017) states that

cultural practice is inferred through behaviour that leads to a routine by individuals participating in the learning practice (Frese, 2015, p. 1328). In addition to Frese's statement, Reuters (2003) also indicates that these common descents of knowledge include shared historical experiences, myths, and a common culture (Reuter, 2003). These common descents are also connected to a geographic location, which the group may or may not currently inhabit (Reuter, 2003). Therefore, aspiring beadwork practitioners can seek out guidance from skilled Zulu beadwork practitioners who reside in traditional communities. Guidance from skilled practitioners in their traditional communities provides unique opportunities for aspiring practitioners to learn directly from masters of craftsmanship and apply their understanding of knowledge in a relevant context. In this instance, the learning experience influences learning behaviour that results in authentic learning (Houwer, et al., 2013, p. 631).

The immersive method of learning through participation in beading practice activities enables a deeper comprehension of the complex process. This is done for the development and refining of cultural conditions, which are transmitted and inherited through beadwork traditions. Understanding the cultural conditions of beadwork practice therefore enables learners to create beadwork in relevant contexts by honoring traditions. However, Houwer, et al. (2013) suggest that the nature of human culture is not static or unchangeable entities but change and evolve constantly over time (Houwer, et al., 2013, p. 633). As such, adaptation of knowledge addresses certain cultural features of the environment that drive the constant evolution of community ideas (Houwer, et al., 2013, p. 633). In the case of Zulu beadwork, techniques evolve as the community engages with new ideas during practice. The evolution of beading techniques is influenced by new materials such as fabric or even metal that can be incorporated into artworks when making traditional beadwork. Therefore, engagement in communal practice offers opportunities to adapt techniques in the processes of making beadwork that meet contemporary societal trends.

The cultural features referred to in the previous paragraph above can be passed on from one generation to the next through reproduction (Houwer, et al., 2013, p. 633). These cultural features are meant to improve adaptation of customs and norms (Houwer, et al., 2013, p. 633). Hence, ideas are adapted by specific communities, within a communal environment, and knowledge is shared across generations during the lifetime of an individual in a culture of communal practice. Such learning experiences describe modification processes in which an

individual's learning behaviour is brought on by patterns in their environment (Houwer, et al., 2013, p. 633). Therefore, learning behaviour refers to indigenous learners engaging in independent and collaborative activities that foster learning habits through interaction with others and the traditional environment. Interacting with people in a traditional setting promotes socio-cultural activities that provide experiences pertinent to an individual's life and the communal practice culture (Zuallkernan, 2006, p. 198). Subsequent provision of learning experiences is through well-defined stages of cultural practice.

Houwer et al (2013) advise that the learning stages are perspectives of learning consisting of three components that bring about the learning of an organism (Houwer, et al., 2013, p. 634). Herein, the organism could refer to individual learners who participate in learning activities to acquire new knowledge on Zulu beadwork. In this instance, Houwer, et al (2013) states that the first component addresses changes in the behaviour of the organism (Houwer, et al., 2013, p. 634). This change of behaviour may occur because of learning experiences through individual exploration or collaborative practices with the teacher who is a skilled beadwork practitioner or fellow peers. Whereas the second component of learning addresses regularity in the environment of the organism in which learning occurs (Houwer, et al., 2013, p. 634). As such, regularity in a learning environment may refer to activities that occur in the space to bring experiences into learning during Zulu beading practice. Therefore, regularity in the learning environment has a direct influence on the physical setup of the environment (Houwer, et al., 2013, p. 634). The physical setup allows for an environment in which aspiring beadwork practitioners are situated therefore encouraging change of behaviour by fostering positive motivation related to people's ability to learn.

Consequently, participating in learning activities influences prosocial behavior for the benefit of others in the learning community. Prosocial behavior encourages reciprocal obligations to each other's learning that foster the development of new knowledge. As a result, the process of creating knowledge increases significantly through strong connections between activities and prosocial behavior between skilled and aspiring practitioners. The connection is influenced by the learners' ability to participate in relevant activities and prosocial behaviour through social interactions within learning environments such as traditional or heritage settings. In the learning environment, teachers provide this guidance and foster relevant experiences. During practice, skilled beadwork practitioners spend time sharing knowledge

with aspiring practitioners in their traditional homesteads or community centers. Therefore, the flexibility of face-to-face and the dynamic nature of social interaction that the physical learning environment provides, enables learning interactions that can be challenging to replicate outside the physical setup.

Therefore, the local conditions of communities that practice Zulu beadwork allow space for learning to occur within a particular learning environment. Subsequently, the implications of learning in local conditions of the community link to the third component of learning, which addresses changes in the behaviour of the organism within that environment and beyond (Houwer, et al., 2013, p. 634). These learning opportunities spark new ideas and influence different ways of thinking by reflecting on knowledge learned in the classroom. This process is reflective and beneficial for learning Zulu beadwork since traditional knowledge constantly evolves to address the needs of the changing society. Members are subsequently encouraged to actively investigate and explore knowledge beyond what is presented within the traditional scope. This means that indigenous learners are provided with fundamental information to develop an understanding of culture and further explore information in their relevant context.

For example, during practice activities, aspiring Zulu beadwork practitioners can adapt procedures for making beadwork forms in their practice, in their own time. This type of learning behavior is often influenced by what has been taught in the training session, which in turn sparks learner interest in exploring further research on beadwork. As such, the change of behaviour in a learning environment is due to conscious thoughts that are caused by what Houwer (2013) refers to as a certain stimulus as a result of interaction in the physical setup (Houwer, et al., 2013, p. 635). Such stimuli offer hands-on experience in the learning environment is intentional rather than the random occurrence of these activities (Houwer, et al., 2013, p. 635). In this instance, indigenous knowledge learners are required to apply conceptual knowledge about Zulu beadwork. This is archived by completing particular beadwork patterns with guidance from an aspiring practitioner. During practice, unconscious information such as thoughts and memories of experiences that occurred in the learning environment contributes to knowledge stored in the brain in which individuals are situated (Houwer, et al., 2013, p. 634). Knowledge acquisition on Zulu beadwork is subsequently connected to the learning environment in which communities engage in learning activities. This connection extends to the idea of multiple stimuli in which individuals are situated.

The idea of multiple stimuli refers to the second component of learning, which extends to the idea of stimulus by placing focus on a single moment in time (Houwer, et al., 2013, p. 634). As such indigenous learners are presented with learning opportunities that occur in a single trial or experiment. These activities result in a change of behaviour that occurs with only just one experience during practice sessions. For instance, a needle might poke a person when trying to stitch a string of beads together during practice. The experience of pain would result in an individual handling the needle differently when beading forms and patterns. Hence, experiencing this incident would result in a change of behavior when creating beadwork. This information would be difficult to learn in other ways as tactile information can be interpreted with their sense of touch. Making experimentation a crucial part of the learning process in a physical learning environment. In addition to experimental learning where learners learn by doing. This activity is linked to the third functional element of learning and addresses a complementary relationship between the environment and the behaviour of learning in an environment (Houwer, et al., 2013, p. 634). This means that an engaging environment promotes meaningful experiences that increase students' attention and focus for the retention of knowledge and subsequently encourage indigenous learners to engage in high-level thinking skills. These skills increase student's motivation to participate in learning activities to practice critical thinking skills related to the subject matter at hand.

In this instance, the complementary relationship or interaction between the environment and behaviour cannot be observed directly but needs to be inferred based on observations and arguments (Houwer, et al., 2013, p. 634). Learner participation in social interaction is therefore necessary for deep learning. The establishment of learning through social interaction enables deep learning including demonstrations for practical components as well as opportunities for discussions that should infer behaviour in a learning environment (Houwer, et al., 2013, p. 634). This way indigenous learners can learn from each other and develop and understand new knowledge as in the culture of communal practice. This means the process of inferring knowledge requires meaningful learner interaction in the learning environment by drawing from existing backgrounds and developing new knowledge. As a result, the three elements of learning presented by Houwer, et al., (2013), present a hypothesis of what it means to say that learning has occurred for individuals within a learning environment.

Overall, the learning hypothesis presented by Houwer, et al., (2013) claims that learning is subjective in such a way that learning is shaped by the learning history that emphasises the individual experiences of the observer who is the learner and subject of the subject matter at hand (Houwer, et al., 2013, p. 634). In the instance of the Zulu beading practice, learning history is captured through individual experiences and their participation in practice activities for them to reflect and so gain new knowledge. This knowledge includes understanding basic knowledge related to the application of procedure and conditioned by the individual's interactions with the skilled practitioner or fellow peers in the learning environment. Resulting in experiences that have an impact on what Houwer and fellow authors (2013) refer to as the individual's learning behaviour. Therefore, individual motivation to participate in learning activities is connected to the actions of the learner and what they hope to achieve in the end (Halldén, 2006).

Based on the hypothesis presented by Houwer, et al. (2013), it is clear that the perception of behaviour change can qualify as instances of learning for those who participate in the learning activity. This includes observation of authentic experiences that lead to a change of behaviour in a learning environment. Therefore, learning within the culture of communal practice aims to enable opportunities for indigenous knowledge learners to acquire appropriate skills in a relevant context. Doing so increases opportunities for future focused activities such as beading workshops that occur in practicing communities. These future-focused activities recognize how the quality of learning can be developed with effort and perseverance through practice. These practice activities refer people to recurrent activities and learned ways of working with knowledge (Knorr Cetina 2001, as cited in (Klas, et al., 2020). This includes learning where knowledge should be understood in a broader sense (Knorr Cetina 2001, as cited in (Klas, et al., 2020). Therefore, by participating in activities that are relevant to the context of Zulu beadwork practice, indigenous learners have enabled opportunities for lifelong opportunities that bring experiences into learning. These learning opportunities are accessible through skilled beadwork practitioners in their local communities.

Consequently, making knowledge accessible in traditional communities as it is embedded in people within their local setting. As a result, individuals participating in Zulu beadwork practice are required to tap into each other's expertise through social interaction in a particular location (Hildrum, 2009, p. 198). Hence, the location in which learners are

situated is significant for retaining information through social interaction. This social interaction results in active participation in acquisition. The knowledge acquisition process refers people to recurrent activities and learned ways of working with knowledge (Knorr Cetina 2001, as cited in (Klas, et al., 2020). This includes learning where knowledge should be understood in a broader sense (Knorr Cetina 2001, as cited in (Klas, et al., 2020). Therefore, indigenous knowledge of beadwork has proven to be tacit knowledge.

The term tacit knowledge refers to knowledge embedded in its holders' practices. Knowledge is commonly transferred through 'personal communication and demonstration from the teacher to the apprentice' (Owiny, et al., 2014). Commonly transferred knowledge describes knowledge gained through individual experiences and context (Alexander, n.d.). Often this information is difficult to articulate in a written form or presentation in a tangible form. It is knowledge that is gained through practice, dedication, and active participation and thus, the application of implicit knowledge is to its holders (Alexander, n.d.). Through individual consultation and workshop experiences, indigenous people can create awareness about Zulu beadwork practice among those who reside in urban areas. However, these modes of training require interaction with skilled practitioners in a physical setup, within a culture of communal. Therefore, the learning process of Zulu beading is tacit, and 'it cannot be shared with others in a simplified manner' (Sheposh, 2020). Because of the nature of tacit knowledge communicated, approaches to teaching and learning Zulu beadwork in traditional communities capture the essence of traditional ideas and concepts through practice activities that are social, experimental, and practical to master the relevant skills. The nature of these traditional activities therefore encourages participation in a physical setup.

This approach to learning provides indigenous people with relevant knowledge that can be used to make meaningful beadwork that is relevant to the culture of a community or family. Subsequently, opportunities for aspiring practitioners to interact with indigenous people in their traditional environment by immersing them in the culture of communal practice. Based on the findings of this section, the learning process of Zulu beading is highly social and requires active participation for the acquisition of knowledge. This means that language is at the center of the learning interaction. To provide an overview of methods of teaching, the section explores a case study example of beadwork teaching and learning in action. Through

this exploration, the study aims to provide an overview of teaching strategies employed by skilled beadwork practitioners to support student learning within traditional communities.

3.4 Practical example of teaching and learning Zulu beadwork

The pedagogy of traditional Zulu beadwork knowledge through cultural practice plays a crucial role in the dissemination of knowledge and conservation of beading customs for future generations. Traditional pedagogy of beading practices embraces the diversity of learning experiences that exist within the context and culture of a specific community as an Indigenous Knowledge System. Pedagogical approaches to teaching Zulu beading knowledge are positioned for future generations by passing down knowledge and techniques across generations through oral traditions such as storytelling, demonstrations, and hands-on practice. These oral traditions are designed to facilitate the transmission of knowledge about the theoretical aspects of Zulu beadwork and the process of marking artifacts (Grenier, 1998, p. 1).

Consequently, communities are encouraged to disseminate the Zulu beading artistry knowledge among community members and people within their networks. Resultantly, community members are afforded opportunities to learn the artistry of Zulu beading, which they can use to adapt new ways of thinking about the pedagogy of the practice. Learning for the acquisition of Zulu beading knowledge is achieved through the intergenerational knowledge transfer systems that foster participation and engagement in social learning activities within the culture of communal practice. Accordingly, the Zulu beading practice encourages teaching and learning practices that can conserve knowledge and sustain the culture of traditional communities. The teaching practices are aligned with ways in which knowledge is transferred for acquisition purposes.

Shulman (2005) states that it is insufficient to learn for the sake of knowledge and understanding alone but one also learns to engage in practice (Shulman, 2005, p. 18). Therefore, as with any form of knowledge sharing, professional teaching, and learning strategies in which ideas, facts, and principles are shared could contribute to skilled professional practice. In the same light, teaching the concept of indigenous pedagogy follows these strategies by recognising different experiences that bring communities together to learn in local communities (Edwards, 2021). Therefore, authentic learning experiences are

needed to engage aspiring practitioners in meaningful cultural practice activities that situate them in real-life contexts for the application of knowledge on Zulu beading. Through cultural practice, indigenous knowledge learners engage in traditional activities that involve working collaboratively with their peers to discuss contextual ideas related to beading practices. This context fosters an understanding of knowledge in irrelevant scenarios through practice activities.

Therefore, this chapter explores the different attributes of the authenticity framework and their relevance to the Zulu beading practice. Furthermore, this chapter investigates pedagogical approaches to teaching the art of Zulu beading in the culture of communal practice, to determine methods of enabling authentic learning experiences in the digital environment. The methods are determined by exploring two components namely 1) the authenticity framework designed in this study and 2) evaluating the artistry of the Zulu beading practice about the framework. The subsequent topic segments relate information on each component and its connection to the arguments presented in this chapter, starting with using the framework to understand authentic learning of Zulu beading, followed by exploring the artistry of Zulu beading in practice.

a) Using the framework for authentic learning of Zulu beading

The point of departure for enabling authentic experiences for learning the artistry of Zulu beading in a digital environment is to recognise traditional pedagogical approaches to teaching the artistry of Zulu beading as an authenticity framework. Therefore, to better frame the notion of authenticity, I draw from the *Authenticity Framework* document by the K20 Center for Educational and Community Renewal at the University of Oklahoma_(The K20 Center for Educational and Community Renewal, 2016). In the document, the K20 Center for Educational and Community Renewal describes authenticity as a conceptual foundation for significant student-centered learning (The K20 Center for Educational and Community Renewal, 2016). It has been established that the authenticity of the Zulu beading practice intellectual work is gained through teaching and learning experiences of Zulu beading knowledge that can be aligned with the *Authenticity Framework* document by the K20 Center for Educational and Community Renewal. The document states that the notion of authenticity in education refers to a conceptual framework for creating meaningful and personalised

learning experiences to create deep knowledge (The K20 Center for Educational and Community Renewal, 2016). Subsequently, the authenticity framework embraces a constructivist learning theory based on the idea that learning is an active process that learners construct for themselves through physical actions, hands-on experiences, and reflective activities that engage the learner's mind to create their knowledge.

Therefore, knowledge is constructed using methods of instruction namely disciplined inquiry, real-world connections, and student-centered learning to create deep knowledge (The K20 Center for Educational and Community Renewal, 2016). In the same manner, the attribution of the methods of instruction presented in the document by the K20 Center for Educational and Community Renewal enables learning experiences that mirror the complexities of real-life scenarios presented in the Zulu beading practice. Aspiring beadwork practitioners engage in hands-on experiences by participating in practice activities to acquire Zulu beadwork knowledge. Participating in self-directed learning activities is of value when applying knowledge within a relevant context. To support the arguments presented in this chapter, this study uses the case study presented in the next section to provide insight into the practical application of Zulu beading and learning.

b) Exploring the artistry of the Zulu beading practice

One of the objectives of this study is to provide insight into the practical applications of Zulu beading and learning through analysis of the educational documentary viewed in this section. This educational documentary was produced as part of the South African reality series called *Kulcha Kwest*, broadcasted on the South African Broadcasting Channel (SABC 1). The program was aimed at reaching a broader audience to inform viewers about different practices in South African cultures and to highlight the importance of preserving traditions (Awiwe BDS, n.d.). These series were intended to provide an instrument for educating the nation through its programming designed to encourage young people to learn about different South African cultures through an engaging reality show. By embracing and viewing the show, young people between the age of 18 – 35 who have cultural issues would then be availed of a visually interactive opportunity to find resolutions. Presumably, these youth would engage in a personal journey that would help them understand their culture, connect with their heritage, and infuse culture into their modern lifestyle (Awiwe BDS, n.d.).

The mode of knowledge transfer therefore through these reality series aligns with the aim of this study, which further extends to the need for greater accessibility of practicing communities to continue the Zulu beading art form through professional digital practices. The nature of the series also aligns with the interest of this study, which focuses on traditional Zulu beadwork pedagogy, which includes a cultural approach to transferring knowledge in the Zulu tradition. It is worth noting that there is repeated referencing to this educational documentary, to provide information or examples of Zulu traditional beading practical teaching and learning in action, to support arguments presented in the sub-chapters of this section.

Given the highlighted points on the practical applications of Zulu beading and its pedagogy, this study draws on the episode from the series titled *Kulcha Kwest 4 - Eps 2: Traditional Zulu beading*, which was created in 2017 to document a young woman's journey of learning about the Zulu traditional beadwork (SABC Education Shows, 2017). The young woman studied jewelry design and wanted to learn the art of Zulu beading to incorporate it into her contemporary design practice. Her contemporary practice involves designing jewelry using silver and gold but she was interested to learn about beadwork techniques including the historical background of beaded forms and the meaning behind each bead colour and pattern. For this reason, the young woman embarked on a quest to seek knowledge from an elder who was identified as a skilled beadwork practitioner by the producers of the show. Consequently, the lesson took place inside a traditional rondavel dwelling in Inanda Valley, KwaZulu-Natal, South Africa.

Chrona (2016) states that the place in which people live is used as a learning environment for practice activities (Chrona, 2016). Therefore, the traditional rondavel dwelling is a perfect example of a traditional learning environment where skilled beadwork practitioners share knowledge and moderate learning experiences. The rondavel dwelling provided a space where teaching enabled learning to take place. The learning opportunities included sharing ideas, asking questions, collaboration, peer reviewing, and feedback; they all demonstrated knowledge transfer and cultural conservation. Thus, the rondavel dwelling provided a conducive learning environment that fostered a deeper understanding of content based on shared interests. Herein, the shared interest refers to common history, goals, traditions, and other aspects of culture. Therefore, engaging in the Zulu beading practice inside the rondavel

dwelling cultivates immersive learning experiences that lead to gaining deep knowledge of the art. Understanding the pedagogy demonstrated through the documentary takes into account only, a single educational documentary that could be found in the literature presenting an overview of how only one elder successfully approached teaching to transfer knowledge. However, the knowledge-sharing experiences also acknowledge challenges encountered in accessing communal practices and the lack of documented resources in literature.

Analysis of the teaching and learning activities captured in the educational documentary enables unpacking traditional approaches to creating deep knowledge similar to the aim of this study. In line with earlier discussions, the exploration aims to identify teaching and learning practices and interventions that foster relevant authentic learning experiences of the three categories of knowledge namely the *Techne*, *Phronesis*, and *Episteme*, within the culture of communal practice. The goal is to provide insight into traditional practices to enable authenticity and establish the adaptation of these practices to a digital learning environment without compromising the integrity of both the cultural practices and knowledge transmitted. Therefore, the sections that follow elaborate on the three types of knowledge (*Techne*, *Phronesis*, and *Episteme*) construction through the three components of authentic learning namely the disciplined inquiry, real-world connections, and student-centered learning, respectively. Through exploration of the three components of authentic learning, the rest of the chapter aims to provide insight into the pedagogical approaches to teaching the art of Zulu beading and subsequently discuss the traditional approaches to knowledge transfer, starting by exploring indigenous Zulu pedagogies followed using language as a pedagogical enabler.

3.4.1 Indigenous Zulu beading pedagogy

3.4.1.1 *Constructing Techne knowledge through storytelling*

According to the K20 Center for Educational and Community Renewal, the construction of knowledge is a dynamic process where learners use their prior knowledge to understand new information, and then manipulate ideas to synthesize, generalise, explain, and hypothesize to ultimately solve problems and discover new meanings (The K20 Center for Educational and Community Renewal, 2016). Often traditional approach to acquiring new knowledge in a discipline requires reading learning material and answering questions to gain an

understanding of the subject matter (The K20 Center for Educational and Community Renewal, 2016). This approach to knowledge construction is an effective way to engage learners with theoretical concepts of a subject.

The knowledge construction process involves oral traditions as a form of communication. Oral traditions refer to the procedure as well as the result, which are spoken messages derived from earlier spoken messages that have been passed down from the elder generation (Vansina, 1985, p. 3). Such knowledge is transmitted verbally over time from one generation to the next. Consequently, oral traditions encourage knowledge transmission through social interaction and dialogue for the exchange of knowledge. Knowledge is passed down orally from one generation to the next. Therefore, the strategy for constructing knowledge through oral traditions as authentic learning experiences fosters social interaction with others in a learning community during the acquisition of knowledge.

Similarly, the knowledge and skills of Zulu beading are positioned for future generations by passing down knowledge and techniques across generations, where knowledge transmission is done through oral traditions such as storytelling (Grenier, 1998, p. 1). According to Iseke (2013), storytelling is a vital practice in indigenous cultures as it sustains communities and validates the experiences and epistemologies of the indigenous people who live in these communities (Iseke, 2013, p. 559). Iseke (2013) further states that indigenous people use storytelling to communicate experiences in their languages, which strengthens ties between community members and promotes successful information exchange within the culture of communal practice (Iseke, 2013, p. 559). As such, indigenous people use oral traditions to share historical and cultural knowledge in current environments. Sharing historical and cultural knowledge aligns with the philosophical thoughts of a community. Consequently, as stated by Iseke (2013), storytelling is a central focus of Indigenous Epistemologies and research approaches (Iseke, 2013, p. 559).

In the case of the Zulu beading practice, philosophical thoughts of a community are embodied *Techne*. As a result, teaching the artistry of Zulu beading starts with *Techne* knowledge as the first phase of learning about Zulu beading. The construction of knowledge in this first phase of learning is evident in the Kulcha Kwest 4 (Eps 2: Traditional Zulu beading) documentary (SABC Education Shows, 2017). To start a session, the skilled beading practitioner began her lesson by introducing herself and further shared how she learned about Zulu beading from

her mother as part of her upbringing (SABC Education Shows, 2017). Her experiences of learning support Newman & Hatton-Yoe's argument of intergenerational learning through a familial and the "Extrafamilial" paradigm already discussed in the introduction chapter of this study. In this case, the skilled beadwork practitioner learned Zulu beading skills through familial paradigm strategies fostered by her parents. The aspiring beading practitioners gained an opportunity to learn Zulu beading skills through a renowned skilled Zulu beading expert. This pedagogy can be seen at the beginning of the episode at 8 minutes and 52 seconds (SABC Education Shows, 2017). Thereafter, the skilled beadwork practitioner told a story about pairing a red hat (Isicholo), hairband (Isambozo), red and a leather skirt representing a married woman in her community tradition (SABC Education Shows, 2017).

She said:

"As I wear it, I am now representing to the world that I'm a mother and then I inform my children that I am going to Cape Town...Now I Mrs. Mtshali by wearing this sambozo on my head...according to our customs, when a woman is wearing this, it symbolises that she is married" (SABC Education Shows, 2017).

Consequently, this information provided context on the functions of patterns in Zulu beadwork. This background information provides context for the learner to understand the purpose of Zulu beadwork in the community, reflect on traditional beliefs about the functions of Zulu beadwork, and consequently gain knowledge on designing ornamentation. Evidence of this social interaction fostered in the teaching and learning about beadwork will be discussed in this chapter.

3.4.1.2 Fostering Phronesis knowledge through a disciplined inquiry

Disciplined-based inquiry learning engages indigenous learners in discussions that lead to a meaningful understanding of concepts related to beadwork; it can provoke thought, spark curiosity to learn more and stimulate a conversation around the discipline. Generally, the concept of constructing knowledge through a disciplined inquiry involves elements of substantive conversations and deep knowledge acquisition through meaningful questions (The K20 Center for Educational and Community Renewal, 2016). Substantive conversations refer to discussions about concepts and problems in the discipline beyond an argument (The K20 Center for Educational and Community Renewal, 2016). These conversations present a

degree to which learners converse deeply about disciplines to understand the substance of a discipline. Deep learning is achieved through the encouragement of learners to actively participate in active social interaction such as raising questions to discuss the application of ideas. These discussions require interaction among learners as well as with the instructor for deep learning to take place.

Through this interaction with peers and the teacher, learners are enabled the opportunity to incorporate problem-solving abilities based on what they have discovered through shared participation in learning-oriented discussion activities. Consequently, these learning-oriented discussions foster a mutual agreement for learning. This is a knowledge-sharing approach where people can learn from each other and establish a common understanding of concepts beyond what is presented in the curriculum (The K20 Center for Educational and Community Renewal, 2016). As a result, knowledge is shared through dialogues where learners respond directly to questions from their peers and can explain themselves to clarify their opinions about given facts on a topic.

Learning through dialogues, therefore, encourages critical thinking as it builds on individual expertise to create group understanding of concepts, through deliberative efforts of knowledge construction with opportunities for social interaction (K20 Center, 2016, p. 3). Thus, the process of constructing knowledge through dialogues builds on the learners' understanding of concepts. Evidence of this interaction is presented in the documentary (*Kulcha Kwest 4 - Eps 2: Traditional Zulu beading*) when a skilled beading practitioner shared *Phronesis* knowledge of Zulu beading in the context of traditional adornment. The aspiring beading practitioner expressed her interest in learning beadwork colours used to symbolize the youthfulness of young girls. In this case, the skilled beading practitioner explained by inferring the learner to the rainbow colours to make sense of beadwork for young girls (SABC Education Shows, 2017). For instance, a blue and white beaded necklace is associated with love (SABC Education Shows, 2017). However, the skilled practitioner advised that blending of the colours used influences the symbolic meaning of beaded patterns.

Further deliberate social interaction was observed at the beginning of 12 minutes and 2 seconds (12:02) where the skilled beading practitioner discussed traditional beaded outfits and styles for young girls created to symbolise their youthfulness (SABC Education Shows, 2017). Accordingly, the practitioner advised that in the Zulu custom, a young girl does not

wear a black skirt but rather wears a red skirt with white trimming and matches it with a necklace to symbolize if the girl is not married (SABC Education Shows, 2017). Therefore, deliberate social interaction efforts allow individuals to engage in meaningful conversation to construct new knowledge. To gain an understanding of the traditions of beadwork, indigenous learners are placed in positions where they can share their understanding of the culture. This is achieved through the lens of authentic artifacts by unpacking the historical significance and meaning of symbolic communication in designated communities within Zulu society. As such, dialogues for learning promote social analyses of content and reflection by drawing on learners' learning experiences, through an open exchange of perspectives that deepen their understanding of topics (University of Colorado Boulder, n.d.).

Subsequently, engaging in meaningful dialogues deepens understanding of knowledge concepts through active collaboration. The goal of knowledge deepening is to increase learners' ability to add value to their learning or in a community of learners. As such, knowledge is considered deep when learners can make clear distinctions, develop arguments, formulate questions, solve problems, construct explanations, and work with complex understandings' (K20 Center, 2016). Therefore, deep knowledge is achieved through instruction that involves meaningful acquisition of knowledge and essential questioning that allows opportunities for learners to interrogate the topic and formatively assess it in their understanding. Furthermore, deep knowledge is achieved through a learner's ability to investigate concepts, find connections between topics, and recognise the relationship between ideas. Deep knowledge is manifested when learners can articulate and demonstrate their understanding of content to others using logical and supported explanations. (K20 Center, 2016).

The principles of disciplined inquiry recognise the importance of provoking thought to spark students' curiosity to explore concepts through dialogue and motivate learners to further investigate concepts and learn information that contributes to new knowledge. Consequently, the new knowledge created is communicated through participation in activities, social conversation collaborations, interactions, practices, and educational approaches to enable re-world scenarios for learners to make connections. Therefore, contextualizing the Zulu beadwork in the communication of messages enables indigenous people to gain knowledge of which communities portray artistic expression through symbolic

communication that serves as a visual language. Thus, communication is through the articulation of meaningful artworks that support communication, ornamentation, and economics as the three significant aspects of beading practices as '*Zulu vision in art*' in the Zulu society.

Through the '*Zulu vision in art*', indigenous people are therefore able to address their needs of making ornaments for communication as well as representing the identity and culture of an individual within the Zulu society. Communities draw inspiration from the '*Zulu vision in art*' to create meaning of forms and patterns that represent the culture of a society. By engaging with the variation of context, indigenous people within the Zulu society have been provided with symbolic means to communicate cultural information in the absence of written language, for many centuries. To understand ornamentation in the context of Zulu beading practices, I will reference the documentary video session where the teacher began her lesson by introducing herself and further sharing how she learned about Zulu beadwork from her mother her upbringing, at the beginning of the episode at 8 minutes and 52 seconds (SABC Education Shows, 2017). Thereafter, she provided insight into how beaded outfits are designed with a specific wearer in mind to provide context on the functions of patterns in Zulu beadwork (SABC Education Shows, 2017).

For instance, the pairing of a red hat (Isicholo), hairband (Isambozo), red, and a leather skirt represents a married woman in her community tradition. This background information provided context for the learner to understand the purpose of Zulu beading in the community, reflect on traditional beliefs about the functions of Zulu beading practices, and gain knowledge on design approaches for ornamentation. As the learner's interest was to learn about the representation of young girls, she still inquired about specific colours used to symbolize the youthfulness of young girls. The learner's enquiry led to the *Techne* phase whereby the teacher advised about traditional colours used for representing young girls. The teacher advised that traditional communities use the colours of the rainbow, namely blue, white, yellow, white, green, and other colours to communicate messages to young girls. Therefore, the symbolic meaning of communication is particularly important to understand the next type of knowledge presented in Zulu beading practices, which involves Phronesis knowledge.

Through the social engagement learning process, learners strive to acquire and make sense of new knowledge on Zulu beading practices. To appreciate new knowledge, The K20 Center for Educational and Community Renewal advises that learners refer to their prior knowledge of the subject (The K20 Center for Educational and Community Renewal, 2016). Thereafter, they can compare new information to what they already know (The K20 Center for Educational and Community Renewal, 2016). Similarly, in Zulu beading practice, learners explore and hypothesize information to generate new meanings of knowledge on forms and patterns by exploring historical facts and traditional concepts. This process of hypothesizing information enhances learners' abilities to synthesize information critically through critical thinking techniques. Aspiring practitioners can adapt critical thinking techniques to manipulate information and ideas to resolve problems and discover new meanings and understandings about traditional Zulu beading practices. Therefore, this approach to the construction of knowledge on Zulu beadwork involves building on what the learner already knows to make new meaning of new knowledge. Therefore, it was observed that building new knowledge on the Zulu beading practices is an active process of their learning journey that requires understanding of a topic or concept through exploration, reflection, and interaction.

The learning journey to acquiring knowledge on Zulu beading practice therefore provides meaningful experiences in which learners can work on tasks for the application of knowledge in a relevant context (Lombardi 2009). This is done by nurturing curiosity, which can positively and negatively influence the learner's experience through their journey. As a result, learners are more likely to remember relevant concepts and art-making processes when they engage in cultural practice activities and apply learnings in their day-to-day roles. For this reason, cultural practice activities provide learners an opportunity to create meaningful beaded artworks within local conditions and spaces. Learner engagement with new information to construct their understanding of knowledge through traditional approaches to teaching is attributed to the social context, which promotes a real setting for critical thinking. Therefore, the Zulu beading traditional knowledge is constructed through social interactions, which informs the learning needs with relevance to culture. The idea of learning with relevance to a cultural context speaks to individual needs from various cultural groups within a society and different communities.

3.4.1.3 Mastering Episteme knowledge through learner-centered learning

Learner-centered learning shifts the focus from the teacher to a student-learning environment and allows teachers to quantify and determine knowledge acquisition by integrating complex problems to be solved by learners. The learning environment may include formative or summative assessments to increase learner-centered learning where learners can choose ways to demonstrate understanding of concepts related to a discipline. The learning process allows learners to integrate multiple information and interdisciplinary perspectives from varied disciplines to broaden learners' learning outcomes. Consequently, the learner-centered learning environment actively engages learners to promote high-level thinking of skills in multiple aspects of learning facilitated by teacher instruction to guide learners in their learning journeys. In learning environments, learners' choices are central to their learning experiences, which encourages them to analyse given tasks and synthesise information while applying problem-solving skills. Learners' results and performance for the assessments allow opportunities for learners to reflect on their learning and evaluate their knowledge and given solutions or others' ideas. Furthermore, the learning outcomes allow opportunities for learners to reflect on new information and relate their understanding with peers. This collaboration allows learners opportunities to authenticate, articulate, and share their understanding of concepts with peers (Butoni, 2020).

Even though authentic learning experiences are learner-centered and require active participation from learners to create and acquire new knowledge, teachers play an important role in creating content and the successful implementation of authentic learning environments for learners. Teachers' content contributes to creating learning environments that enable learners to construct meaning individually or with their peers themselves. Therefore, teachers mediate and guide learners in inquiry-based learning and connect learning beyond the classroom setting (K20 Center, 2016). The K20 Center for Educational and Community Renewal states that the student-centered processes of knowledge construction involve disciplined inquiry, real-world connections, and student-centered learning to produce knowledge (The K20 Center for Educational and Community Renewal, 2016). Hence, the production of knowledge is linked to real-world scenarios that engage learners in meaningful tasks and context as they connect to their personal experiences (The K20 Center for Educational and Community Renewal, 2016).

Through these experiences, learners are often engaged in activities performed to influence the learning community by communicating knowledge to others, solving problems that occur as part of the learning process, and providing assistance through collaboration (The K20 Center for Educational and Community Renewal, 2016). The lessons learned provide learners with relevant authentic learning experiences within the social context in which they live. Subsequently, learners are provided with a degree of connectedness when they engage in real-world personal experiences or prior knowledge as a context for applying and constructing new knowledge (The K20 Center for Educational and Community Renewal, 2016). As such, lessons become more authentic when connections are made with broader social contexts or groups of learners.

Real-world connections mimic work done by professionals by engaging learners in meaningful works, tasks, and contexts that link to their personal experiences and situations to address concepts or issues effectively. Therefore, learners participate in collaborative activities to impact a larger audience beyond the classroom by sharing knowledge with others, offering solutions to social problems assisting people, or creating useful products that benefit society. There are lessons gained through authenticity when learners can connect their learnings to social contexts or environments in which they inhabit. Connectedness is evident when learners can address the real-world situation using personal experiences or prior knowledge as a 'context for applying and constructing new knowledge'. (K20 Center, 2016). Learners can engage with multiple sources and interdisciplinary perspectives, reflect, collaborate through social connections, and articulate learning through authentic experiences to increase their engagement and motivation.

In the case of Zulu beading practices, the connection of knowledge to the real world is mirrored through instructional approaches that engage aspiring practitioners in meaningful activities. These activities seek to influence larger audiences beyond traditional homesteads as knowledge is shared with others through avenues such as community centers. Learners can create artwork or performances that have practical or aesthetic value. When learners discuss and share their experiences or prior knowledge, they provide opportunities for others to perform activities of value to mitigate issues. To explain the pedagogy of beading practices further, in the context of practical approaches to teaching and learning beading, the

documentary is continually used as the key point of reference for the different stages of beading.

In the context of beading traditional necklaces for young girls (from the documentary), the teacher proceeded to the next phase of learning, which was the art involving *Ethnomathematics*. As discussed in chapter two of this study, Ethnomathematics refers to learners to an intersection of mathematics, historical use of colours and shapes, and cultural context as a codification process of Zulu beadwork (Chahine & Kinuthia, 2013, p. 4). Therefore, at the beginning of 10 minutes and 16 seconds of the documentary, the learner was introduced to different qualities of stitching as well as the approach to sewing (SABC Education Shows, 2017). At this stage of learning, the teacher referred to stitching techniques for making beadwork forms from the introduction of the documentary, which was part of the general overview of the beading processes. Therefore, the teacher referred to that information for the learner to recall what was discussed and advised on three different techniques that involve using numbers such as '*number one*', '*number two*', and '*number three*' to describe sizes (SABC Education Shows, 2017).

Even though the teacher presented the three sizes of bead stitching, she also advised that there are also larger sizes that can be used for stitching. The numbers are associated with the size of beads that the learner could use for sewing different beadwork forms (SABC Education Shows, 2017). For instance, '*number one*' is associated with quality stitching that requires focus to archive the desired stitch. At the same time, stitching using '*number three*' beadwork would be easier as the hole for looping beads is bigger. As such, smaller beads require time, dedication, and patience, and may even take a couple of days to complete the desired beaded form (SABC Education Shows, 2017). Using *number 1* stitching results in the creation of a compact piece. Moreover, the size of beads used also seems to be associated with the function of beadwork. For instance, at the beginning of 10 minutes and 24 seconds of the documentary, the teacher advised that *number one* beads are used to create foot or ankle bracelets worn by women as part of their traditional attire (SABC Education Shows, 2017).

According to Chahine and Kinuthia (2013), different choices of physical and material texture of the pattern might be incorporated into the design (Chahine & Kinuthia, 2013, p. 10). Hence, stitching patterns reveal a complex multidimensional layering of information that makes the

meaning embedded in the motif explicit, if appropriately decoded (Chahine & Kinuthia, 2013, p. 10). Subsequently, the process of making traditional Zulu beadwork forms also involves the selection of material in the planning phase to appropriately complete patterns. When making a beaded bangle (*Ucu*), the learner was instructed to use *number one* beads to master this particular stitching technique to textualize ideas of the beaded bangle (*Ucu*).

Following the description of stitching techniques, the teacher introduced the learner to the next process involving the procedure for inserting different coloured beads discussed in the *Techne* phase to convey specific messages. As indicated by Chahine and Kinuthia (2013), the asymmetrical arrangement of colours conveys explicit messages (Chahine & Kinuthia, 2013, p. 10). In this training session, the teacher started with red beads, then placed blue beads on the side followed by white. Following this demonstration, the learner was required to create a beaded bangle using any of the colors of the rainbow discussed in the *Techne* phase to formulate a message. Later, the teacher followed up on the learner's progress and provided feedback during the training session. Considering the time, it took for the learner to master precession in creating the beaded bangle (*Ucu*), the teacher advised the learner to finish the task at home. However, the learner was required to present the completed pattern the following day. Finishing the task at home allowed aspiring practitioners an opportunity to master stitching techniques as well as apply concepts through a self-directed practice to achieve the desired learning outcome.

On the following day, a moment captured at the beginning of 16 minutes and 57 seconds in the documentary (SABC Education Shows, 2017), the learner had to present a completed beaded bangle (*Ucu*). The teacher-reviewed the learner's efforts in grasping necessary concepts and acknowledged her progress as a form of formative assessment. This served as a form of formative assessment to monitor the learner's progress and advised her to proceed to the next stage of the learning process. According to Worrell, (2016) teachers assessing students' progress provides information that can be used as feedback to modify teaching and learning activities (Dixson & Worrell, 2016, p. 154). Hence, formative assessment aims to keep track of student learning and provide continual feedback that both learners and teachers can utilize to enhance their instruction, should the need arise (Carnegie Mellon University, 2023). For instance, following the formative assessment, the teacher further explained the function of the beaded bangle (*Ucu*) in Zulu society. According to the teacher, the beaded bangle 'Ucu'

is hung at their partner's house to inform ancestors of the union between a boy and a girl (SABC Education Shows, 2017). However, the learner had to create the beaded form before the teacher explained its functions and uses in Zulu society.

Following the formative assessment stage, the teacher introduced the learner to the next stage of designing patterns that followed a particular algorithm to complete the beaded pattern. At the beginning of 17 minutes and 58 seconds, the teacher introduced the learner to create a particular pattern, which started with "12 beads, then turn with 4, go straight with 3 and go back with 4 again" (SABC Education Shows, 2017). This algorithm for creating the pattern required the learner to position the needle such that the beads were added in a line and closing lines to complete the pattern. Furthermore, switching between the lines required calculations of beads added and taken out. The algorithm presents a continuous loop for completing the pattern, where completing the pattern requires practice to master precision. Therefore, for this stage of learning, a peer was also required to assist the learner in mastering the stitching technique. This was done under the supervision of the teacher. Learner progress was examined, and the teacher advised the learner to practice further. The student was required to create her version of the beaded shape and submit it for summative assessment once she had mastered the method for making the pattern. As part of the brief, the learner was required to display what she learned through the training sessions and subsequently apply the learned knowledge in her practice.

According to Dixon and Worren, summative assessments are designed to assess a student's learning or the quality of their learning and compare their performance to predetermined learning outcomes (Dixon & Worrell, 2016, p. 154). Hence, for the summative assessment, the learner created a blue and white coloured beaded ring as a symbol of love for her husband. As such, the learner applied the knowledge she was taught and further added her twist by using silver as a base for the ring. This modern approach to beading is aligned with the *Isimodeni* style, which makes use of contemporary approaches for creating beaded forms. The showcase of this modern approach to making beadwork was also beneficial to the practicing community. At 23 minutes and 13 seconds of the documentary, her peers and the teacher expressed that they learned a new technique, expressing that beadwork can be infused on a metal ring (SABC Education Shows, 2017). Knowing about this technique situates them in a position where they can spread new knowledge across generations and

subsequently evolve the practice to meet the needs of the contemporary generation. Further continuation of beadwork tradition within traditional communities advances the practice and ensures continuity of the practice into the future. The overall experience of learning about beadwork in traditional communities is profound and highly immersive.

3.4.1.4 Enhancing student-centered learning through interactive activities

It has been established that engaging in craftsmanship enables learners to be immersed in the three stages of learning namely the *Techne*, *Phronesis*, and *Episteme*. As part of the learning journey, these stages of learning require learners to be involved in activities that encourage active listening skills, social interaction, self-directed learning, peer review, and learning, assessments as well as the development of presentation skills. Throughout the learning journey, learners are provided with 'just-in-time' assistance during their learning process. The concept of 'just-in-time' learning is a phrase that describes the communication changes that take place (Riel, 1998, p. 3) during the delivery of learning resources as a response to interaction in a learning environment (Riel, 1998, p. 3). Such a learning process supports the constructivist learning approach in Zulu beading practice whereby the learner is at the center of their learning with guidance from a skilled practitioner. The constructivist view of learning is based on the idea that learning is not transmitted passively but rather gained through different stages of learning by active participation as a learner (Zuallkernan, 2006, p. 198). This active participation focuses on the importance of socio-cultural activity in learning in addition to learning through stages of learning (Zuallkernan, 2006, p. 198).

In the case of beading practice, learners actively participate in the three stages of learning (*Techne*, *Phronesis*, and *Episteme*) for knowledge acquisition. For each phase of learning, aspiring practitioners participate in learning activities that require them to think and act in a particular way to master components. According to Ingold (2013), the work of 'craft people' such people think through making as opposed to theorists who make through thinking' to gain knowledge (Ingold, 2013). This learning process intuitively alternates between thinking and making through a back-and-forth approach and involves rapid alterations to produce art forms. Thus, creators of knowledge are allowed to reflect on what has been constructed to gain knowledge and master stitching techniques (lexicon of design research, n.d.). Demonstrations of learning are measured through performance and application of knowledge in real-time when applying methods for procedure (Ingold, 2013).

The learning experiences that occur in communal practice therefore provide a holistic opportunity for aspiring practitioners to learn inclusive knowledge about the art form and foster contribution to the beadwork traditions for cultural continuity. This means digital learning technologies need to provide enabling opportunities to augment similar learning experiences in a virtual environment. However, to address teaching and learning experience, language needs to be taken into consideration since language is central to learning. Therefore, the next section explores how communities use language as a tool for pedagogical engagement. Considering what has been discussed in this section, the current pedagogy of the Zulu beading forms and using the framework for authentic learning of Zulu beading while exploring the artistry of the Zulu beading practices. Furthermore, the craftsmanship immersed by the learners through the three stages of learning namely the *Techne*, *Phronesis*, and *Episteme* are discussed with examples in the context of the Zulu beading practices.

It is worth noting that learners acquire skills active listening skills, social interaction, self-directed learning, peer review, and learning, assessments as well presentations as a part of the learning journey. Constructing *Techne* knowledge through storytelling has been elaborated on in detail using examples from the documentary on bead-making. On the other hand, mastering *Episteme* knowledge through learner-centered learning has been linked to interactive learning. The 'just-in-time' concept has been identified as a tool that provides learners with assistance during their learning process while describing changes that have taken place in the communication. The learner-centered approach where the learner is at the center of their learning with guidance from a skilled practitioner, which is linked to the constructivist view of learning, aligns with the pedagogy of the Zulu beading practice. The findings of this chapter showed that learners can grasp beading and stitching techniques through practice activities by following specific procedures and making necessary alterations.

Furthermore, this chapter established that participating in the learning activities enables aspiring practitioners to gain a deep understanding of the cultural significance and techniques of creating traditional Zulu beadwork. Therefore, the learning experiences that occur in communal practice provide a holistic opportunity to learn inclusive knowledge about the art form and foster contribution to the beadwork traditions for cultural continuity. This means digital learning technologies need to provide enabling opportunities to augment similar learning experiences in a virtual environment. However, to address teaching and learning

experience, language needs to be taken into consideration as language is central to learning. Therefore, the next section explores how communities use language as a tool for pedagogical engagement.

3.4.2 Language as a tool for pedagogical engagement

Language is a very powerful tool for pedagogical engagement. It plays a crucial role in facilitating Zulu beading activities, which require communication of information for understanding that leads to knowledge acquisition. According to Mercer (2000), this activity allows opportunities for collective thinking by drawing on history, collective identity, reciprocal obligations, and discourse for joint intellectual activity (Mercer, 2000, p. 106). Therefore, practice activities that enable people to think and act together to perform necessary tasks (Mercer, 2000, p. 105). In the same manner, intergenerational knowledge transfer systems involve benefits of learning, reciprocal obligations, empowerment, and cultivating knowledge through a shared communal practice. Therefore, foster interaction through pedagogical approaches that drive learning processes. These learning processes define methods of imparting knowledge or general instruction, selection of information, and how it is delivered for knowledge acquisition.

a) The language of *Techne*

In this instance, concepts can be determined by communication that involves cultural, historical, psychological, social, and physical factors (Beach, 2018). The communication concepts of how societies adhere to ground norms and traditionally employ language discourse for communicating through language discourse (Mercer, 2000, p. 105). The intellectual activity occurs through a language discourse that allows communities to think and act together. People can use language for social interaction which allows them to transmit knowledge from one person to another. To this end, language holds cultural information that is encoded in unique ways that are linked to indigenous ways of knowing (Mercer, 2000, p. 105). For instance, the language of a specific region embeds distinctive information about the history of a particular culture. Regional language is useful for connecting people to the system values of their culture. Thus, indigenous people can transmit cultural information from one generation to the next using language through intergenerational knowledge transfer systems.

In instances of learning, language acts as a tool that helps people understand the culture of a community in that specific region. This is because the language of a community provides ground rules for the learning processes in which people are placed. For effective information transfer through social contact, communities adapt language as a tool for sharing ideas and engaging in joint intellectual activities during cultural practice. The language of a community increases exposure to original content related to Zulu beading and the opportunity to communicate in it through social interaction, in either group or one-on-one settings. Through language, communities can make sense of their shared experiences. One could argue that language is a living, working, and practical tool kit for understanding information. Therefore, pedagogical approaches to teaching target the discourse of a community and capture the essence of ideas. For this reason, there is value in understanding the language discourse of a community to grasp concepts of *Techne* knowledge.

The importance of a language discourse is evident in the Kulcha Kwest educational documentary where, the skilled practitioner explained the concept of a married woman and the customs linked to their expected behavior in the Zulu society (SABC Education Shows, 2017). These customs include the traditional concepts associated with wearing beadwork and traditional attire as a symbol of their status in the Zulu society (SABC Education Shows, 2017). Therefore, the linguistic phenomena of a community discourse show language at play in everyday spoken interaction (Carter & McCarthy, 2004, p. 62). Furthermore, the everyday spoken language plays a significant role in society. It fosters structure that influences actions 'tied' to appropriate concepts (Douglas & Perakyla, 2006, p. 244). For instance, in the educational documentary, the skilled beadwork practitioners explained concepts of beadwork as she wore and transformed into a married woman through beadwork ornamentation (SABC Education Shows, 2017). The transformation process through beadwork ornamentation is therefore a significant and powerful form of representation in which beliefs are embodied.

Douglas & Perakyla (2006) explained the relationship between projection and relevance of actions. The authors stated that this action '*projects*' what should be done next, while this, in turn, recognizes a responding action that '*fits*' with what has been projected (Douglas & Perakyla, 2006, p. 242). Therefore, the construction of knowledge is produced in real-time. Language plays a significant role in allowing opportunities to process information for

application of ideas in real-time and take necessary actions. Making it clear that interaction is conducted through language encourages people to perform actions. Through actions, indigenous people can process the application of ideas in real-time and take necessary actions. Making it clear that interaction is conducted through language encourages people to perform actions that are linked to the *Phronesis* knowledge explored in the next section.

b) *The language of Phronesis*

The language of *Phronesis* plays a significant role in allowing opportunities to process information for the application of ideas in real-time and take necessary actions. Making it clear that interaction is conducted through language encourages people to perform actions. According to Douglas & Perakyla (2006), such explanations are two-folded, starting with socially distributed aspects such as the use of a dialect, vocabulary, and idiom that explain social factors (Douglas & Perakyla, 2006, p. 253).

In the case of Zulu beading, in the *Phronesis* phase of learning Zulu beading, the language discourse consists of jargon that enables learners to grasp necessary terminology related to beadwork forms. A typical example is the 'smiling face' (discussed in the educational documentary), which refers to a specific beaded necklace used by young girls to represent youthfulness (SABC Education Shows, 2017). Hence, the term 'smiling face' is a concept that is connected to *Techne* knowledge as it connects the purpose and function of the beaded necklace. As a result, words and phrases may be used to explain the meaning of concepts (*Techne*, *Phronesis*, and *Episteme*) based on the conditions in which the ideas exist. As such, the jargons of beadwork are applied through relevant context that focuses on communication, ornamentation, and the economic aspect of Zulu beadwork. Therefore, knowing appropriate terms is essential for understanding the context of beadwork. By drawing on this jargon, aspiring practitioners are availed the opportunity to be competent in processing necessary concepts relating to the subject matter.

Understanding Zulu beading jargon therefore provides aspiring practitioners with relevant language for the application of knowledge in a relevant context. The value of language in the *Phronesis* phase includes social competence to negotiate meaning related to the application of ideas within the three contexts of beadwork, namely communication, ornamentation, and economic aspects of beadwork. Thus, understanding the context in which language is applied,

enables both the skilled and aspiring beadwork practitioners to comprehend concepts when interacting with others. This interaction enables opportunities for deep learning making sense of learning interaction. However, Douglas and Perakyla (2006) state that contextual meaning is fundamental for interaction for people to understand each other, to process information, and to do what is necessary (Douglas & Perakyla, 2006, p. 246). As a result, contextual understanding is necessary for processing, interpretation, and comprehension of meaning in the learning interaction. Therefore, contextual understanding plays a significant role in the Zulu beading practice to make meaning of concepts (*Techne*, *Phronesis*, and *Episteme*) that are applied in relevant contexts (communication, ornamentation, and economic aspects).

The second linguistic feature is individual patterns that define how people live (Douglas & Perakyla, 2006, p. 253). Such language variables are understood about individual patterns, which define problems and issues by individuals in their experience. This means that all aspects of social life are addressed as context for creating meaning. For this reason, skilled beadwork practitioners communicate in a community discourse, which is contained in isiZulu, to facilitate learning processes related to Zulu beadwork and further support learning interventions during practice through social interaction in a physical place. This discourse contributes to carrying content for learning under the supervision of skilled beadwork practitioners throughout the three phases of learning (*Techne*, *Phronesis*, and *Episteme*). Therefore, discourse serves as the language of instruction and has an impact on how a learner understands concepts and focuses on tasks for mastering concepts and skills (Arnó-Macià & Mancho-Barés, 2015, p. 64). In this regard, language is used to communicate and coordinate learning activities.

Participation in beading activities therefore enables aspiring beadwork practitioners to master relevant skills and adhere to different learning processes for indigenous people. This is done in conjunction with direct command and communicates ideas in any given situation. Through the language discourse, learning processes for grasping content are necessary. They provide relevant insights necessary to enhance learning experiences. Language is used for pedagogical engagement as well as adapting the learning process for craftsmanship such as beadwork. However, it is important to note that the linguistic discourse also includes transactional language. Language discourse is one that normally carries a message and gets things done in contrast to interactional language. Just like interactional language,

transactional language is common in everyday language speech. Therefore, articulation of speech is creative and may include a particular way of seeing message content by making remarks, underlying what is communicated through the expression of words in a particular way (Carter & McCarthy, 2004, p. 63). This linguistic creativity of Zulu beading depends on how people use language for local contextual purposes and their interaction with language in communal practice.

The local context of language is our variable that is understood about individual patterns, which define problems and issues by individuals in their experience. This means that the language of *Episteme* addresses the context (communication, ornamentation, and economic aspects) of Zulu beading for creating meaning. Thus, strategies to enable proficiency in the language of instruction for pedagogical engagement target traditions of beading through the community discourse. The community discourse increases exposure to original content and the opportunity to communicate in it through social interaction, whether with a group or on one. Viewpoints and ideas are fostered through social language that is used to build and maintain relationships. Consequently, each type of communication has a specific context and can be contextualized as an environmental ecosystem in which communication takes place.

As a result, the language of *Phronesis* provides a communication tool for both skilled and aspiring beadwork practitioners to enable social interaction for the acquisition of knowledge within the ecosystem. The learning interactions that occur in the eco-system foster meaningful conversations and may include answering questions that require intellectual thinking for an answer in which people have to describe their response or perform actions that others may describe. Thereby constituting a mutual relationship between language and society. Mutual relation means that without language there could be no social interaction for learning and vice versa (Douglas & Perakyla, 2006, p. 248). This means that the learner's proficiency in the language of instruction is a crucial part of the learning process. It provides a learning tool to grasp content and increase learners' ability to comprehend the context (communication, ornamentation, and the economic aspect) of beadwork and perform well when completing tasks in the *Episteme* phase of learning. The next section explores how the language of *Episteme* is used to support the processes of making Zulu beadwork.

c) *The language of Episteme*

The language of Episteme enables skilled practitioners to think, reason, organize ideas in their minds, and execute instruction for learning about Zulu beadwork. Through the language discourse, people can participate in discussions and engage in meaningful conversations through language. This is achieved through communication methods for executing ideas. As a result, practicing communities communicate effectively when coordinating ideas during practice activities such as Zulu beading classes. These activities enable people to think and act together when performing necessary tasks (Mercer, 2000, p. 105). Elders can communicate direct instructional commands for aspiring practitioners to follow necessary instructions to complete beading tasks. Direct instruction from elders enables learners to take necessary steps to complete tasks without necessarily being required to explain them. Undertaking these steps is necessary for measuring the viability of *Episteme* knowledge, which is gained through the processes of making beadwork. Therefore, language, as a discourse, contributes to carrying instruction for learning under the supervision of skilled practitioners.

By comprehending instructions for procedures from skilled practitioners, aspiring beadwork practitioners can follow procedures through actions. These actions are carried out to enhance decisions when following the *ethnomathematics* procedure for making beadwork forms. For instance, the genre in the technical language of teaching procedure for making Zulu beadwork patterns is mathematical and coded. Evidence of this teaching can be found in the Kulcha quest video at the beginning of 10 minutes and 5 seconds whereby the elder code-switched to using numbers such as 2's and 3's to communicate the size of beads needed to be used by the learner for completing the pattern (SABC Education Shows, 2017). Thereafter, the elder instructed the aspiring practitioner to insert a certain number of beads, which guided the design of the pattern. The technique for stitching resulted in the formation of a Zulu beadwork form. In their case, it was "Ucu" (the Zulu love letter). Hence, the use of technical language to communicate what needs to be done and how it can be done through procession is a necessity. This codification of language is what Mercer refers to as 'dry' and unemotional quality (Mercer, 2000). Consequently, helping learners focus on mastering technical skills rather than storing information in the brain, for retrieval at a later stage to apply knowledge.

Consequently, proficiency in the language of instruction is therefore essential for social competence to participate in joint intellectual activities to acquire relevant knowledge on Zulu

beadwork. Without this language competence, aspiring practitioners are likely to misunderstand information. In addition to understanding content, learners are required to follow instructions efficiently by attending to spoken language to sequence information in appropriate steps when beading traditional forms and patterns. Through the language of instruction, learners can process information and seek clarification if they have trouble remembering information. Therefore, understanding the language of practice is necessary for learning as it allows capabilities for learners to apprehend content. It also boosts learner engagement to participate in relevant activities for knowledge acquisition. This makes it essential to prioritise strategies for aspiring practitioners to be competent in the language of practice as a first step to enabling authentic learning in a digital environment. Given opportunities to understand the language of instruction in a digital environment, aspiring practitioners might be able to better understand necessary concepts related to Zulu beadwork and the art-making process.

Nevertheless, both strategies for the transmission of knowledge on beadwork and using language as a pedagogical enabler for learning work about beadwork are cohesive. They are an essential experience that requires argumentation in a digital environment. Therefore, augmenting the authentic learning experience of the communal practice in a digital environment would ensure real-world relevance by engaging aspiring practitioners in meaningful tasks that actively engage the learners to be invested in their learning. By engaging aspiring practitioners in authentic activities, they are more likely to participate in real-life situations that are linked to authentic context, as in the culture of communal practice. For instance, the historical context of beadwork serves as theoretical knowledge that is applied in practical scenarios when making beadwork. Through this activity, indigenous communities can collaborate and communicate information, reflect on the information provided think critically, solve any problems, and produce meaningful artworks. Thus, the traditional approaches to teaching and learning about beadwork provide aspiring practitioners with engaging opportunities to connect learning about beadwork to real-world contexts. To inform strategies for authentic learning in a digital environment, the next section explores professional digital practices for enabling authentic learning experiences in Zulu beadwork in a digital environment.

Chapter 4: Enabling authentic learning experiences of Zulu beading in a digital environment

Enabling authentic learning experiences of the Zulu beading practice in a digital environment is essential for intergenerational continuity and culture conservation in a contemporary society driven by the technology culture. To date, there is a lack of documented resources to teach and learn Zulu beadwork practice from a traditional perspective, under the suggested structured methodological framework comprising the *Techne*, *Phronesis*, and *Episteme* categories of knowledge to support beading practice in a digital environment. As discussed previously in chapter two of this study, *Techne* describes knowledge relating to skill or technique for specific craftsmanship, while the *Episteme* and *Phronesis* stages address the procedure and visual aspect of the beading process, respectively. As a result, wisdom on the art of Zulu beading emerges from a cohesive relationship between *Techne*, *Phronesis*, and *Episteme*. The application of beadwork is context-specific and focuses on three areas namely 1) contextualizing Zulu beadwork in the communication of messages, 2) making ornaments to represent identity and culture and 3) adding economic value to improve the livelihoods of indigenous people in the Zulu society.

Documented resources found on social media platforms such as YouTube and Facebook often focus on teaching unstructured knowledge for making Zulu beadwork forms and patterns. It is, therefore, necessary to enable authentic Zulu teaching and learning experiences in a digital environment, especially in a contemporary society driven by the technology culture. Therefore, this chapter explores the enabling of authentic teaching and learning in the digital environment by discussing 1) Opportunities for enabling intergenerational learning in a digital environment; 2) Designing authentic learning experiences in an enabled learning environment, and 3) Positioning the future of the Zulu beading practice in a digital environment. By identifying appropriate approaches for creating deep and meaningful connections that align with the community of the Zulu beading practice, this chapter aims to position traditional teaching and learning of Zulu beading practices with enhanced teaching techniques that align with the learning trends of the 21st-century generation. The recommended enabling techniques are based on the designed methodological framework consisting of the *Techne*, *Phronesis*, and *Episteme* categories of knowledge, and existing Zulu beading pedagogy.

4.1 Enabling the environment for digital teaching and learning of Zulu beading

Over the years, traditional intergenerational knowledge-sharing practices have provided avenues for the Zulu society to pass down knowledge from one generation to the next within practicing communities. Therefore, recognising a learning environment as the underpinning foundation for the type of teaching and learning activities that occur in a communal practice is the starting point for defining digital learning opportunities for intergenerational knowledge. The findings of this research suggest that knowledge is unique to a community living in a particular environment and communities gradually gain this type of knowledge through successive intergenerational transfer (Vukuzenzele, 2011). McIntosh, (2008) acknowledges that "cultural heritage is typically recognized as having major educational relevance and as a key predictor of 'sense of place,'" whereby individuals feel a special connection to a location in which local knowledge and interpersonal connections are meaningfully maintained (McIntosh, 2008, p. 42). Therefore, geographical locations are valuable for cultivating learning experiences of Zulu beading.

Subsequently, it is important to create ties of knowledge access to relationships with people in their local communities for the acquisition of expertise (Hildrum, 2009, p. 198). This means that traditional knowledge learners can access traditional knowledge on Zulu beading through practice activities by engaging with relevant skilled practitioners in local communities. Hence, traditional communities provide an informal setting avenue where teaching and learning can take place. The place in which people are situated not only provides an avenue for learning but also situates a learner's mindset. Setting up a conducive learning environment is achieved through the creation of a relationship deeply rooted in cultural perspectives of living and learning in a particular environment (Chrona, 2016). This relationship addresses change of behaviour in response to interaction and activities that occur in traditional communities.

Generally, community-based learning provides students with opportunities for real-life experiences of learning while allowing learners to benefit simultaneously from participating in practical knowledge within a community (Andrade, 2021, p. 402). Learning communities schedule frequent meetings that allow opportunities for learners to engage in practice activities such as sharing knowledge and completing relevant tasks related to the topic or discipline of interest. Teachers who create content and foster relevant interaction for learning usually manage learning communities. This includes examining students' opinions and

providing detailed feedback as a means of validating student findings and consolidating knowledge. Subsequently, the learner engages in communal learning practice to deepen knowledge for the acquisition of new skills. Therefore, it can be argued that traditional modes of learning about Zulu beadwork allow space for creative practice. Learning in traditional communities provides a meaningful experience guided by elders, who are skilled practitioners, to ensure that the learning outcomes align with what needs to be learned.

Typically, traditional communities inhabit the same space, reside in a specific geographic area, and share everyday life experiences (Mercer, 2000, p. 105). As such, there is a significant emphasis on the use of the learning environment (place) as a 'locus' of traditional knowledge (Canadian Council on Learning, 2009, p. 24). Therefore, knowledge is tacit and can be learned through experiences in 'co-located interaction with other people, through a master-and-apprentice collegial relationship' (Hildrum, 2009, p. 198). This means that the transmission of knowledge is contact-based and allows for real-time interaction for knowledge acquisition. In the context of a collegial relationship, determining opportunities for enabling intergenerational learning in the 4IR age should therefore align with the needs of a learning community. The concept of learning communities refers to a group of individuals who share a common location and interest as they work towards a shared purpose (Sue, et al., 2003, p. 2). This allows a space for a group of individuals and teachers where pupils can share ideas, ask questions, collaborate on knowledge, and provide peer feedback. These social structures are aimed at developing deeper learning of content based on shared interests (Sue, et al., 2003, p. 2). The digital technologies platform has been developed to support a more interactive, collaborative, and dynamic learning environment where learners can access material, communicate with teachers and peers, and engage in numerous learning activities that support the 4IR generation of learners. For this reason, this study identifies a Learning Management System (LMS) as an appropriate avenue for teaching and learning Zulu beading.

The LMS derives from an online learning (e-learning) application, which can be used for the administration, tracking, reporting, and delivery of educational courses or training programs (Ferdianto & Dwiniasih, 2019). The LMS can be set up on a cloud-based system and it leverages the concept of accessibility to the platform anytime and anywhere through the World Wide Web (web), thereby breaking barriers to interacting in a physical classroom (Ferdianto & Dwiniasih, 2019). Accessing a centralised system helps to streamline the

activities and process of learning in one space. Teaching and Learning activities such as collaborative learning with peers and online instructor feedback are supported by LMS platforms (Ferdianto & Dwiniasih, 2019). To create content, teachers leverage tools such as blogs, forums, and Wikis to facilitate student learning outside the traditional physical classrooms. The LMS system creates a centralized digital environment for learners to engage in social and hands-on experiences. The benefits of LMS tools include providing an effective platform for learners to access learning materials, and attempt online quizzes, among others. Therefore, LMS systems offer a flexible, accessible, and adaptable platform that can result in authentic learning experiences, making it a potential tool for fostering digital learning in practicing communities that wish to preserve and transmit the tacit knowledge of Zulu beading.

To create authentic learning environments in the LMS, as a digital enabler for the teaching and learning of Zulu beading, this study examined professional digital practices for designing authentic learning experiences similar to the culture of communal practice. The findings of this study established four components of enabling a holistic learning experience in a digital environment. The four components are 1) Construction of *Techne* knowledge through storytelling, 2) Fostering *Phronesis* knowledge through a disciplined inquiry; 3) Mastering *Episteme* knowledge through real-world experiences, and 4) Enhancing student-centered learning through assessments. Each component is discussed in the sections that follow.

4.2 Enabling authentic teaching and learning experiences of Zulu beading in a digital environment

Generally, approaches to designing authentic learning experiences involve instructional strategies usable for imparting tacit knowledge in a digital environment. ‘Craftspeople’ think while making the art as opposed to theorists who think before making the art. (Ingold, 2013). This process, which happens intuitively to allow creators to reflect on what has been constructed, alternates between thinking and making, back and forth, and involves rapid alterations when producing art forms (lexicon of design research, n.d.). For instance, people gain knowledge about beadwork through social interaction and people learn beading methods through making. Furthermore, when people make beaded forms, they are required to follow a procedure and make necessary alterations to master the stitching techniques.

Therefore, the demonstration of learning is measured through the performance when implementing methods for the procedure (Ingold, 2013). The knowledge is therefore tacit as it is best articulated in a free form and learned through experiences within a specific context; learners engage in activities that require dedication and practice (Alexander, n.d.). The application of tacit knowledge is therefore implicit and allows for the transfer of skills from one person to another without being articulate in a written form or presented in a tangible form (Alexander, n.d.). The combination of external inputs with the already stored concepts in the brain allows apprentices to gain tacit knowledge and new knowledge; they process new information and link it to knowledge stored in the brain to develop an improved understanding of concepts (Sheposh, 2020).

With the development of ICT-mediated technologies such as video and conferencing tools, it is now possible to record and share knowledge beyond geographic boundaries (Hildrum, 2009, p. 198). Nowadays, communal practice can occur in digital environments facilitated through the Internet (Hildrum, 2009, p. 198). Video conferencing tools also offer opportunities to nuance the language of the beading practice. This makes it possible to adapt instructional approaches that involve methodologies and pedagogical perspectives guided by modern approaches to synchronous and asynchronous learning in a remote environment. The concept of synchronous learning refers to a learning approach that requires attendance or meeting at a scheduled time on a specific online platform for teaching and communicating about a lesson (Amiti, 2020, p. 62). This mode of learning necessitates involvement in real-time activities under teacher supervision in a digital setting, similar to traditional classroom techniques. The learning process allows interaction between the learner and the instructor on the LMS platform.

Within an online learning environment, real-time synchronous learning usually occurs through a video or audio conference to allow for interaction between those in attendance (Amiti, 2020, p. 62). For instance, instructors may use video conferencing software such as Big Blue Button (BBB), which is a virtual classroom that can be embedded in LMS to support teaching and learning activities in real-time. Therefore, the main benefit of synchronous learning is that instructors interact with multiple learners from different geographic locations in real-time. Instructors can use the platform to explain concepts and address questions about any aspect of learning during a live session.

In contrast to synchronous learning, asynchronous learning allows learners the flexibility to complete learning activities online in their schedules, and access is flexible (Amiti, 2020, p. 63). Approaches to asynchronous learning encourage self-study whereby learners gain knowledge by interacting with online learning material. This asynchronous mode of learning often provides flexibility for learners to complete tasks, activities, and assessments at their own time and pace. Learners also have the opportunity ability to re-visit content and focus on aspects they struggle with in their learning process. The instructor also can add or link to additional resources that would be useful for student learning. Nevertheless, the next section explores opportunities to foster a holistic approach to learning *Techne*, *Phronesis* and *Episteme Knowledge*.

4.2.1 Fostering a holistic approach to learning *Techne*, *Phronesis*, and *Episteme Knowledge*

Techne describes knowledge relating to skill or technique for specific craftsmanship, while the *Episteme* and *Phronesis* stages address the procedure and visual aspect of the beading process, respectively. Based on the research findings, the study makes recommendations for creating one video that comprises of segments consisting of four in the following phase to enable authentic learning experiences of *Techne*, *Phronesis*, and *Episteme* in the LMS. The recommendation is based on the findings in the reference video, which illustrated that the three phases of knowledge, namely *Teche*, *Phronesis* and *Episteme* happen simultaneously.

a) *Part 1: Introduction to the lesson*

Before the lesson, a basic checklist could be included to cover the basic material needed for completing a particular pattern that would be discussed in the video. This includes details on the estimated time that one would typically take to complete creating the pattern. This checklist would help aspiring beadwork practitioners keep track of what needs to be done as well as ensure that the quality of work is completed according to the set requirements. Aspiring beadwork practitioners could then set personal tasks to ensure that necessary material and dedicate the time needed for the completion of beadwork forms and patterns. Bearing in mind the time aspiring practitioners would also need to watch the video to follow the appropriate procedure. Therefore, providing information on the estimated time needed to complete patterns would help aspiring practitioners prepare for the next phase of learning.

*b) Part two: Enabling construction of *Techne* knowledge*

The lesson could begin with an introduction to the concepts of Zulu beadwork. In the case of Zulu beading practice, the *Techne* knowledge provides a theoretical component to art-making processes. This would provide aspiring practitioners with the necessary theoretical knowledge to situate learning into context. Access to this information in a digital environment would provide theoretical knowledge that aspiring practitioners can reflect on in the process of designing meaningful beadwork form patterns. The findings of this research suggest that the context of beadwork focuses on three areas namely 1) contextualizing Zulu beadwork in the communication of messages, 2) making ornaments to represent identities and culture and 3) adding economic value to improve the livelihoods of indigenous people in the Zulu society. Gauging this knowledge would therefore assist with the design process in the next phase, which is *Phronesis*.

*c) Part three: Enabling construction of *Phronesis* knowledge*

The findings of this study suggest that *Phronesis* is the second phase of learning that is aimed at enabling people to make decisions necessary for the application of knowledge in particular situations (Sheposh, 2020). Therefore, the *Phronesis* phase is concerned with conceptualising theories and aligning them to the aesthetic criteria of traditional Zulu beadwork. Taking into consideration that the recommended solution is asynchronous, this would limit opportunities for live interaction between the skilled and aspiring practitioners, to discuss ideas and thoughts. However, embedding questions in the form of a quiz on the video would encourage reflection on conceptual knowledge gained in the *Techne* phase. This would encourage aspiring practitioners to think critically about the concepts of beadwork (presented in the *Techne* phase) about the context (Communication, ornamentation, the economic aspect) in the process of designing forms and patterns. In this case, the quiz questions could focus on adapting the concepts in the *Techne* knowledge, which provides an understanding of the cultural norms, historical background, and traditions of the Zulu society. When the aspiring beadwork practitioner gets the relevant questions right, they can proceed to the next stage. This would mimic social interaction that occurs during practice activities whereby learners can stop elders at any time and ask questions for clarification. Consequently, this learning process would encourage self-directed learning.

Doing so could help aspiring practitioners focus on important concepts discussed in the video rather than prompting them at the end of the video. Therefore, incorporating quizzes in a task in a digital environment could promote high-level thinking skills, allow opportunities for learners to reflect on their understanding of content, and enable instant evaluation of their knowledge about given solutions (K20 Center: The University of Oklahoma, 2016). Opportunities for reflection could create a meaningful learner journey, thereby bringing experiences into learning. By watching the video segment, aspiring beadwork practitioners would gain knowledge about cultural norms and their connection to the aesthetic criteria of traditional patterns and forms. Understanding this information would provide guidelines for creating art forms and patterns in the next *Episteme* phase of learning, which is an Ethnomathematical procedure for creating art forms. Moreover, adding a layer of interaction to the video would motivate students to engage with the content rather than watching passively, thereby bringing learning into the experience. Consequently, this would link to the next phase of learning, *Episteme*, which involves creating beadwork forms.

d) Part four: Enabling opportunities to master Episteme knowledge

Based on the findings of this research, this phase of learning involves gaining scientific knowledge from observation and literature (Sheposh, 2020). Therefore, this study makes recommendations for creating a third segment in the video that demonstrates the art-making process. By watching the video, aspiring beadwork practitioners would observe the process of art making and apply ideas in the physical world in which they're situated for learning to take place. During the art-making process, aspiring practitioners can listen to the recorded video instruction, observe the process of making, then pause the video and practice the process of making to grasp the process of making. With video learning, individuals can see the technique being demonstrated and the instruction lesson simultaneously, which can make the learning process engaging and effective.

The recommended video demonstration would simulate traditional settings of a practical learning environment, allowing a learner to connect with mentors in a digital environment. This immerses learners in prerecorded content for them to understand the appropriate steps of beading and tackle challenges they may experience during artmaking. Therefore, the process of learning would be more behavioural as it would shift from theoretical concepts to gaining competence in creating traditional forms and patterns. As indicated by Lalrinzuali &

Lalbiakdik, observing others and mimicking their actions encourages learning to occur (Lalrinzuali & Lalbiakdiki, 2015, pp. 30-31). Therefore, the demonstration of creating forms and patterns would help aspiring beadwork practitioners grasp techniques and procedural knowledge of making traditional beaded forms.

In addition to observing the processes of making, an additional layer of questions is recommended. Aspiring practitioners can answer these questions before moving to the next stage. As a result, aspiring practitioners can self-test their knowledge and undertake the necessary steps to repeat or follow the right procedure. As a result, the quiz would act as a tool to provide feedback before moving to the next step. Not only will this improve opportunities for aspiring practitioners to grasp concepts, but it could also endorse their ability to meet learning outcomes. The quiz demonstrates engaging in processes of making rather than passively taking in information. However, for aspiring practitioners to fully engage with the content, certain strategies need to be put in place for them to interact in practices that allow them to interact with content beyond what was eventually presented. As a result, the overall experience of learning procedural knowledge would immerse aspiring beadwork practitioners in the process of creating beadwork. Aspiring practitioners as learners, would be immersed through a combination of external input with already stored concepts in the brain allowing apprentices to gain knowledge connected in the brain to develop new knowledge (Sheposh, 2020). Therefore, the process of learning would be beneficial for learning in a digital environment.

4.2.2 Enabling community engagement

Based on the findings of this study, community engagement is a fundamental part of the lessoning process. Therefore, this study recommends community engagement through a discussion forum. Through discussion forums, aspiring practitioners could seek clarification regarding content (the introduction video), whether from peers or instructors. Even though text-based discussion would provide a space for learners to participate in the joint intellectual activity, the skilled beadwork practitioner could facilitate this discussion to foster collaboration in the learning environment, in this case, the LMS environment. Therefore, a discussion forum could enable a conducive learning environment within the LMS. As indicated by Rovai, a conducive environment can be achieved by allowing opportunities for 'socio-emotional discussions that have the goal of nurturing a strong sense of community within the

course' (Rovai, 2007, p. 77). Such interactive dialogues could immerse learners in social conversation. Therefore, these conversations would promote a dialogue where the learner can raise questions and reflect on concepts related to the context of Zulu beadwork.

By participating in interactive discussions, learners are enabled an opportunity to increase the learners' chances of retaining knowledge that helps them conceptualize ideas (University of Colorado Boulder, n.d.). In addition to active participation to improve individual learning outcomes, Lalrinzuali & Lalbiakdiki (2015), suggest that learning is impacted when competency in transforming experiences into knowledge from various perspectives (Lalrinzuali & Lalbiakdiki, 2015, pp. 30-31). This can be done by developing opportunities for learners to participate in the development of content and task-oriented discussions would be beneficial for enabling authentic topics linked to learning outcomes (Rovai, 2007, p. 77).

Wenger (2008) advises that the nature of various perspectives is tied to the community of practice that defines itself within the three dimensions; 1) What it is about 2) How it functions and 3) what capability it is expected to produce (Wenger, 2008, p. 2). Within these three dimensions, member engagement is expected to move through various stages of development as a community by navigating different levels of interaction through activities that would allow this progression (Wenger, 2008, p. 2). In the case of online learning, this would mean that all aspiring practitioners participating in a course automatically become part of the community thereby confining their learning activities to the three dimensions of learning. This results in individual development of information as a response to these external influences. For this reason, individual participation in activities allows learners to reflect on their understanding of concepts whilst influencing and contributing to knowledge understanding for others. Subsequently, participation in collaborative discussion would help learners obtain new knowledge to deepen their understanding of topics through a collaborative practice that adds value to the learning process of their fellow peers.

Individual contribution to external influences therefore contributes to the development of knowledge for the community. Subsequently, reciprocity to community development creates a system where the community engages and extends existing knowledge for the benefit of all members as well as individual learning. As a result, simulating social interaction through discussion forums within the LMS would mimic reflection activities that occur in the culture of communal practice. However, as with any use of technology, there are challenges to using

the technology in mimicking real-life situations. In this case, online discussions are task-oriented resulting in interaction that does not happen in real time. As a result, online discussion forums provide the minimum social interaction required for a constructivist approach to learning. The constructive approach to learning encourages learners to participate in learning activities that embed real-time social experience to acquire knowledge from multiple modes of representation (Rovai, 2007, p. 77). Therefore, engaging in real-time social interaction provides opportunities for participants to troubleshoot issues they may experience during their exploration at that time. This way community members can stay connected and foster interaction for each other's learning experiences through social platforms from anywhere in the world.

Issues of real-life engagement support this study's recommendation of recording videos that can be used as learning resources. Amity (2020) suggests that access to online learning material is essential as when the real-time response is delayed, "students use critical thinking more, and the more they think about a problem they construct the response instead of giving a spontaneous answer" (Amity, 2020, p. 64). For this reason, the proposed solution of creating videos could become handy as it allows the flexibility of being paused, rewound, and repeated as required. Individual learners can revisit content as part of the learning process when creating beaded forms. Revisiting content is particularly useful in knowledge to regain knowledge that learners might have forgotten or did not comprehend during the tutorial. Knowledge can be regained through spacing practices by offering opportunities for learners to take the temporal gap between study sessions before revisiting content in the future. Learners can revise content and master sections they find tricky, increasing the likelihood of information being remembered in the future (Using Spaced Practice in Inform Curriculum Design, 2019).

As a result, videos permit additional flexibility for learners to access traditional knowledge about beadwork, learn at their own pace, and study anytime from anywhere in the world. Knowledge recorded in the video remains accessible through archives for future reflection unless the owner decides to take it down. Reflection in learning is necessary for deep learning, allowing learners to transform individual experiences into abstract concepts that can be adapted for the application of ideas (Chang, 2019, p. 95). Through observation, learning and development of beadwork skills happen continuously based on the outcome of each review

when replaying videos. Therefore, the practical aspect of beading requires time and dedication for learners to master skills through experimentation and reflection on concepts for the application of ideas. By video within the LMS, indigenous people from the Zulu society can transmit and share knowledge about beadwork in a digital environment. Nevertheless, developing videos and using an LMS system, allow for a modern approach of handing down knowledge of the Zulu beading practice from one generation to the next through the LMS. Subsequently, the avenue of knowledge transfer allows for the sustainability of resources that are both current and future generations.

In the context of digitalising the Zulu beading practice, the recommended LMS is Canvas Instructor because of the nature of the engagement and interaction required to enable an authentic learning experience in a digital environment. The Canvas LMS provides a platform where instructors can use teaching and learning tools that align with the recommendations presented in this chapter. This would be ideal and practical for transferring beading practice because the allows instructors to create discussion forums, instructional videos, assignments, and conferencing tools as well as uploading learning content amongst many other features. The Canvas LMS provides a user-friendly platform that is accessible and flexible in its form. This will allow for the exchange of skills, cultural context, and artistic processes involved in beading. The Canvas LMS can be accessed using smartphones, tablets, laptops, and desktop devices. This makes the platform feasible as this means that both aspiring practitioners can access can use digital devices, they already have access to the LMS. The overall design of the LMS is responsive, meaning that the layout of the platform is designed to adapt to different layouts accordingly. However, even though the canvas LMS is ideal, there is an opportunity to develop systems that align with authentic experiences for learning and address the specification of the Zulu Beading practice. To further align with the trends of the contemporary generation, the next section explores opportunities for enhancing the learning experience in the 4IR age.

4.2.3 Opportunities for enhancing learning experiences in the 4IR age

LMS platforms infuse the use of Fourth Industrial Revolution (4IR) tools in digital environments. 4IR tools have made an impact on the governance of social technologies that facilitate social interaction and communication capabilities as well as the technological

transformation of physical-biological worlds and cyber-physical systems (Kayembe & Nel, 2019, p. 80). These systems are computer-based algorithms that are capable of making decisions and operating independently without computer intervention (Kayembe & Nel, 2019, p. 82). As such, these 4IR tools can be successfully utilized in a digital learning environment to bridge the gap between the classroom and the real world by providing access to knowledge resources, experimentation, and real-time feedback that one would normally acquire in a real-life environment. Such strategic approaches to teaching and learning have enhanced processes through creativity and innovation of education in the 21st century. This includes how content is delivered to ensure that learners get the best of their learning experiences in a digital environment as they would in a traditional classroom.

Through 4IR tools, digital information can be processed through complex data sets and computer systems that can read complex big data sets and provide feedback to the user where necessary. Kayembe and Neil (2019) refer to big data as large sets of structured and unstructured data, which can be processed through algorithms to perform a particular function environment (Kayembe & Nel, 2019, p. 84). These algorithms analyse and process information that needs to be used to enhance insight, decision-making, and process automation (Kayembe & Nel, 2019, p. 84). In the case of learning management systems, the automation process could allow opportunities to analyse input data by learners and make meaningful feedback based on the data set provided. This means teachers who are beadwork practitioners could analyse both input data and feedback to determine what learners struggle with to understand their needs and develop remediation strategies for personalized learning experiences. Most LMS platforms such as Canvas Instructure, Moodle, and other learning platforms, if not all, also provide new analytics that provide data on learner participation, interaction, and activity on the site as a system feature. This data analysis can help teachers improve the effectiveness of the learning process by adjusting the content, delivery methods, and assessments to meet the needs of learners.

Not only could beadwork practitioners review data analytics but it can also be utilised by 4IR tools such as Artificial intelligence (AI) technologies allow abilities for computers to be able to perform complex functions associated with human intelligence (Kayembe & Nel, 2019, p. 84). AI technologies learn like humans and can respond to certain behaviours based on computer algorithms and commands or even based on user input, which could be instructions for the

computer to perform tasks in the same way that a human being would (Kayembe & Nel, 2019, p. 84). Sequentially providing machines with the capacity to perform functions such as logic, reasoning, planning, learning, and perception (Kayembe & Nel, 2019, p. 84). In conjunction with AI technologies, quantum-computing technologies offer machine-learning methods that can diagnose challenges and provide automated solutions based on the material through algorithms to direct necessary resources (Kayembe & Nel, 2019, p. 86). In the case of learning beadwork remotely, the resources or learning material could be used to provide feedback thereby ensuring learner participation in a digital environment. Real-time time feedback that tools such as quizzes and other interactive components provide, enables learners to identify areas where they need to improve and adjust their learning strategies to improve their understanding of content to address the learning gaps.

In other words, AI technologies such as mastery pathways functions embedded in most LMS systems such as *Canvas Instructure*, *Moodle*, and other similar learning management systems allow teachers to customise learning experiences for learners based on their performance. Therefore, the mastery path function could be utilised to provide remediation intervention through feedback systems. The feedback systems automatically assign coursework based on the score achieved for a previous assignment. Subsequently, automated feedback provides opportunities for multiple opportunities to show and achieve mastery in a course based on learner participation and interaction (Instructure community, 2022). As such, mastery paths offer opportunities to guide the learning journeys of aspiring beadwork practitioners in a digital environment in the absence of human (teacher) intervention. However, teachers would be involved at some level in setting up learning pathways. This requires skilled beadwork practitioners to create learning pathways by defining points for measuring performance and re-rooting learners to relevant content.

Learning pathways direct a route that the learner would take through a range of activities that allow them to build knowledge progressively. The built-in LMS data analysis tools enable teachers to set triggers to monitor student progress and identify areas of difficulty. Adapting mastery paths as a form of remediation can help to improve the effectiveness of the learning process in a digital environment whereby the skilled beadwork practitioner sets automated remediation practices such as mastery paths in place. The implementation of mastery paths could therefore guide the learning journey in a digital learning environment to archive

learning objects, which are set goals that aspiring practitioners are expected to achieve because of instruction.

However, optimisation of the learning requires course content and how learning outcomes could be obtained with time and interaction expended on the course (Alva, et al., 2016, p. 421). This means that there is a need to develop learning material that can be used as resources for learning and 'mastering the pathway'. Thus, the development of learning resources will be beneficial for learning. The learning resources would provide means for the optimisation of learning pathways sequentially involving the adaptation of different learning styles that could accommodate the individual needs of aspiring beadwork practitioners. As such, mastery paths provide computers with relevant instruction to efficiently process instructions and provide real-time feedback. The feedback will be based on the aspiring practitioner's interaction with the learning tool. Subsequently enhancing efficiency in providing feedback real-time feedback in a manner that occurs in communal practice.

As a result, AI tools allow opportunities for machines to learn and strive for the ability to respond like a human to certain behaviour using algorithms and programming commands. This means certain interactions that certain human behaviour can now be archived in a digital environment provided that the system allows for the implementation of AI technologies. AI tools such as mastery are beneficial in the learning process. This tool helps root learners to appropriate stages to understand the application of knowledge in different ways. Consequently, encouraging a student-centered approach by simulating experiences that situate aspiring beadwork practitioners into learning. Once aspiring beadwork practitioners are situated in learning, they will be able to connect concepts that they are learning into context. As such, the quality of learning could be mediated through an inquiry-based approach that prompts learners to bring learning into practice guided by AI technologies.

In addition to facilitating the learner journey in a digital environment, Robotics technologies help to perform certain tasks that are often too complex for human beings to confirm (Kayembe & Nel, 2019, p. 84). These robotics are built on the developments made in mechatronics, electrical engineering, and computing but rely heavily on machine production to fulfill a particular purpose (Kayembe & Nel, 2019, p. 84). With the ongoing progression of AI technologies, significant contributions have been made to the development of robotic technologies to fully automate the production process for increased productivity. Even

though Robotics are strongly associated with industrial sectors, the nature of Robotics has the potential to further transform how people learn by linking both digital and physical environments. Thereby connecting the digital environment in which teaching occurs and the physical space in which participants are situated for learning to take place.

A typical example of Robotic technologies is three-dimensional printing (3D) printing machines, which have provided opportunities to process the printing of objects from a digital file and quantum computing to perform calculations to harness probabilities of an object that is being measured (Kayembe & Nel, 2019, p. 86). 3D printing processes can make solid objects from a digital file, using a process called additive manufacturing (Kayembe & Nel, 2019, p. 86). This technology can be used for many processes to suit different functions. Nevertheless, 3D technology has also gained momentum throughout the years as it presents a faster way to create or print draft objects during the design process and in some cases, 3D prints out are used as the final object that can be used for a particular purpose. Therefore, this technology provides opportunities for printing out existing 3D samples that aspiring practitioners may need. For instance, 3D objects of Zulu beadwork and printed by aspiring beadwork practitioners during planning stages for them to see objects in real life. Thereby connecting the digital world and the physical environment where learners would be able to get a tactile feel of the objects presented in a digital environment.

In addition to guiding learning pathways in a digital environment, the connection between real-world objects and the digital environment can be achieved through the Internet of Things (IoT), which involves connecting data with other systems over the Internet. The Internet of Things helps to synchronize information in different devices through an internet connection (Kayembe & Nel, 2019, p. 85). As such, IoT concepts have introduced electronic connections in which one or more devices are connected using the internet. The internet enables devices to send and receive information from one device to another (Kayembe & Nel, 2019, p. 85). However, users are the triggers of this connection as their instructional command input on the software influences the output of how the electronic behaves. This interaction between the human, machine, and software is cohesive, with one influencing the behavior of the other. For instance, the teachers may enter instructional commands on the software, then this will feed into the cloud in the server which stores and stores information that is updated for

different devices that are connected to the server. This means access to updated information would be available to all learners regardless of the device that they are using.

In light of what has been discussed in this section, the use of LMS platforms keeps these education tools centralized in one space to be utilised for teaching and learning activities. The LMS avenue is provided through virtually simulated environments for practical sessions to complete the curriculum by digital means within an academic calendar. The Learning Management Systems and simulation tool will allow skilled beadwork practitioners who are instructors to manage teaching and learning activities online in a technology-led remote classroom facilitated by teachers. The teacher facilitates activities that promote creativity, critical thinking, and problem-solving abilities in a digital environment. This means LMS platforms could play a role in enhancing and facilitating Zulu beadwork practice activities in a digital environment. In addition to facilitating learning, meaningful pedagogical activities and delivery of instructions through the LMS tools would require the skills of a skilled beadwork practitioner. As a result, relevant training would need to be provided to assist skilled beadwork practitioners in mastering the use of the LMS.

By digitising the practice, practicing communities would be able to reach a wider audience, including those who are born and based in urban areas. Greater accessibility of the practice would promote a greater understanding of cultural heritage. With LMS tools, learners would also be provided with a collaborative space such as discussion forums where they can work together with indigenous communities to share knowledge, resources, and ideas related to traditional Zulu beadwork. Subsequently, this collaborative approach to learning and knowledge creation supports the ongoing developments in traditional practices such as Zulu beadwork. In this light, professional digital practices could help foster authentic learning experiences by providing opportunities to simulate real-world scenarios and further enhance learning experiences using AI technologies to encourage student engagement.

Chapter 5: Conclusion

This study set out to explore professional digital practices that can be used to access and conserve indigenous knowledge, focusing on the case of Zulu beading practice; without losing authentic ways of sharing knowledge by researching and unpacking indigenous pedagogies for sharing the art of Zulu beading. Furthermore, the study explores opportunities for

enabling authentic learning experiences of Zulu beadwork in a digital environment. To scope the research area, a methodological framework was designed. This framework supports research aligned with understanding the current pedagogical approaches to transmitting the Zulu beadwork practices and exploring how these practices can be enabled in a digital environment without compromising authenticity.

Literature findings suggest that beadwork is a multifaceted cultural art form that transcends time and has remained significant in Zulu society. The art of beading is a profound and meaningful process that goes beyond creating intricate forms and patterns. Knowledge of Zulu beading is passed down from one generation to the next, as an integrated epistemological system taught through indigenous pedagogies within traditional communities. Indigenous pedagogies follow familial and 'extrafamilial' integrational learning paradigms that encourage transfer systems by people inside and outside families. The constantly increasing globalization and modernization of societies are continuously affecting social relationships and the communication and conservation of indigenous knowledge. Therefore, people's access to their traditional communities has shifted thereby challenging access to the communal practice of Zulu beading. This means that generations of aspiring practitioners who are born and based in urban areas do not have access to the shared practice. In urban areas, where learning in digital environments is prominent, people adapt to modern lifestyles that sideline cultural practices embedded in traditional communities. Therefore, it is important to align traditional knowledge-sharing systems with the learning avenues of the contemporary generation to ensure the continuation and conservation of the practice.

To position the future of the Zulu beading practice, revitalisation of the 'extrafamilial' paradigm to meet the needs of the contemporary generation driven by the digital culture of learning is encouraged. The lack of appropriate interactive teaching approaches affects the sustainability and cultural continuity of the Zulu beading practice. Consequently, there is a risk of traditional knowledge such as knowledge about Zulu beadwork becoming extinct when the knowledgeable elders pass. Therefore, there is a need to address the gap between traditional and digital learning by enabling authentic pedagogical approaches in digital environments. However, constructive alignment is necessary to ensure that aspiring beadwork practitioners are availed of learning opportunities that are equivalent to the culture

of communal practice. Remote access to practicing communities would offer equivalent access to beadwork expertise for cultural continuity. For this reason, the study explored the possible enabling of the Zulu beading practice pedagogy in a digital environment without losing the authenticity of the content.

Through exploration of the Zulu beadwork history, this study has established that Zulu beadwork is an indigenous art form that serves as a powerful vehicle for maintaining the culture of the Zulu society. It has provided a means for communities for the Zulu people to communicate in the absence of written language. Therefore, the Zulu society utilises beadwork as a communication language using artistic criteria in a relevant context to combine traditional practices with contemporary symbolic communication. This artistic criterion follows the 'Zulu vision in art', which makes use of three categories of knowledge namely *Techne*, *Phronesis*, and *Episteme* to create traditional beadwork that fosters creativity and innovation of traditional knowledge. This criterion is applied in the processes of making traditional beadwork forms. Zulu beadwork is significant in Zulu society in terms of being a communication tool and ornamentation and being a contributor to the economic aspect of the Zulu people. As such, the art of beading is recognised as a form of artistic expression that connects cultural beliefs to art and creations to represent community traditions within Zulu society. As a result, Zulu beadwork is a creative art form that deeply connects historical beliefs and cultural heritage. The integration of historical and cultural heritages through the art of beading is significant in the Zulu culture as it promotes a sense of pride, and identification and ensures the continuity of indigenous traditions in the continuously evolving world.

It is established from the findings of this study that the Zulu society aligns with the needs of the continuously evolving world by prioritising knowledge-sharing practices that connect the people to the culture of communal practice. These knowledge-sharing practices encourage the dissemination of traditional knowledge inheritable by the next generation. Therefore, aspiring beading practitioners can acquire the knowledge required for cultural continuation, through the knowledge exchange channels fostered through communal practice. To ascertain the cultural continuity of Zulu traditions within the communal practice, learning activities about beadwork forms and patterns are cultivated. Therefore, the foundation of traditional knowledge concepts namely the *Techne*, *Phronesis*, and *Episteme*, and context (communication, ornamentation, and economic aspect) is linked to the knowledge

philosophies of a community based on the principles of indigenous learning. During practice, the Zulu society draws on the principles of indigenous learning to implement instructional strategies aligned with the culture of communal practice. By incorporating indigenous learning principles into Zulu beading educational practices, communities can enrich the learning experiences for indigenous knowledge learners within the relevant scope of learning.

This study established that the dissemination of knowledge within a relevant scope is facilitated through the intergenerational learning paradigm that promotes systematic knowledge transfer relevant to all generations. The intergenerational learning paradigm is significant in learning as it fosters benefits of learning, reciprocal obligations, and empowerment to ensure the sustenance of knowledge within traditional communities. Benefits of learning involve, refers to the immediate as well as long-term effects of learning traditional knowledge where both skilled and aspiring beadwork practitioners can gain knowledge. Whereas reciprocal obligations encourage reciprocity within a community to foster the exchange of knowledge and the goal of empowerment is to ensure relevant skills and wisdom are shared across generations. This intergenerational learning paradigm implies that engagement in the culture of communal practice is fundamental for enabling authentic learning experiences. These experiences are brought into learning through communal practice. Therefore, an intergenerational approach to knowledge transfer ensures cultural continuity by addressing the underlying needs of the culture of communal practice and the ever-changing social structure to meet the needs of the contemporary generation.

To address the needs of the ever-changing social structures, this study recognized that relevant learning experiences are fostered within the culture of communal practice for the acquisition of knowledge. Furthermore, it was acknowledged that traditional communities adapt instruction strategies that provide opportunities for aspiring beadwork practitioners to engage diverse indigenous knowledge learners in hands-on and meaningful learning experiences for the acquisition of new skills and traditions of a particular community. These learning experiences immerse aspiring beadwork practitioners in physical learning environments that allow for a deep understanding of knowledge. This includes beading techniques involved in creating traditional Zulu beadwork that aligns with societal norms. Therefore, the nature of communal practice guides learning processes by encouraging learning processes that are highly social, experimental, and practical for aspiring practitioners

to master Zulu beading skills as well as understanding traditional knowledge associated with beadwork forms. These learning activities refer people to location-based learning. The location in which learners are situated is significant for retaining information through social interaction. Within the learning environment, participants are availed of opportunity that allows for hands-on experiences while providing a platform for cultural exchange. Consequently, learning within practicing communities has remained significant in Zulu society to ensure cultural continuity and conservation of the art.

This study discusses the current pedagogy of the Zulu beading forms and uses the framework for authentic learning of Zulu beading while exploring the artistry of the Zulu beading practices. Furthermore, the craftsmanship immersed by the learners through the three stages of learning namely the *Techne*, *Phronesis*, and *Episteme* are discussed with examples in the context of the Zulu beading practices. It is worth noting that learners acquire skills including active listening skills, social interaction, self-directed learning, peer review, and learning, assessments as well as presentations as part of the learning journey. Constructing *Techne* knowledge through storytelling has been elaborated on in detail using examples from the documentary on bead-making. On the other hand, mastering *Episteme* knowledge through a learner-centered approach to learning has been linked to interactive learning. The 'just-in-time' concept has been identified as a tool that provides learners with assistance during their learning process while describing changes that have taken place in the communication. The learner-centered approach where the learner is at the center of their learning with guidance from a skilled practitioner is linked to the constructivist view of learning and it aligns with the pedagogy of the Zulu beading practices. This study showed that learners can grasp beading and stitching techniques through practice activities by following specific procedures and making necessary alterations.

Furthermore, this chapter established that participating in the learning activities enables aspiring practitioners to gain a deep understanding of the cultural significance and techniques of creating traditional Zulu beadwork. Therefore, the learning experiences that occur in communal practice provide a holistic opportunity to learn in-depth knowledge about the Zulu art form while fostering contributions to the beadwork traditions for cultural continuity. This means that digital learning technologies need to provide enabling opportunities to argue similar learning experiences in a virtual environment. However, to address teaching and

learning experiences, language needs to be taken into consideration, as language is central to learning.

Based on the research findings in this study, it has been established that a Learning Management System (LMS) could be used to enable a learning environment that can digitally facilitate the authentic learning pedagogy of Zulu beading knowledge and skills. An LMS could provide opportunities for intergenerational modes of transfer through virtually simulated classrooms for communities to participate in joint intellectual activity. Through virtual simulations fostered by LMS teaching and learning tools and the 4IR tools, a certain degree of social interaction and learning activities can be fostered in the digital environment. This process would embrace a holistic approach to address administration, tracking, reporting, and delivery of educational courses or training programs in a controlled environment. Through the internet, aspiring beadwork practitioners would be able to access LMS platforms to engage in beadwork practice digitally. Furthermore, with the help of AI tools in the learning environment, skilled practitioners would be able to automate certain human behaviour such as providing instant feedback. Therefore, the quality of learning could be mediated through an inquiry-based approach that prompts learners to bring learning into a practice guided by AI technologies.

The process of enabling authentic learning experiences in a digital environment requires the inclusion of indigenous viewpoints from knowledgeable elders who are skilled practitioners, language, and the integration of professional digital practices for the development of learning solutions. Professional digital practices may include synchronous approaches through video conferencing tools to offer relevant opportunities for aspects of learning that require relevant interaction in a digital environment. By accessing the digital environment, aspiring practitioners would be able to take part in beadwork practice online by participating in real-time activities and/or accessing beadwork resources. In addition to using, asynchronous learning, digital learning environments offer flexibility to the teacher and the learner. Knowledge can be video recorded and shared by the aspiring practitioners for them to access online. Consequently, learners can complete tasks in their own time. Nevertheless, learning in a digital environment would require the development of digital learning materials accessible as resources for learning. Therefore, engagement with practicing skilled practitioners is necessary for enabling authentic learning experiences.

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