

**The integration of indigenous graphics knowledge and skills to  
enhance Grade 9 learners' understanding of graphic designs in  
Technology Education**

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## ABSTRACT

This single descriptive case study explored the integration of indigenous graphics knowledge and skills into the Technology curriculum of a school in the Ehlanzeni District of the Mpumalanga Province with a Grade 9 Technology teacher and the learners. The integration of indigenous knowledge and skills can help promote Grade 9 learners' understanding of graphic design, which forms part of the content taught in Technology Education. The graphics knowledge and skills existent in the indigenous contexts from which most of learners come can make the learning of graphic design relevant and more understandable to learners. Hence, there was a need to research this issue. One Grade 9 Technology teacher was purposively selected for an interview and observed while teaching the class. Seven learners from this teacher's class were also selected to be interviewed. The data analysed in the present study were obtained from the teacher and seven learners. The constructivist theory of learning framed this study. The findings revealed that, although the teacher had some understanding of technology, (i) she battled with the concept of indigenous knowledge; (ii) she was unaware that indigenous knowledge is even mentioned in the subject's Curriculum, Assessment Policy Statement (CAPS); and, (iii) her limited understanding of the concept of indigenous knowledge meant that she did not know how she could integrate indigenous knowledge into the teaching of graphic design. She also did not capitalise on indigenous knowledge as a resource in a resource-hungry teaching environment that she faced. While she acknowledged the importance of the learners' culture, she did not take full advantage thereof in her teaching. Her adoption of demonstration as her predominant teaching approach provided an opportunity for integrating indigenous knowledge and skills but, again, she did not capitalise on that opportunity fully. This study can help transform the teaching of Technology by ensuring the integration of indigenous knowledge into the teaching of graphic design, a much-needed approach to education in the (South) African context.

**Keywords:** Indigenous knowledge, integration, graphic design, culture, skills, Technology Education

## I-ABSTRAKTHI

Lesifundvo sinye, lesichazako sihlola kufakwa kwelwati lwebuchwepheshe nemakhono eluhlelwenitifundvo Lwebuchwepheshe esikolweni seSigodzi saseNhlanzeni eSifundzeni saseMpumalanga. Kuloku, thishela nemfundzi wesifundvo sebuchwepheshe welibanga 9 babe nencenye kulesifundvo lesifuna kubona kutsi kufakwa kwelwati lwenzabuko nemakhono kungatfutukisa kuvisisa kwemfundzi likhono lekuhlanganisa titfombe nemifanekiso, lokuyincenye yengciki kutsi lefundziswa eSifundvweni seBuchwepheshe Technology teacher and learners participated in a study seeking to determine how the integration of indigenous knowledge and skills can help to promote learners' understanding of graphic design, which forms part of the content taught in Technology Education. Lwati lwebuchwepheshe nemakhono losekuvele kukhona encenye yenzabuko leyo linyenti lebafundzi lebeta, baphindza bayisebentisa lokwenta kufundza ngemakhona etitfombe nemifanekiso kwekubili kufaneleke kuphindze kuvisiseke kakhulu. Ngenca yalesizatfu, thishela munye wesifundvo seBuchwepheshe weLibanga 9 wakhetfwa ngenhloso kute ahlolwe ngemibuto, aphindze acashelwe lapho afundzisa. Bafundzi labaSikhombisa kuleliklasi lalothishela bakhetfwa kute bahlolwe ngemibuto, lokwatsi emva kwaloko ledatha yahlatiywa. Ngekusebentisa ithiyori yemcambitayela yekufundza kute kwetiwe luhlaka lwalesifundvo, lokutfoliwe kuveta kutsi, nakuba thishela anekuvisisa lokutsite ngebuchwepheshe, (i) unebumatima ngemcondvo welwati lwenzabuko; (ii) bekangati nekutsi lwati lwenzabuko kukhulunywa ngalo esifundvweni seCurriculum Assessment Policy Statement (CAPS); nekutsi (iii) lwati lwakhe lolulinganiselwe ngemcodvo welwati lwenzabuko kusho kutsi akakwati kukufaka lapho afundzisa likhono lekuhlanganisa titfombe nemifanekiso. Amange asebentise lwati lwenzabuko kutsi lumsite njengemtfombo wesimondzawo sekulambela kufundzisa lebekabukene naso. Nakuba akuvuma kubaluleka kwemasiko ebafundzi bakhe, amange akusebentise kutsi kumsite ekufundziseni kwakhe. Kusebentisa kufanekisa njengendlela legceme kakhulu ekufundziseni kwakhe kumnike litfuba lekufaka lwati lwenzabuko nemakhono, kodwa, futsi, amange akusebentise kute kumsite. Lokutfolwe kulesifundvo kungasita ekushintjeni kufundzisa sifundvo seBuchwepheshe, ngekuciniseka kutsi kufakwa lwati lwenzabuko ekufundziseni emakhono ekuhlanganisa titfombe nemifanekiso – lokuyintfo ledzingeka kakhulu emfundvweni nemcodvo we (Ningizimu) ne-Afrika.

**Emagama labalulekile:** emasiko, lwati lwenzabuko, kufakwa, likhono  
lekuhlanganisa tiffombe nemifanekiso, emakhono, Imfundvo Yebuchwepheshe

## NGOKURHUNYEZIWEKO

Leli rhubhululo elilodwa elihlathululako elisasibonelo beliphenya ngokuhlanganiswa kwelwazi kanye namakghonofundwa wendabuko asagrafu kukharikhyulamu yeThekinoloji yesikolo esisesiPhandeni seHlanzeni esiFundeni seMpumalanga. Ukufika lapha. utitjhere wakwaGreyidi 9 kanye nabafundi bazibandakanye kurhubhululo elifuna ukuthola ukobana ukuhlanganiswa kwelwazi namakghonofundwa kungasiza bunjani ekuthuthukiseni ilwazi labafundi malungana nokudizayinwa kwamagrafiki (*graphic design*), okuyinto eyingcenywe yomongo ofundiswa eFundweni yeThekonoloji. Ilwazi kanye namakghonofundwa wegrafiki sele akhona ngaphakathi kobujamo bendabuko, kukulapho abafundi abanengi beza khona, kanti bangasebenza ukobana benze ukufundwa kwedizayini yegrafiki ukobana kukhambisane neendingo zabafundi begodu kuzwisiseke. Yeke-ke ngalesi sizathu, utitjhere munye wakwa Greyidi 9 weThekinoloji wakhethwa ngehloso ukobana abuzwe ngehloso, ngemva kwalokho idatha yoke yahlathululwa. Ngokulandela ithiyori *i-constructivist theory* yokufunda ngokwesakhiwo serhubhululo leli, okutholakeleko kwaveza ukobana, nanyana utitjhere bekanelwazi lethekinoloji, y, (i) bekakalukana nokuzwisisa amagama amalungana nelwazi lendabuko; (ii) bekangakatjheji ukobana ilwazi lendabuko khelavezwa kuSitatimende soMthethomgomo seKharikhyulamu yezokuHlola (*Curriculum Assessment Policy Statement (CAPS)*) yesifundo; begodu (iii) ukuzwisisa kwakhe kancani igama lelwazi lendabuko bekutjho ukobana bekangazi ukobana ilwazi leli bekangalihlanganisa bunjani nokufundisa ukudizayinwa kwegrafiki. Njengombana wabuka ukuqakatheka kwesikopilo labafundi, akhange asebenzise ngokuzeleko ithuba eliveleko lokha nakafundisako. Ukulandela kwakhe indlela yokufundisa ngokukhombisa njengendlela ejayelekileko yokufundisa kulethe ithuba lokuhlanganisa ilwazi kanye namakghonofundwa wendabuko, kanti, begodu, akhange abambelele kilokho. Okutholakeleko kileli rhubhululo kungasiza ukutjhugulula ukufundiswa kweThekinoloji, ngokuqinisekisa ukuhlanganiswa kwelwazi lendabuko ngokudizayinwa kwegrafiki – okuyindlela edingeka khulu efundweni ngaphasi kobujamo beSewula Afrika.

**Amagama aqakathekileko:** isikopilo, ilwazi lendabuko, ukuhlanganiswa, kudizayinwa kwegrafiki, amakghonofundwa, iFundo yeThekinoloji

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## **LIST OF ACRONYMS AND ABBREVIATIONS**

ACE	Advanced Certificate in Education
CAAC	Contemporary African Art Collection
CAD	Computer Aided Design
CAPS	Curriculum, Assessment Policy Statement
DBE	Department of Basic Education
DoE	Department of Education
EGD	Engineering Graphic Design
GD	Graphic Design
IK	Indigenous Knowledge
IKS	Indigenous Knowledge System
IWK	Indigenous Ways of Knowing
LCO	Learner Christian Organisation
MINI-PAT	Mini Practical Assessment Task
TE	Technology Education
2D	Two Dimensional
3D	Three Dimensional

# CHAPTER 1

## ORIENTATION INTO THE STUDY

### 1.1 Background of the study

This is a case study which explored the integration of indigenous graphics knowledge and skills into the teaching of Technology in order to enhance the understanding among Grade 9 learners of graphic design in Technology Education from an indigenous point of view. The background, rationale, problem of the statement, aim of the study, motivation, definition of terms and the outline of the chapters are provided in this chapter. In this study, concepts such as Technology, Technology subject and Technology Education are used interchangeably throughout.

Technology Education is a relatively new phenomenon in curricula, both nationally and internationally. Technology Education has developed as a subject in many countries over the past three to four decades. Internationally, looking at New Zealand, for an example, the Technology Education curriculum was developed relatively recently, despite the long history of Technical Education (Jones, 1997:46). The New Zealand Technology Education curriculum places more emphasis on human needs, as learners are expected to engage with human and social interests, within specific contexts and constraints, through value judgements (Jones, 1997:57). Value judgement, in this regard, is associated with indigenous knowledge systems (IKS), as they play an important role in problem solving within specific societal contexts.

In a similar manner, in South Africa the Technology Education curriculum, when compared to subjects such as Science and Mathematics, is relatively new. The core of Technology as a subject is in the nature of design. The design process forms the heart of Technology as a subject in problem solving. Graphics, therefore, plays a very important role in problem solving, i.e., to communicate the possible solutions and, subsequently, the solution to the problem during the process. It is against this background that graphic design is defined as “problem solving” (Amy, 2011:4). Solutions to problems in graphic design always relate to visual communication (drawings). Drawings are the product of the freehand, mechanical or computer

methods which form representations of objects and structures (Chedi, 2015:129). This attests to the fact that technical design, drafting and drawings are essential in the curricula of Technology Education, Engineering and Design programmes (Kabouridis, 2010:110). In the South African context, graphics forms part of Senior Phase Technology Education and part of the technical subjects in the Further Education and Training Band. The focus in this study was on Senior Phase Grade 9.

The Constitution of the Republic of South Africa, Act 108 of 1996, provides the basis for curriculum transformation and development in South Africa (Department of Basic Education [DBE], 2005:1). This transformation led to an introduction of Technology as a subject in 1998. Technology plays an important role in developing learners who can identify and solve problems and who can make decisions using critical and creative thinking (DBE, 2002:5). In the context of the transformation agenda, one of the main aims of introducing Technology into the South African curriculum, as per the Curriculum Assessment Policy Statement (CAPS), was to recognise the need to produce the engineers, technicians and artisans required in a modern society, and to appreciate the interaction between people's values and attitudes, technology, society and the environment (DBE, 2011:8). The appreciation of the interaction between people's values, attitudes, technology, society, and environment is an indication that Technology Education recognises indigenous knowledge systems (IKS). Studies conducted by Amy (2011:4) and Gumbo (2015:61) indicate that IKS play a major role in the impact of how learners learn. Custer (in Gumbo, 2015:63) states that a more balanced technological perspective is to begin with imagination and culture, and then consider and appreciate the wonderful diversity that has been created. It is against this background that IKS should be considered in Technology teaching and learning activities, including those that involve graphic design.

Technology is practical in nature, which enables learners to gain an idea of the way engineers apply scientific principles to practical problems. Solving practical problems requires learners to follow the design process. The design process is the main methodological approach adopted for teaching Technology. Technology requires the implementation of the design process in the classroom to enable learners to use graphics in communicating and sharing ideas (DBE, 2011:13). The design process

provides learners with an opportunity to develop the important design skills of investigating, designing, making, evaluating and communicating in Technology.

This study concentrated on the aspect of design skills in the design process. Design skills can be acquired through simple drawings, such as two-dimensional (2D) and complex three-dimensional (3D) shapes. Design comes in different forms, such as graphic design, industrial design and built environment design (architecture, landscape architecture and interior design). Widad and Adnan 2000, in Makgato (2015:1), highlight the notion that Engineering Graphic Design (EGD) provides an accurate and complete picture for every object in terms of shape and size in technology related fields. Technology employs the EGD approach as this approach contributes to the learners' technological literacy by providing them with opportunities to apply the design process to solve civil, electrical, and mechanical problems, both analytically and graphically. However, learners lack an understanding of graphics and its principles (Makgato & Khoza, 2016:613). Makgato and Khoza' s study focused on factors associated with the difficulties experienced by student teachers in mastering the sectional drawing components of an EGD course. In their study, the factors they identified did not include IKS and their study was particularly focused on student teachers at a tertiary institution, and not on Senior Phase Technology Grade 9 learners.

The understanding of graphic design from an indigenous knowledge point of view has not yet been explored in research in Technology Education. The non-integration of IKS in this aspect of Technology Education, at its implementation level, is undesired, especially when considering that the third aim of CAPS includes the impact and biases of technology, as well as indigenous technology (DBE, 2011:8). The conceptualisation of Technology Education from a purely industrial perspective motivates this omission of IKS. Learners from indigenous environments are switched off in the learning situation, as their home/local knowledge is not being catered for. Learners from the non-indigenous environments are also disadvantaged from learning about alternative knowledge forms and ways of technology. Hence, this proposed study explored the integration of indigenous graphics knowledge and skills to enhance the understanding of Grade 9 in graphic design Technology Education from an indigenous point of view.

This study was conducted in the Ehlanzeni District of the Mpumalanga Province. Mpumalanga Province is predominantly a rural province comprising of four major districts, namely, Bohlabela (situated in north-eastern part of the Mpumalanga Lowveld), Ehlanzeni (situated in the Mpumalanga Lowveld, where it shares borders with both Mozambique and Swaziland), Gert Sibande (situated in the southern part of the Province) and Nkangala (situated in the Mpumalanga Highveld). The Province is rich in cultural diversity and local technologies (illustrated in Chapter 2 of this study). The indigenous people of the Mpumalanga Province still value their cultures, languages, traditions and beliefs. The predominant cultures in the Province include the Ndebele, Shangaan, Sotho, Swati and Zulu cultures.

The Mpumalanga Province is well known for its caves (Echo and Sudwala) situated at Ehlanzeni, where there are remarkable marks of graphics on rocks on display. The Province is also known for Ndebele graphics and designs spearheaded by the renowned artist, Esther Mahlangu of the Nkangala District. Esther Mahlangu is an indigenous granny who still follows her indigenous ways of living to assist young generations with IKS (de Jager & Loots, 2003:10). Culture and tradition have had an influence on Esther's paintings which she inherited from her grandmother and mother, which means that history and culture are evoked her paintings. Gumbo (2000), cited by Maluleka, Wilkinson and Gumbo (2006:503), views culture as a concept that embraces technology as one of its descriptors. The cultural paintings are generated from the traditional materials that are known by people and are presented in geometric forms. The designs show daily experiences, are flat and two-dimensional and possess a playfully mesmerising quality. The centrepiece of her paintings is normally a stylised razor blade. The stylised razor blade is an object importantly used in many Ndebele ceremonies and in other cultures. Esther Mahlangu's use of traditional materials has added great value in the development of her technological skills and knowledge. This has enabled her to come up with solutions to visual problems. Her work is displayed on Ndebele houses and on BMW cars.

Technology teachers should consider using the IKS representations and their exponents, such as Esther Mahlangu, as role models. Technology teachers should also consider using the rich heritage of caves, in order to integrate IKS into the teaching and learning of graphics and design. The integration of IKS into the teaching



and learning of graphics and design can be realised when learners communicate their solutions to problems, both visually or graphically. Teachers can also make the integration of IKS into the teaching and learning of graphics possible if they take the background of learners and their indigenous communities into consideration, which values their culture, traditions and beliefs as a way of life. Furthermore, IKS can contribute towards the learners' understanding of graphics within their contexts, specifically drawings, since the materials and methods used are related to the Technology subject (DBE, 2011:8). Consequently, it would be easier for the learners to learn how to draw using indigenous methods and relate these methods to the current curriculum. According to Seemann (2000:2), "the context of human settlements generally dictates the things one had to know and become skilled on". Thus, the development of skills is set within the real-life contexts that require learners to provide solutions in graphical format, taking IKS issues into consideration.

## **1.2 Rationale for the study**

There is a need to integrate IKS into the teaching and learning of graphic design in Technology Education. In his study on *Indigenous Technology in Technology Education curricula and teaching*, Gumbo (2015:58) reveals that Technology lessons are devoid of indigenous technology issues and that Technology teachers appear not to understand the concept IKS. This, therefore, leads to confusion about how IKS should be integrated into the process of teaching and learning. This remains one of the factors that prevent learners from learning graphic design with consideration of their values, beliefs and cultures.

The Technology subject aims to introduce learners to the world of engineers, and how they apply their skills to solving problems graphically (DBE 2011). However, both the studies conducted by Makgato and Khoza (2016) on the integration of the cognitive and manipulative skills used in design, and by Chedi (2015) on technical drawing skills acquisition for teaching and learning and challenges in Technology Education, lack attention to the inclusion of IKS issues. These studies are more focussed on the challenges facing technical graphic/drawing skills acquisition. In both studies, the emphasis is on difficulties students have in the understanding of technical drawings and the background of EGD; and on the lack of understanding of sectional drawing

and principles. However, Jones (1997:57) brings another aspect of the Technology Education curriculum to the fore, one that gives the impression that, all too often, we simply have considered the impact of technology on society, rather than considered the different views people have about Technology; and the way these impressions are influenced by their beliefs, values and ethics. These different views people have about Technology should be applicable when dealing with EGD and IKS. In spite of the findings of Makgato & Khoza (2016) and Chedi (2015), it seems that no effort has been made to integrate IKS into the curriculum, thus, Grade 9 learners still face challenges with the integration of IKS when learning graphic design.

Furthermore, Mpumalanga is predominantly a rural province. I have, however, noticed that learners' home-grown knowledge is not catered for in their learning. It, therefore, becomes imperative that indigenous graphic designs, which are displayed in contexts such as house architecture, sculpture and textile materials, are explored within the broader context of South Africa, down to the local context in the province, and that the educational value and relevance of these designs are recognised.

Therefore, this study intended to explore the integration of indigenous graphics knowledge and skills into the curriculum in order to enhance the Grade 9 learners' understanding of graphic design in Technology Education from an indigenous perspective. An understanding of this integration may assist to provide the techniques to mitigate the lack of understanding when learners design objects or present ideas and their sketched designs.

### **1.3 Statement of the problem**

Technology Education is meant to provide learners with opportunities to apply the design process in order to solve civil, electrical, and mechanical problems analytically and graphically. Therefore, Technology Education has created a need to provide learners with an opportunity to solve technological problems through the design process, where learners communicate and solve problems by using illustrations and drawings that form visual representations of ideas and messages. However, learners lack an understanding of graphic design in Technology Education from an indigenous point of view. This lack of understanding is linked to the non-inclusion of IKS into the

curriculum and a lack of skills in the teaching and learning of the subject. IKS are part of the knowledge forms that learners bring from home or their cultural environment. There is, therefore, a need to explore the integration of indigenous graphics and skills into the curriculum in order to enhance the Grade 9 learners' understanding of graphic design in Technology Education from an indigenous perspective. This problem statement leads to the main research question stated thus:

How can the integration of indigenous graphics knowledge and skills into the Technology Education curriculum enhance the Grade 9 learners' understanding of graphic design in Technology Education from an indigenous perspective? This question is divided into the following sub-questions:

- What indigenous graphics knowledge and skills exist which can help enhance the Grade 9 learners' understanding of graphic design in Technology Education from an indigenous perspective?
- In what ways can these indigenous graphics knowledge and skills be used in the learning of graphic design in Grade 9 Technology?

#### **1.4 Aim of the study**

The aim of the study was to explore the integration of indigenous graphics knowledge and skills into the Technology Education curriculum in order to enhance the Grade 9 Technology learners' understanding of graphic design in Technology Education from an indigenous perspective. The following objectives were pursued in order to achieve this aim:

- To explore the indigenous graphics knowledge and skills that can help enhance the Grade 9 learners to understand graphic design in Technology Education.
- To determine ways in which these indigenous graphics knowledge and skills can be used in the learning of graphic design in Grade 9 Technology Education.

#### **1.5 Motivation for the study**

My passion for, and concern about, design drove my interest in conducting this study on graphic design. This study is in consideration of how learners learn in a manner

which is based on knowledge built from their own experiences, which enables learners to transfer their skills from the familiar to unfamiliar situations. Part of this knowledge and these experiences can be attributed to IKS in the sense that learners learn basic drawing knowledge and skills from their childhood in their indigenous environments and, yet, indigenous graphics knowledge and skills are not entertained in their lessons at school. Onwu and Mosimege (2004:2) claim that IKS support a combination of traditional knowledge and other knowledge systems, such as technological, social, economic and philosophical learning or educational, legal and governance systems.

Technology is a practical subject that values IKS, meaning that, when learners solve problems or learn, they are provided with an opportunity to explore or solve problems considering what is known from their background, as stipulated in the National Curriculum Statement [NCS] (DoE 2003:4) and CAPS (DBE 2011:10). Learners seem to lack an understanding of how to link their graphic knowledge and skills with their background knowledge or experiences of IKS when exposed to related graphics activities (Seery, Lane & Canty, 2015:10). Hence, I was motivated to explore how the integration of indigenous graphics can enhance Grade 9 Technology learners' understanding in learning graphic design. This study is useful in the sense that it helps to highlight the importance of the integration of IKS into graphic design in Technology Education. The outcomes of this study will conscientize Technology teachers to recognise the indigenous graphic designs available in Mpumalanga, especially in rural contexts, which can provide extended knowledge and skills, as well as resources, in the teaching of Technology. The study could help to transform the subject from its conventional knowledge forms to alternative knowledge forms, specifically IKS.

## **1.6 Limitations and delimitations**

This study is limited to qualitative research methods and a case study design was chosen in order to obtain an in-depth understanding of IKS and their importance in the teaching and learning graphics in Grade 9 Technology. The study is limited to Senior Phase Grade 9 in schools in Mpumalanga. In view of this, the study cannot be generalised, but could inform the teaching and learning of Technology in similar contexts and inspire future studies in the field.

## **1.7 Overview of research methodology**

This study employed a qualitative approach. Qualitative research is an approach used for exploring and understanding the meaning that individuals or groups ascribe to a social or human problem (Creswell, 2014:32). A descriptive case study, as a research design, was adopted in order to explore the integration of indigenous graphics knowledge and skills into the Technology Education curriculum in order to enhance the Grade 9 Technology learners' understanding of graphic design in Technology Education. A non-probability sampling of Grade 9 Technology learners at a school in the Ehlanzeni District of the Mpumalanga Province was used. Seven learners and one teacher were purposively selected for interviews and observation as data collection instruments. Content analysis was used on the interview data, which were corroborated with observation data. Themes emanated from the notes of the coded and manipulated interview and observation data. The ethical protocol was observed in the study in order to protect the rights of the participants and to ensure their confidential and voluntary participation in the study. To ensure ethical protocol, an application for ethical clearance was granted by the University of South Africa (UNISA) and permission to conduct the study was granted by the DBE. The research methodology is fully accounted for in Chapter 3.

## **1.8 Definition of key terms**

### **1.8.1 Design**

The term design means the generation of variety solutions to problems (Thatcher, 2013:56). Design is a creative, intellectual, problem-solving process involving problem identification, planning, research, innovation, conceptualisation, prototyping and critical reflection. This process typically results in environments, systems, services and products that may be unique or intended for mass production, hand-crafted or produced by mechanical and/or electronic means. Design is concerned with issues of purpose, functionality and aesthetics in shaping the social, cultural, and physical environment to the benefit of the nation (DBE, 2004:4).

The above definition is in line with this study, as design sets the base from which learning takes place in the Technology subject, specifically graphic design and the integration of IKS. As stated, design is concerned with the issues of purpose,

functionality and aesthetics in shaping the social, cultural and physical environments. Furthermore, the definition recognises creativity, which should be considered in order for the learners to come up with different solutions during design. These solutions can be enriched by involving IKS. Thus, teachers should allow learners to learn using their own knowledge to solve problems, which should be presented analytically and graphically. This would provide learners with an opportunity to learn through exploration. In line with the definition, it is clear that IKS should be recognised in the learning of graphic design.

### **1.8.2 Design process**

The design process is a creative and interactive approach used to develop solutions to identified problems or human needs (DBE, 2011:11). Skills associated with the design process include investigating, designing (development of initial ideas), making, evaluating, and communicating. The design process is also utilised by engineers, architects, industrial designers and many others when developing original ideas to meet the needs or wants of people, and to solve problems, where learners present their solutions both analytical and graphically (DBE, 2011:11).

This definition fits well with this study as it provides learners with ample opportunities to learn considering their own experiences (background, cultures and beliefs) which can be used in the investigation of the problem and attempting solutions. The learners' designed solutions may be based on their surroundings (communities). Based on these definitions, through their investigations and drawing on their backgrounds, learners are supposed to learn ways in which drawings are presented. This can simplify the learning of graphics.

### **1.8.3 Design and Technology**

At the simplest level, design and technology have two components, i.e., design and technology in close relationship. "While design involves using technology to achieve solutions that satisfy sound design criteria, technology uses design to achieve solutions that satisfy sound technological criteria" (Eggleston, 1997:21). As stated above, design paves the way for the learning of graphic design with regard to IKS integration in relation to technology. Van Aswegen (1990:7) highlights the fact that indigenous people made tools themselves, which shows that they were the main

custodians of knowledge about indigenous technology. Therefore, I hold a view from the above statement that, in every technology, there is a design which requires the involvement of prior knowledge from the learners' background and surroundings.

#### **1.8.4 Graphic design**

The term graphic design is defined as a creative process that combines art and technology to communicate ideas in both print and electronic media. Graphic design often refers to both the process (designing) by which the visual communication is created and the products (designs) that are generated (DBE 2011:12). This definition fits well with the current study in the sense that graphic design employs creativity, as learners are required to use their creativity in the exploration of designs from a graphics point of view. The creative process combines art and technology. Combining art and technology allows for the integration of IKS through the use of art and technology, enhancing the learners' learning of graphic design through the creative processes. Technology and art were used before western colonial education, which played a role in excluding indigenous technology from the formal school curriculum (Maluleka, Wilkinson & Gumbo, 2006:501). I, therefore, conclude that ingenious people were involved creativity in every product that they produced. So, in this case, learners need to understand and use methods which were used by ingenious people in an integrated manner in order for the learning of graphics to take place. In support of this assertion, Maluleka et al. (2006:510) suggest that "activities for learners should be thought out in such a way that they encourage an interaction between learners and indigenous contexts". This could, therefore, mean that indigenous communities could assist learners in the learning of graphics through their contextualised knowledge and technology because Technology also expresses itself through art (Maluleka et al., 2006; Custer, 1995; Gumbo, 2003).

#### **1.8.5 Engineering graphics and design**

Engineering Graphics and Design integrates cognitive and manipulative skills and uses lines, symbols and technologies to design and communicate graphically. The subject combines lines and symbols to render services and design processes and systems that contribute to economic growth and an enhanced quality of life (DoE 2006:9). This definition shows that EGD is based on the way in which the lines and symbols can be used to develop the systems that enhance the quality of life. This

simply means that the teaching of graphics should promote the role of IKS in the society. In other words, learners need to produce products using knowledge gained from indigenous communities within their perception of graphics as they are supposed to relate to the knowledge and skills taught that depend on the knowledge background they obtain from their indigenous communities.

### **1.8.6 Technology Education**

According to Reddy (1995:14), Technology Education (TE) is defined as “an activity which involves investigating peoples’ needs in the contexts of the home, school, community, and larger environment. Learners need to consider the economic, moral, social, and environmental consequences of their ideas and innovations when “identifying, designing, making and evaluation of their ideas”. TE also concerns itself with technological knowledge, skills and processes, and an understanding of the impact technology has on the individual and on society.

### **1.8.7 Technology**

Technology can be defined as the use of knowledge, skills, values and resources to meet people’s needs and wants by developing practical solutions to problems, taking social and environmental factors into consideration (DBE 2011:8). Gumbo (2019:3) posits that, Technology involves humankind’s purposeful mastering and creative use of knowledge and skills with regard to products, processes and approaches so as better to control his environment. According to Ndlovu (2012:7), the Technology subject, or the subject of Technology, or the Technology curriculum, refers to the explicit curriculum taught in a school or other educational institution which seeks to develop knowledge, skills, values and attitudes associated with the body of knowledge and activities of Technology.

The above definitions suit this study well as they recognise an activity that is all about investigating people’s needs. This means that education occurs in many contexts, such as in the home, and not only at school. The Technology subject is one of the subjects that does not limit how learning should take place. So, as a subject, Technology plays a vital role in assisting the learners to learn through the construction of their knowledge in different contexts, as stipulated above.



### **1.8.8 Indigenous knowledge system**

Indigenous knowledge systems refer to the knowledge systems that are unique to a given culture (Tharakan 2017:124). IKS may seem to tone down the metaphysical aspects of such systems by referring to them as the combination of knowledge systems encompassing technology, social, economic and philosophical learning, or educational, legal and governance systems. They refer to the knowledge related to the technological, social, institutional, scientific and developmental aspects, including those used in the liberation struggles (Odora Hoppers & Makhale-Mahlangu 1998 in Odora Hoppers 2002: 8-9).

The definition of IKS gives a base for the learning of graphics as the community will be a source of information with regard to the understanding of graphics. The learning of graphics would be enhanced by the use of indigenous tools.

## **9. Overview of chapters**

### **Chapter 1**

This chapter comprises the background, rationale, problem statement and research questions, aim and objectives, motivation for the study, as well as a definition of key terms.

### **Chapter 2**

This chapter discusses a scholarly literature review of the studies that address the research problem. The chapter also outlines the theoretical framework that drives this study on IKS and their integration into the teaching and learning of graphic design.

### **Chapter 3**

This chapter discusses the research methodology used in the study, accompanied by the research design, population and sampling, data collection analysis and ethical considerations.

### **Chapter 4**

The chapter presents the data analyses and findings of the study.

## **Chapter 5**

This chapter concludes the study by summarizing the findings, drawing relevant conclusions and making recommendations.

## CHAPTER 2

### LITERATURE REVIEW

#### 2.1 Introduction

The purpose of this scholarly literature review was to explore graphic design from an indigenous perspective. The idea was to give consideration to the value that the integration of indigenous graphic knowledge and skills contributes to the learning of Technology. As part of embarking on this exercise, crucial factors related to the integration were highlighted. Therefore, this chapter discusses the literature on the integration of indigenous graphics knowledge and skills into the TE curriculum in order to enhance the Grade 9 learners' understanding of graphic design in TE. Moreover, the chapter defines the important concepts related to the integration of IKS and outlines the theoretical framework that drove the study. The next section discusses the theoretical framework chosen for the study.

#### 2.2 Theoretical framework

The constructivist learning theory and the indigenous paradigm guided this study. The constructivist theory emanates from the work of the two scholars, Jean Piaget and Lev Vygotsky. The next two paragraphs discuss their work briefly.

Von Glasersfeld (1998:1) acknowledges that Jean Piaget was in the forefront of the development of constructivism during the 20th century. Piaget views the human mind as a natural product of evolution that helps to find equilibrium within the environment and helps one to adapt to the different conditions of life (Pass, 2004:xi). According to Von Glasersfeld (1982:613-614), Piaget believes that knowledge involves organisation that concerns action, an entity that is connected to action, and is not meant to describe or to replicate the environment. Piaget suggests four stages of chronological development, which are sensorimotor from birth to 1½ years; preoperational from 2-3 years to 7-8 years; concrete operational from 7-8 years to 12-14 years; formal operational older than 14 years (Pass, 2004:xiv). Piaget's stages of development charted the development of human cognition. Cognitive structures are formed, externalised, internalised and eventually construction (reality) takes place. Zooming

into the present study for Grade 9 Technology class, which is the operational stage, a learner starts to understand that he or she lives in a social context in which there is a special form of interaction. This stage brings not only a new form of interaction but action structures, assimilation and validating cognitive structures and knowledge through mutual agreement and confirmation (Von Glasersfeld, 1982:624). It is however argued that Piaget's generic epistemology tries to focus on individualisation which is more radical in nature (Pass, 2007:277) (see also sub section 2.2.1.1).

In contrary to Piaget, Lev Vygotsky views both human psyche and its development as a result of the acceptance of cultural-historical experience of humanity resulting from the interaction with adults (Pass, 2004:x). Vygotsky further emphasises that the whole purpose of education lies in the organisation of a child's interaction with adults of which if it is missing, there is no development (Pass, 2004:x). Just as Piaget suggests four stages of development, Vygotsky originally postulated three stages of development such as pre-causality, secondary differentiation and differentiation. However, these stages were modified into two with pre-causality being the primary differentiation, and real instrumentation. The stage of real instrumentation was further categorised into four stages of development, namely: primary differentiation, secondary differentiation, differentiation, zone of proximal development (ZPD). The ZPD is the difference between the knowledge that a child obtains by self and the knowledge that a child obtains with the help of adults. The four developmental stages fit well to form a theoretical foundation for the present study on the infusion of IKS in the teaching of Grade 9 graphic design. Vygotsky's view of child development is promoted by cultural-historical experience which resonates well with social constructivism (see 2.2.1.2).

This concept of constructivism is further discussed in-depth in section 2.2.1 below.

### **2.2.1 Constructivism**

This section focuses on the constructivist theory of the theoretical framework. Constructivism is a philosophical view of how people come to understand or know (Savery & Duffy, 1995:1). Ültanir (2012:195) views constructivism as more than just a social or educational theory, but as a scientific and meta-theory, which defines the daily life theories of humanity. Human beings perceive, interpret and explain the same object differently in order for the object to make sense. This, in itself, demands a

constructivist approach (Ültanir, 2012:196). According to Hein (1991:1), the term constructivism refers to the idea that, as learners learn, they construct knowledge for themselves individually (and socially). Reddy, Ankiewicz and De Swardt (2005:19) claim that learning is an active process of knowledge construction on the part of learners, a notion which has become popular. This has contributed to the burgeoning popularity of constructivism as an instructional approach to learning. O'Loughlin (1992:336) posits that the popular view is that constructivism is synonymous with approaches to teaching that are progressive and learner-centred and is a “welcome antidote to traditional approaches”. Constructivism focuses upon individuals building representations of their knowledge, which is then tested against experience (McCormick 1997:148). These representations of learners’ knowledge can also be demonstrated when dealing with indigenous graphics knowledge and skills in order to provide learners with an opportunity to show their understanding of graphic design in a Grade 9 TE classroom. Hoover (1996:1) stipulates that constructivism has important implications for teaching. Firstly, teaching cannot be viewed as the transmission of knowledge from the enlightened to the unenlightened. Secondly, if learning is based on prior knowledge, then teachers should take note of that knowledge and provide learning environments that exploit inconsistencies between learners’ current understandings and their new experiences (Hoover, 1996; Clements, 1997). Thirdly, if learners should apply their current understandings to new situations in order to build new knowledge, then teachers should engage learners in learning by bringing learners’ current understanding to the fore (Hoover, 1996:1). Fourthly, if new knowledge is actively built, teachers need to create a conducive environment in which learners can engage meaningfully in activities involving graphic design within the context of indigenous knowledge.

Therefore, with regard to the above implications, constructivist teachers need to create a learning environment in which learners can use their experiences to build new knowledge of indigenous graphic designs in TE (Hoover, 1996 and Clements, 1997 cited in Mvududu & Thiel-Burgess, 2012:110). In so doing, this would provide learners with an understanding of graphic designs during the process of learning, as prior knowledge is taken into consideration.

Reddy et al. (2005:19) state that the constructivist theory promotes the ability to think critically, creatively and conceptually and the ability to solve problems and to make informed decisions about learners' designs. In light of this view of Reddy et al. (2005:19), I hold a view that constructivism, as a learning theory, lays a good foundation for the learning of graphic design, as graphic design requires learners to think critically and creatively and to solve problems in the form of drawings that integrate indigenous graphic designs. Reddy et al. (2005:19) also view the constructivist theory in relation to TE as the theory that guides the process of the teaching and learning of the design process and skills, including those processes that are associated with graphic design, by providing a platform from which to construct knowledge. Constructivism as a learning theory stresses that a new form of knowledge is constructed and forms part of the existing constructed knowledge. The application of this theory could provide learners with an opportunity to generate a variety of solutions using graphics or drawings (Yilmaz, 2008:162) as they add to their learning of design knowledge sourced from their indigenous contexts.

Two perspectives arising from the constructivist theory of learning are radical constructivism and social constructivism. Radical constructivism is oriented on Piaget's generic epistemology that concentrates on an individual, whereas social constructivism is more orientated on Vygotsky's cultural-historical theory concentrated on the social in learning (Pass, 2004: xiv) (see section 2.1). These perspectives play a very important role in learning and instruction, and also in learning indigenous graphic designs in TE, and each is looked at in detail in the following sub-sections.

#### **2.2.1.1 Radical constructivism**

This sub-section focuses on radical constructivism in relation to graphic designs. Reddy et al. (2005:19) suggest that, in view of knowledge construction in radical constructivism, human beings are, from birth, constantly engaged in a process of adaptation of knowledge through individual life experiences. Zietsman (1996 cited in Reddy et al., 2005:19), posits that human knowledge does not consist of real, true facts, but is viewed as knowledge that is viable to the individual in making sense of the world that they live in. Therefore, in this case, radical constructivism suggests that teachers "create situations in which learners could develop and exert their innate drive

towards acting independently” (Candy, 1991:258). In addition, radical constructivism as an approach used to promote learning in TE provides each learner with an opportunity to experience knowledge construction through a process of creative and critical thinking, decision making, problem solving and design on an individual basis (Reddy et al., 2005:20). Radical constructivism has its roots in the self-construction of sense, meaning or ideas about objects of phenomena around people. This process of construction of knowledge by an individual is deeply associated with representational thinking, where an individual learner demonstrates knowledge based on experiences from their society in relation to graphic design. A radical constructivist respects the presence of different ideas in relation to an object or phenomenon.

#### **2.2.1.2 Social constructivism**

The social constructivist perspective differs from the radical constructivist perspective in that social constructivism sees learning as a process of enculturation, where learners possess multiple frames of reference with which to construct knowledge (Reddy et al., 2005:20). This sub-section focuses on the social constructivism. Mutekwe, Ndofirepi, Maphosa, Wadesango and Machingambi (2013:54) define social constructivism as an epistemology that promotes the social construction of knowledge through interactive teaching and learning activities in the classroom. Mutekwe et al. (2013:54) further highlight that social constructivism undergirds the importance of knowledge as a product co-constructed through meaningful interactions between teachers and learners in the classroom. On the other hand, Reddy et al. (2005:20) view social constructivist learning as a process of “enculturation”, where learners are inducted into the cultural practices of the societies in which they live. The social constructivist assumes that understanding, significance and meaning are developed in co-ordination with other human beings (Amineh & Asl, 2015:13). Social constructivism is based upon assumptions about reality, knowledge and learning. Social constructivists assume that reality is not out there, but it is constructed through the social interactions of individuals. According to Ernest (1999:3), knowledge is a construction or product of human interactions through social and cultural activities. Thus, learning is a social process conducted through social activities.

This study focuses on social constructivism where learners are expected to interact with their prior knowledge and background in order to present technological solutions

analytically and graphically during technological activities in a design situation. Social constructivism provides learners with an opportunity to draw from their experiences within their social context (Von Glaserfeld, 1992:624). In line with this statement, Mutekwe et al. (2013:54) assert that adoption of the social constructivist theory has the potential to afford virtually all learners an opportunity to participate in interactive learning activities in the classroom. Social constructivism also emphasises teaching and learning that draw from the learners' diverse socio-cultural backgrounds (Vygotsky, 1987; Kozulin, 2002). TE learners come from different backgrounds and exposure socially and culturally, so there is diversity of experiences that a social constructivist teacher can explore and tap into in order to promote the learning of indigenous graphic design. This assertion resonates well with IKS issues that need to be taken into consideration when selecting content and methodologies in the Technology subject when dealing with graphic design activities. In the light of the above arguments, the constructivist theory is used in this study to allow learners to learn by having regard for their prior knowledge, as indigenous knowledge and skills are taken into consideration in the learning of graphic design. The employment of the constructivist theory in this study enables learners to learn taking into account their backgrounds and culture, as these factors play a vital role. The constructivist theory, as discussed above, attracts the African expression of knowledge construction. Hence, consideration is given to the merging of these constructivism and the indigenous knowledge construction in order to advance an African indigenous perspective as the title of the study suggests. Indigenous knowledge is first of all discussed in detail in the next section.

### **2.2.2 Indigenous knowledge as a framework**

Indigenous knowledge is located within IKS. Maurial (1999:62) defines indigenous knowledge as the peoples' cognitive and wise legacy as a result of their interaction with nature in a common territory. Hart (2010:2) defines indigenous knowledge as the established knowledge of indigenous people, their worldviews and the customs and traditions that direct them. The two definitions are lacking in detail, as they are more of western orientation, which is not bad. However, there are a number of definitions of indigenous knowledge by various African scholars, such as Odora Hoppers, Gumbo, Shava and many others. According to Shava (2013:384), the definition of IKS should incorporate key important aspects, such as people, context, culture, language,



knowledge, practices and dynamism. Odora Hoppers (2004:2) associates IKS with traditional knowledge, whereas Gumbo (2017:4) posits that the traditional environmental knowledge should be seen as a means to understand complex systems in order to give rise to a greater understanding of IKS. Odora Hoppers (2004) and Gumbo (2017) share a similar view of traditional knowledge and the important role it plays in IKS. In the same breath, the traditional knowledge can be located within the aspects of people, context, culture, knowledge and practices, as highlighted by Shava (2013) in his definition of IKS. Overall, the contributions made by Maurial (1999), Hart (2010), Odora Hoppers (2004), Shava (2013) and Gumbo (2017) towards defining IKS resonate with the aspects of people, context, culture, language, knowledge, practices and dynamism highlighted in Shava's (2004) definition of IKS. These characteristics are at the heart of the indigenous paradigm in this study. My view is that the contributions by these authors should be seen as a means to encourage learners' interaction with their societal and traditional views towards the learning of graphic design and, in turn, enhance their understanding of graphic design within the context of indigenous knowledge. Indigenous knowledge is employed in this study to support the theoretical framework that guides the study, based on the construction of knowledge, which would enable learners to construct knowledge from within their indigenous situations (discussed in detail in section 2.7).

The incorporation of social factors, such as the arts and indigenous symbols, towards drawing in the teaching of Technology may provide clarity, direction and focus to learners when they are given an opportunity to experience knowledge construction in graphic design and to express their design ideas through graphics as informed by their context-based designs. Indigenous knowledge systems focus specifically on teaching indigenous knowledge, models, methods and content within formal or non-formal educational systems (Semali & Kincheloe, 2002:4). The growing recognition and use of indigenous education methods can be employed as a vehicle for promoting learning equality in education, which can be viewed as a worthwhile response to the erosion and loss of indigenous knowledge systems that have resulted from colonialism, globalisation and modernity (May & Aikman, 2003; Shava, 2013). Integrating IKS into the school curriculum has the potential to afford indigenous communities an opportunity to reclaim and revalue their socio-cultural traditions, languages, beliefs, attitudes and values and, in so doing, improve the educational success of indigenous

learners, thus ensuring their respect, survival and integration into the global culture (May & Aikman, 2003:139). Adopting collaborative learning experiences, where the learners' basic IKS are used as prior learning experiences, suggests that TE teachers should encourage learners to narrate their experiences based on the complexities of cultures, localities and societies (Gumbo, 2017:4). Thus, collaborative learning has the potential to increase the learners' desire for more interactive classrooms (Odora Hoppers, 2011:24). In current applications of the sociocultural theory, with emphasis on co-participation, co-operative learning and joint discovery, learners and teachers need to bring their existing knowledge. It is knowledge that integrates people, context, culture, language, practices and dynamism into their learning and teaching, so that they use this knowledge to co-construct new forms of knowledge in line with the constructivist and indigenous paradigms (Shava, 2004; Wertsch, 2008; Van der Westhuizen, 2009).

In the South African CAPS curriculum, the Technology as a subject recognises IKS as one of the approaches that should be integrated into the teaching and learning process. In view of this, I argue that the integration of IKS into the learning of graphic design could enable learners to link what is learned in the classroom with their background experiences in order to co-construct new knowledge. According to Semchison (2001:10), learning is part of the process of, not only acquiring new knowledge, but also of accessing that encoded or stored knowledge. This means that, where indigenous knowledge learning-experiences are used to mediate learning, the potential for social harmony is greater than when unfamiliar learning experiences are employed. From the learners' background, IKS could promote the potential for learners to learn with recognition of what is known from their everyday experiences, thus relating to the knowledge they use in two dimensional (2D) and three dimensional (3D) drawings, such as cars, houses and bridges, for example. In line with constructivist theory, learners construct new knowledge based on what is already known to them. Therefore, the study dealt with incorporating IKS into TE as part for learning graphics in the classroom situation.

Hiatt (1984:786) stresses that learners learn through exploration. Hence, it is the duty of the teacher to encourage learners to become actively engaged in discovering what the world of basic design skills (graphics) is like. Tyler (1949:63) maintains that

learning takes place through the experiences which the learner has. The learning experience might be a teacher demonstrating the use of triangulation in structures to strengthen the construction of a model bridge (Tyler, 1949:63). The process evokes design thinking in the mind of a learner which can be examined in multiple fields, such as engineering and architecture. (Brown, 2009:8). Razzouk and Shute (2012:330) view this process as “an analytic and creative process that engage a person in opportunities to experiment, create and prototype models, gather feedback and redesign”. In line with Razzouk’s and Shutte’s assessment, the operation of design is comprised of the stages of solution generation, exploration, comparison and selection of solution (Stempfe & Badke-Schaube, 2002:476). However, the reasons for the inclusion of designing and making within the CAPS curriculum is in recognition of the capability to investigate, design, make and appraise, which is as important aspect in the acquisition of knowledge (DBE, 2011:12). Creativity plays a very crucial role during design activities, as it is an original cognitive ability employed in problem solving (Hamza & Hassan, 2016:587). The section that follows discusses creativity in indigenous designs in detail. The next section follows the above by now looking at indigenous graphic design and creativity.

### **2.3 Indigenous graphic design and creativity**

Indigenous design portrays the identity and living values of one culture. Thus, it gives an important representation of creative indigenous knowledge among the society. Therefore, in this study, creativity sets as a basic platform in designing as indigenous designs are embedded in a community practice, relationships and rituals. The concept of creativity is central to design practice and is defined from different perspectives (Visser, Chandler & Grainger, 2017:54). Kim (2006:3) unpacks the term creativity in the following five steps:

- a process of becoming sensitive to a problem, deficiencies, gaps in knowledge, missing elements and disharmonies;
- identifying the difficulty;
- searching for solutions, making guesses or formulating hypothesis about these deficiencies;
- testing and retesting these hypotheses and possibly modifying and retesting them; and,

- communicating the result.

In order for teachers to enhance learners' understanding of indigenous graphic design in a Grade 9 TE classroom, engaging these five steps in planning learning activities could be helpful. This notion is in line with the view of Rabino, Borri, Stufano and Melone (2014:224) about creativity being an innate ability by which actions of original creation give rise to brand new items and elements. This innate ability to create is regarded as a process in which a learner is able to transform and recombine existing entities toward different, novel configurations. I argue that, if teachers can strive to expose learners to realise their innate ability, then Rabino et al.'s (2014) view can be realised in indigenous graphic design practices.

In line with the present study, Visser, Chandler and Grainger (2017:54) view creativity as central to graphic design practice, and that creativity is also a quality that is valued, expressed and assessed in tertiary design education. This should also happen in a Grade 9 TE class in ordinary school education. Creativity plays a central role, as imaginative solutions are sought through design briefs in graphic design practice, and in pedagogy, where creative thinking plays an important role towards developing creative solutions to design problems in graphic design (Cross, 2011:11). Hokanson (2007:353) views creativity as a way of generating new ideas and as a critical skill in any field, particularly in the field of design, as well as a cognitive and generative ability. Cox (2005:8) defines creativity as "the generation of new ideas in either new way of looking at existing problems or of seeing new opportunities". According to Bull, Montgomery and Baloch (1995), cited in Hokanson (2007:354), cognitive, personal, motivational and social interactive approaches are a wide range of methods within the educational contexts which can be employed to increase creativity. These methods, together with the integration of indigenous knowledge into the curriculum, could be used to address learners with different social/cognitive preferences during the learning of graphic design, within the structure of a single class.

In view of the above definitions, creativity should be considered in the learning of graphic design since it is based on learners' finding solutions to problems. This provides learners with the opportunity to use their own knowledge in presenting solutions. Thus, the learners' presentations of solutions to the problems would also

enable them to explore their learning and integrate the IKS gained from their surroundings, or outside of their classroom. Emphasis should be placed on creativity at the centre of learning in the Technology subject (DBE, 2011:11). Furthermore, creativity forms a foundation for integration of IKS in a way that triggers learners' solutions to the problem which are influenced by consideration of their knowledge background.

## **2.4 Creativity in relation to IKS**

This section touches on the difficult concepts of creativity to bring into perspective the concepts of creativity and graphic design in relation to IKS. Indigenous graphic designs, if placed at the heart of creative activity, could play a very important role towards learning graphic design in a Grade 9 classroom. The activity of creative practice plays an important role in producing ideas and products that come from manipulating and transforming resources through a creative process and offers a credible and systematic approach to arriving at a conclusion or solution (Visser, Chander & Grainger, 2017: 54).

In this study, creative practices were based in the context of indigenous graphic design, as creativity is at the helm of idea generation in TE. Mumford, Medeiros and Partlow (2012:43) suggest that creativity at the helm of idea generation through creative processes has to do with problem definition and problem solving. Mumford et al. (2012:43) further describe creativity as the ability to come up with ideas or artefacts that are novel, surprising and valuable. Novelty or innovation and appropriateness are two elements, together with suitability, that comprise creativity (Wong & Sui, 2012:439). These two elements place creativity at the centre of high cognitive level, which might make it difficult for teachers to assess the answers presented by the learners "as they do not" fit the solution to the specific problem.

In order to simplify the difficulty, teachers need to take into consideration an understanding of the two senses of creativity, i.e., psychological (P-creativity) and historical (H-creativity). Wong and Sui (2012:440) identify P-creativity as essential in finding how an individual carries out the creative thinking process, whereas it is impossible to verify H-creativity, except through self-reflection or observation, as there

is no authority which can guarantee that a particular output is novel in the whole of human history. Innovation and suitability have been occurring in indigenous contexts. Indigenous people are able to meet their needs and solve their problems without officially recording the creative thinking skills employed. However, looking at their products, it can be noticed that indigenous people follow the stages of the creative problem-solving process, which are, preparation, incubation, illumination and verification. These stages can be seen through P- and H-creativity, since there is no creative process that can take place without recognising the four stages of problem-solving processes, indigenous creative designs included. The evidence of the creative processes in the indigenous background can be seen in figures 2.4 and 2.5.

In line with graphic design, creativity can allow learners to learn through the exploration of creative possibilities within the context of indigenous graphic design. Hence, creativity encourages issues of IKS which are based on exploration. Learners can explore the creative indigenous graphic designs through their exposure to the elders in indigenous communities. Creativity is best expressed through design, especially by involving indigenous graphic designs. Further discussions on design, design process and graphic design are detailed in section 2.5.

## **2.5 Design, design process and graphic design**

Design, the design process and graphic design are the concept, which involve creativity and thinking in order to encourage innovative ideas and, ultimately, worthwhile solutions (Visser et al., 2017:54). Thatcher (2013:56) defines the term design as the generation of a variety of solutions to problems. Thatcher (2013:56) further outlines that design is a creative, intellectual problem-solving process involving problem identification, planning, research, innovation, conceptualisation, prototyping and critical reflection. The term design sits well with the design process as the design process is also about creativity. The TE CAPS document Grades 7 to 9 stipulates that the design process is a creative and interactive approach used to develop solutions to identified problems or human needs (DBE, 2011:11). The above definitions show that design activities during the design process given should serve as a platform for creativity, which could enable learners to learn graphic design, especially when

informed by the knowledge background they have learned from their indigenous contexts.

The design activity is creative in nature (Visser et al., 2017:54). Graphic design is a creative and analytical process that integrates art and technology in order to communicate ideas and information (Visser et al., 2017:54). According to Hill (1998:207) and to Kerne and Koh (2007:118), an important feature of the design process is the notion that it involves ideation, defined as the process of generating new and sometimes creative ideas. Ideation in graphic design often involves the creation of thumbnails, which are “idea sketches that provide visual evidence of the thinking, searching and sorting process that brings out solutions” (Arntson, 2007:9). However, Pinker (1997:547) considers creativity as a process of revision of ideas generated and engaging these ideas to solve the problem at hand through visual thinking, i.e., graphics. Visual thinking about graphic design has settled on the basic visual elements, such as dots, lines, shapes, tone, colour and texture, as the root of visual communication (Estrada & Davis, 2015:145). I argue that these are the tools of graphic design which Grade 9 TE learners could be exposed to and should use within the context of indigenous creative designs.

According to Erdurak (2002:5), graphic design is the process and art of combining text and graphics to communicate an effective message in any type of visual communication. Arntson (2007:4) alludes that Graphic design is responsible for communicating information through images or visual representations, thus a visual problem-solving activity. The author further suggests that by using the means of visual language, the designer conceives, plans and executes designs that communicate a specific message to specific audience within given limitations. Hence, according to Arnston (2007:4), Graphic design involves the transmission of information and ideas by visual means.

According to Alhajri (2016:424), graphic designing is a creative practice which requires problem solving skills. and multidisciplinary practice so as to combine typography, images and, increasingly, some combination of media for, the purpose of informing, instructing or persuading a given audience to do something.

The section that follows reviews engineering graphic design (EGD) in relation to learning graphic design in Technology education as the basis for understanding its factors.

## **2.6 Factors to consider in learning graphic designs**

EGD integrates the cognitive and manipulative skills that are used to design and communicate graphically (DBE, 2005:9). According to Makgato and Khoza (2016:609), EGD is a course that teaches a medium of communication in the form of drawings. Makgato and Khoza (2016:609) undertook a study to investigate factors associated with the difficulties experienced by student teachers in the sectional drawing component of the EGD course. The study found that students have poor EGD background knowledge, experience difficulties in understanding sectional drawing, lack understanding of sectional drawing principles, lack knowledge of 2D/3D sectional drawing and show poor pedagogical practices in relation to EGD. Furthermore, it has also transpired in the study that students performed poorly in a spatial visualisation test. The authors' findings contributed to my proposition that learners have difficulties in understanding graphic design, lack knowledge of design skills and principles related to graphic designs. This can be mitigated against by exposing the learners to experiences where they could learn from their elders, who hold the principles and values of indigenous knowledge on graphics in their society in relation to Piaget's theory.

Scholars such as Makgato and Khoza (2016:610), in their study on difficulties of student teachers in the EGD course at a South African University: snapshot on sectional drawing, which was conducted using Piaget's theory of perception and imagery, emphasised that Piaget's theory emphasises on how students perceive and visualise graphic designs in the EGD course. This theory is essential in improving the learning of drawings and, thus, improve the performance of the learners. Piaget's theory, as employed by these scholars, forms a solid foundation for the learning of EGD. However, Makgato and Khoza did not consider the integration of IKS into the curriculum in order to enhance the learning of graphic design. It is my view that the teachers' poor understanding of graphic design may be as a result of the participants trying to understand graphic design from purely conventional industry point of view



and, thus, denying themselves the rich indigenous perspectives as alternative knowledge and skills forms. Hence, my study employed constructivism as a learning theory, which resonated well with the integration of IKS into the (teaching of graphic design) TE curriculum.

Constructivism is based on learners' constructed knowledge. Constructivism can afford learners an opportunity to construct knowledge from their own backgrounds, cultures and beliefs. This indigenous knowledge can be gleaned from the elders of the community they are living in, where an insight graphics from an indigenous point of view can be gained. Indigenous knowledge can also be gained by the invitation of an expert on indigenous graphic designs to address the learners and who can share simplified methods which can be used to design products such as shelter, mode of transport, chairs, water carrying capacities. The integration of IKS into the TE curriculum could enable learners to engage with their real-world challenges. Learning from an IKS expert could also afford learners an opportunity to explore ideas with regard to indigenous graphic design, which would require them to learn to master the processes required during design. An IKS expert could also consider sharing language usage in order to define the processes and the use of different tools or equipment required in order to make it easy for learners to understand graphic design. According to Gumbo (2015:67), indigenous forms of technology can instil an interest in indigenous knowledge in learners, as they will learn about their communities' contributions towards understanding IK within their context. The integration of indigenous knowledge into graphic design processes can help to restore and preserve the identities and cultures of the indigenous societies by learning about them.

Furthermore, in the study by Makgato and Khoza (2016) there is a methodological gap. The authors employed mixed method to investigate the difficulties faced by student teachers in the EGD course at a South African University. Therefore, in this regard, the present study methodologically adopted the qualitative method towards exploring the integration of indigenous knowledge and skills into the teaching of graphic design to enhance Grade 9 learners learning of graphic design.

In another study, Jacobs (2005:ii) investigated the way in which Technology teachers plan, teach and assess the technological process and the way in which the learners

experience the teaching and assessment of the technological process. This study's attention was focused on how Grade 7 teachers and learners work towards the achievement of the first aim, i.e., the application of technological processes and skills. The findings of the study indicate that essential skills within the technological process, such as graphic communication, conducting research and testing the product or solution, are seldom developed to enhance the learners' technological capability. These findings also support the thinking that the way graphic design is taught, which is more a western orientation that does not relate to learners' indigenous backgrounds, has an impact on the learners' understanding of graphic design. One can argue that this could be one of the factors that impact on the learners' learning of graphic design (drawing). Jacobs (2005:30) further elaborated on the importance of graphical communication under the umbrella of the vital role that technological process graphical communication plays, meaning that there is no technological process without graphic designs. In line with the thoughts of Jacobs (2005:30), if TE teachers do not undergo a process of understanding graphic design within the context of indigenous background prior to becoming teachers, this might pose a challenge to their level of competence towards the integration of indigenous knowledge into their teaching of graphic design. The training of teachers in this regard should, therefore, act as a factor towards the successful integration of IKS into the teaching and learning of graphics. The aspect of indigenous technology, as prescribed in CAPS, should form the nerve centre of the TE curriculum. If indigenous technology is not noted as the nerve centre of TE curriculum, then the notion that learners are expected to understand and apply the technological process ethically and responsibly, as outlined in CAPS, could as well present some challenges that relate to the teaching of graphic designs (Jacobs, 2015:4).

A study undertaken by Chedi (2015:129) entitled, *Technical drawing/graphic skills acquisition for teaching and learning and challenges in Technology Education*, found that learners find it difficult to visualise a multi-view drawing and to use computer aided design (CAD). The study further shows that there are difficulties faced by both learners and teachers of technical drawing, more especially in the teaching and learning situation. These findings support my view that both learners and teachers lack skills (for example, sketching and drawing) and knowledge of the procedures and conventions of the graphics that enable learners to solve or communicate solutions in

the form of graphical representations using industry conventions, where applicable (DBE, 2011:12).

## **2.7 Learning of graphic design and creativity in relation to IKS**

The study conducted by Groenendijk, Janssen, Rijjaarsdam and van den Bergh (2013:35) on *Learning to be creative: The effects of observational learning on students' design products and processes*, indicates that observation had beneficial effects on creativity in design products, compared to direct strategy instruction for high aptitude students, but not for low aptitude students. In reference to my argument stated earlier in this section, I view the observation of an IKS expert in indigenous graphic design as the solution that could be of beneficial to both the teacher and learners. Therefore, the study's findings support my thinking in that the way graphic design is taught has an impact on learners' learning of graphic design, since the findings reveal that observational learning is a good strategy, although it mostly favours high aptitude learners. This may mean that the way graphic design is facilitated and taught leaves some learners with little understanding of the same. In this case, teachers seem to only observe the process rather than monitor the whole process of learning graphic design.

The study by Groenendijk et al. (2013) makes a huge contribution to understanding how this way of learning can impact on the learners' understanding of graphic design, although the study under review places emphasis on art education. According to this study, creativity is at the centre of the design process in that creativity increases the chances of learner participation towards an understanding of graphic design. This can be made possible if the promotion of creativity is done within the context of learners' indigenous knowledge background, as the promotion of creativity can trigger learners' experiences towards an understanding of graphic designs in context. Additionally, an observational strategy from indigenous expert in the learning of graphic design could assist learners to learn by observing others and by making meaning from their observations, which allows for the understanding of knowledge.

Another study conducted by Ellmers (2014: iii) on *Graphic design education: Fostering the conditions for transfer in a project-based and studio-based learning environment*,

*through a structured and critical approach to reflective practice*, shows that a structured and critical reflection approach can foster the conditions for the transfer of learning from project understanding to critically reflecting on their designs. However, learners may take differing amounts of time to achieve these learning outcomes, and some may not achieve these outcomes at all. Furthermore, the study revealed that an effective way of evaluating their design process supports learners to reflect on their practice, through the activity of reflection, and the notion that providing multiple opportunities to reflect is an important way to bring about understanding of the concepts. Nevertheless, the findings of the study drew to my attention to the notion that multiple opportunities for reflection assists learners to reflect on, and grasp information on, the learning of graphic design and that it can be argued that IKS should form part of these opportunities for reflection. However, a lack of integration of IKS into the curriculum may, in a way, limit some of these multiple opportunities for helping learners learn graphic design. Ellmers (2014:229), supported by Visser et al. (2017:59), indicates that discussions among learners assists learners to learn, hence sufficient time and focus is required to give learners multiple opportunities in learning graphic design skills.

Creativity in learning graphic design is important in that lack of creativity in learning of indigenous graphic design acts as a factor that could hinder proper ways of learning graphics. Creativity should be considered as a concept that could bridge the gap between the integration of IKS and the teaching of graphic design in order to enhance learners' understanding of graphic design. Alhajri (2016:422) outlines the notion that the graphic design education system lacks a unified framework in support of the concept of creativity, which shows a need for the framework that incorporates IKS aspects, which is the focus for the present study on the understanding of graphic design in TE from an indigenous perspective. The lack of unified framework is as a result of the shortage of pedagogically structured programmes that can enhance creativity in indigenous graphic designs. Moreover, it is believed that this is also about underestimating the importance of creativity in the learning and teaching of graphics (Alhajri, 2016:422). In light of the arguments above, I hold the view that promoting creativity in the teaching and learning of indigenous graphic design has the potential to create an environment that will enable learners to learn with regard to their own indigenous surroundings, i.e., their beliefs, cultural backgrounds and values. Besant,

Whyte and Neely (2005), state that design is the purposive application of creativity and leads to a vast array of innovations. Figure 2.1 shows a shortage of pedagogically structured programmes that enhance creativity.

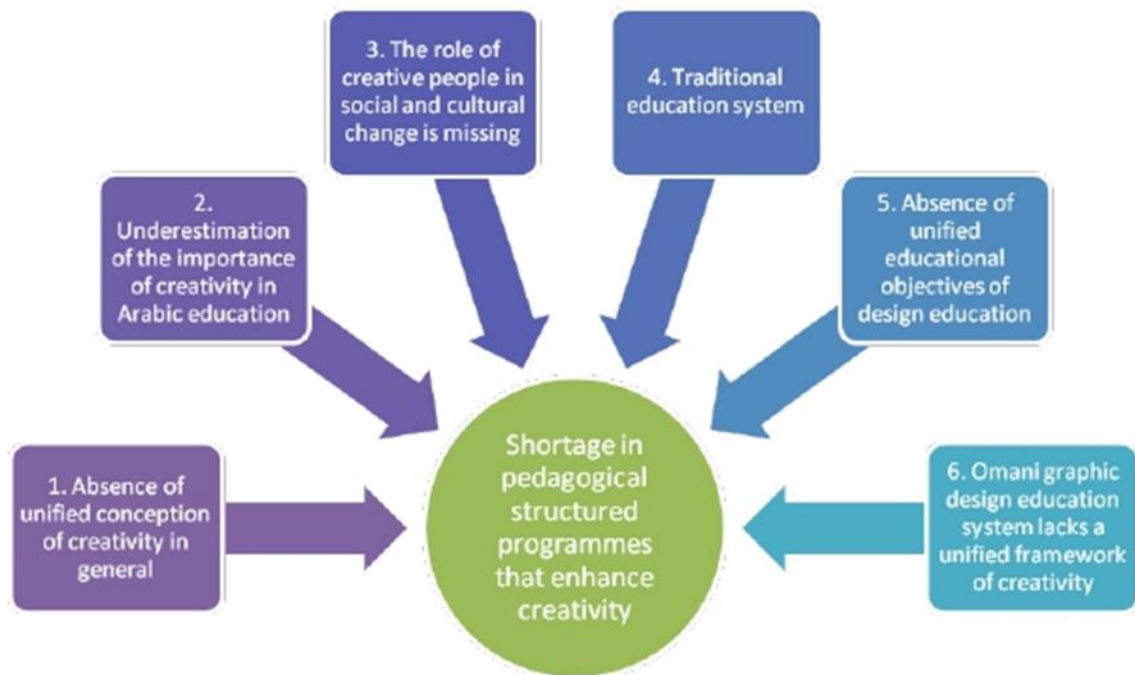


Figure 2.1: The causes of the research problem (adopted from Alhajri (2016:423))

Figure 2.1 shows a shortage in pedagogically structured programmes that enhance creativity in the Omani context. This is revealed through the number of contributing factors, indicated in factors 1 to 6 in figure 2.1. The factors are the absence of a unified conception of creativity in general; the underestimation of the importance of creativity in Arabic education; missing of the role of creative people in social and cultural change; the traditional education system; the absence of unified educational objectives of design education; and, the fact that the Omani graphic design education system lacks a unified framework of creativity. These factors create a gap between the importance of creativity and IKS in learning of graphic design, which needs to be filled by a coordinated system that will facilitate the promotion of creativity in their schooling and learning system. In comparison to the South African context, the system of education based on CAPS does give room to encourage creativity in TE. This is promoted through the design process. The design process offers a range of skills that learners can learn to develop critical and creative skills through design. Therefore, creativity plays a vital role in the learning of graphic design, since such learning lies within the

supportive environment, suitable opportunities and enthusiastic motivation. Thus, creativity can be enhanced through the integration of IKS into the learning process.

A study on engineering design thinking, teaching and learning by Dym, Agogino, Eris, Frey and Leifer (2005:103), outlined the notion that design is widely considered as a central or distinguishing activity of engineering, a notion which is based on the issue of graduating engineers who can design effective solutions to meet social needs. By the same token, this notion is also relevant to secondary schools. This study reveals that, despite the role of design thinking in the curriculum, challenges in this regard faced by designers. These challenges affect novice designers, in this case learners, such as understanding the aspects of graphic design, can be attributed to the lack of integration of IKS into the curriculum during the time teachers plan activities for graphic design. Dym et al. (2005:103) further reveal that design faculty, across a range of educational institutions, still feel that the leaders of engineering departments and schools are unwilling to recognise the intellectual complexities and resources required to support good design education. I, therefore, hold the view that the junior schools are also faced with similar difficulties when teaching good design education (graphic designs) because of the lack of resources to be employed in the learning and teaching of graphic design, as stated above. Furthermore, the complexities of design matters within the context of IKS and the unwillingness of schools to explore these complexities in indigenous communities leads to a lack of the understanding of graphic design in Grade 9 TE classrooms. This brings to the fore the critical concern of pedagogy used in the TE classroom.

In line with this view, Bresnahan (2015:6) attests to the notion that pedagogy is another concern shared with design studies, i.e., graphic design. This is especially true in Canada, but also in other countries, which relates well with our country, South Africa. In line with Dym et al. (2005:103), it has been shown that pedagogy is one of the factors that contributes to the difficulties of learning graphic design which, in turn, leads to the low performance of learners in of graphic design.

According to Mendoza and Matyo'k (2013) (cited in MacLeod & Macdonald, 2016:1), design is a transformative and socially engaged practice offering an important platform for learners' internalisation of the curriculum. In my view, Africanisation of the

curriculum so as to recognise IKS may lead to successful teaching of graphic design. Therefore, the success of IKS recognition needs the co-operation of diverse learners. In a similar vein, according to Berman (2009:2), designers have enormous power to influence how we see our world, changing our world and the way in which we live our lives. This is based on the notion that, for designers to succeed in their world of design, they need not to work alone but should work as a team where they will socially support each other through the sharing of ideas and by working together. This notion of sharing ideas and working together could have a positive impact on the learning of graphic design, should it be socially supported (MacLeod & Macdonald, 2016:4).

In contrast, Lee and Wong (2015:173) investigated whether design thinking and metacognitive reflective scaffolds can help graphic design learners to design on different canvasses, i.e., for industrial design, in order to increase their job opportunities. Based on this study's findings learners were able to identify and match patterns, theorise based on their graphic design knowledge and were able to analyse existing designs in the market with a view to create their own designs. The study contributes to the view that the employment of design thinking and metacognitive reflection in the context of IKS could enable learners to understand and master the learning of graphic design. In support of the above, Engle (2006:458) argues that in the infusion of social constructivism and integration of IKS may enhance learners' understanding of graphic design.

The evidence gathered from this literature review reveals that the focus of the different researchers on graphic design was more on the challenges that are faced in institutions of higher learning, on the application of technological processes and skills in Grade 9, and on the technical drawings/graphic skills and graphic design education. However, none of these studies conducted focused on an exploration of the integration of indigenous graphics knowledge and skills into the design curriculum. In addition, no study investigated the problem in a Grade 9 classroom in the South African context. Grades 7 – 9 are classified in the same phase, i.e., Senior Phase, which means that the curriculum differs only in terms of learners' progress. Therefore, this study sought to explore the integration of indigenous graphics knowledge and skills into the TE curriculum in order to enhance Grade 9 Technology learners' understanding of graphic design in Technology Education. Though this is a qualitative study, the findings might

be useful for the Senior Phase as explained above, respecting the contextual differences, of course.

The next section reviews the importance of the concept IKS and the role it can play in teaching graphic design.

## **2.8 Indigenous knowledge systems**

This section focuses on defining the concepts or elements arising from indigenous knowledge, i.e., indigenous and knowledge. Indigenous means the root of things or something that is natural/inborn to a specific context or culture (Odora Hoppers, 2002; van Wyk, 2002; Khupe, 2014). The South African Department of Education (2003:6) qualifies knowledge as indigenous if it can be described as African, and if it has evolved for thousands of years. Therefore, these elements form an understanding of indigenous knowledge.

According to this study, indigenous, traditional or local knowledge lays a foundation for learning Technology, especially graphic design. Indigenous knowledge refers to the knowledge and know-how unique to a given society or culture, which encompasses “the cultural traditions, values, beliefs and worldviews of local people” (Dei, 1993, cited in Agrawal, 1995:418), including specific beliefs, rules and taboos that are part of the customary law of a specific group (Xiuping & Kissya, 2010:27). Indigenous knowledge is vital for the survival of the historical and cultural heritage of a particular group as it “forms [its] backbone of social, economic, scientific and technological identity” (Odora Hoppers, 2002:76). Therefore, as indigenous knowledge forms the backbone of the technological identity. it follows that Technology and indigenous knowledge can form part of the learning process in technical subjects, such as graphic design.

Furthermore, indigenous knowledge is a “complete knowledge system with its own concepts of epistemology, and its own scientific and logical validity” (Battiste, 2002:7). The characteristics of indigenous knowledge are practicality and dynamicity, derived mainly from the contextual and cultural changes, which require indigenous peoples to constantly renegotiate with their environment and maintain their knowledge systems in constant evolution (Sillitoe, 1998; Bates, 2009). According to Warren (1996:16),



indigenous knowledge “represents [therefore] generations of creative thought and action within each individual community, as it struggles with an ever-changing set of conditions and problems”. Because of these strong contextual and cultural connections, indigenous knowledge becomes an essential part of indigenous peoples’ lives as it provides the necessary means for survival. Indeed, it is usually “driven by the pragmatic, utilitarian and everyday demands of life” (Briggs, 2005:10), which are also influenced by non-indigenous elements, such as the indigenous response to innovation (Maurial, 2002:59). Indigenous peoples are actors of their knowledge; therefore, separating indigenous knowledge from its socio-cultural context is very dangerous for its understanding as it becomes meaningless and may lead to misleading interpretations (McCall 1995, cited in Sillitoe, 1998:244; UNESCO, 2009).

According to Mapara (2009:140), “indigenous knowledge systems are a body of knowledge or bodies of knowledge of the indigenous people of particular geographical areas that they have survived on for a very long time”. IKS is an emerging field, which is also known as indigenous ways of knowing (IWK) and ethno-science. In this case, with regard to the above, IKS can have a great influence on learners’ learning of graphics, as they can use this body of knowledge from their communities, which they are familiar with. This could enable them to learn in a way that could simplify their learning of graphic design, as they learn through the exploration of what is known to them from their backgrounds.

Gumbo (2015:59) posits that indigenous knowledge is that knowledge that is held and used by people who identify themselves as indigenous to a place, based on a combination of cultural distinctiveness and prior territorial occupancy relative to a more recently arrived population with its own distinct and subsequently dominant culture. Owuor (2007:23) further contributes to the notion that indigenous knowledge has to do with a complex set of activities, values, beliefs and practices, has evolved cumulatively over time, and is active among communities and groups who are its practitioners. According to the statement above, culture stands as a vital tool in the Technology subject, that one will need to employ in order to create a backbone in the teaching and learning process.

Using indigenous knowledge in entrenching and boosting rural development enterprises enables indigenous peoples and local communities to actively participate in the decision-making process relating to access to markets and products, i.e., inputs and the full production value chain, including contributing towards fostering a better logistics framework. Indigenous rural development or local level rural knowledge refers to a complete body of knowledge, expertise and practices maintained, developed and tested, generally in rural areas, who have extended the histories of interaction with the natural environment (Nhemachena, Chakwizira, Dube, Maponya, Rashopola & Mayindi, 2011:3).

These sets of understandings, interpretations and meanings are part of a cultural complex that encompasses language, naming and classification systems, practices for using resources, ritual, spirituality and worldview under the auspices of rural transport innovations, adaptations and interventions. This, therefore, provides the basis for local level decision-making about the many fundamental aspects of day-to-day life, for example, trip choice, route, spatial distribution, journey times and average travelling speeds for engaging in health, and adaptation to the environmental or social change. The non-formal rural development knowledge, in contrast to formal rural development knowledge, is handed down orally, making use of learning-by-doing life experiences from generation to generation and is, therefore, seldom documented.

## **2.9 Linking IKS in graphic design**

According to Gaotlhobogwe (2012:190), to fully understand the concept of linking IKS with the lack of resources in design and technology, and other technology related subjects, in Botswana and in other countries in Africa, one has to have a complete understanding of the concept of IKS. I claim that, in order to link IKS with graphic design, there is a need to understand the concepts. This will provide teachers and learners a platform on which to integrate the concepts. This concept could be understood through Dewalt's (1994:123) argument that, for the greater attention of IKS that are based on the need to create more appropriate and environmentally friendly technologies, and to empower people to have greater control on their own destinies, one should create technologies that would have more just socioeconomic implications.

Continentially, studies by Gaotlhobogwe (2012:190) outline that Africa is gifted with indigenous materials and technologies that could revive design and technology-related curriculum systems on the continent, rather than the current burden of too much reliance on the western systems of production that require modern materials, tools and equipment. Gaotlhobogwe's assertion holds huge implications for the what and how learning takes place in Technology. In order to effectively succeed in what this author is suggesting, learners need to be taught, as part of the curriculum, indigenous graphic designs. This could enable them to exploit appropriate resources. In support of Gaotlhobogwe's study, Africa has its own materials that can be used to come up with ways that can pique the learners' interest in the learning about graphics, rather than relying on western materials only. It is through full appreciation of IKS that learners' performance can be enhanced, as this is a way to appreciate their cultures. A typical example of indigenous graphic design is the design by Esther Mahlangu (De Jager & Loots, 2003:10). Esther Mahlangu is a South African artist from the Ndebele tribe in Mpumalanga Province. She is known for her bold large-scale contemporary paintings that reference her Ndebele heritage. She is recognised worldwide because of her artwork, as shown in figure 2.4. Her artwork thrives on indigenous knowledge. Her artwork is hailed worldwide. Her work draws from the integration of different disciplinary knowledge, such as mathematics, design and technology, history and the arts. From the TE point of view, the artwork portrays the creative skills in the drawing or graphic work that resonates well with the Ndebele culture, which is the indigenous knowledge aspect. She uses basic resources, such as chicken feathers and sticks, as her paint brushes. The design and paintings show the aesthetic aspect of design and has a particular meaning in the Ndebele culture. The aesthetic aspect of design is so important because it makes the designed product appealing in terms of the colour, shape and patterns. This suggests that, when teachers engage learners to do graphic design work, indigenous aspects should be taken into consideration. Elders, like Esther Mahlangu, could be invited to help teach graphics. Mahlangu is not only an artist, but she teaches art to young women in her home village. In relation to her artwork, Mahlangu received recognition from various sectors of the globe, e.g., she was honoured by BMW and the University of Johannesburg, where she recently received Honorary Doctorate in recognition of her work.

Mahlangu is one of the African artists whose art is often exhibited internationally. Her works are in major private collections, including that of the contemporary African art collection (CAAC) of Jean Pigozzi, and in many western museums. Despite being an internationally recognised artist, Esther Mahlangu lives in her village in close contact to her culture. In the light of Esther Mahlangu's background, Moalosi, Popovic and Hickling-Hudson (2010:175) argue that, "no matter how people try, it is impossible for them to divest themselves of their own culture, but foreign culture dies easily in times of stress". In accordance with the above, it is clear that, with the value of IKS considered, a strong foundation can be laid in the learning of graphics, since graphics is embedded in the learners' daily life experiences (Shava, 2013:384), rather than something, which is inherited from other cultures or backgrounds.

Let us analyse two models/products made using indigenous design and western design. The models in figures 2.2 and 2.3 are adopted from Gaotlhobogwe's (2012:191) study based on the role of indigenous knowledge systems in addressing the problem of declining enrolments in design and technology. Gaotlhobogwe (2012:191) was looking at the potential of linking IKS to the Design and Technology curriculum in order to address the problem of resources, which impacts on student enrolments in the subject. The author compared examples of the same products made from different materials, as in figures 2.2 and 2.3. The structure in figure 2.2 is made out of wooden coasters (indigenous design), while the other structure, in figure 2.3, is made out of glass/aluminium (western design). The wooden coasters are made out of wood using chisels, sand paper and wax polish. The glass/aluminium coasters are made out of expensive materials using equipment such as a CNC lathe and glass cutting tools, which are the representation of high technology and which may be expensive equipment, compared to the indigenous tools used.



Figure 2.2: Wooden container- indigenous design

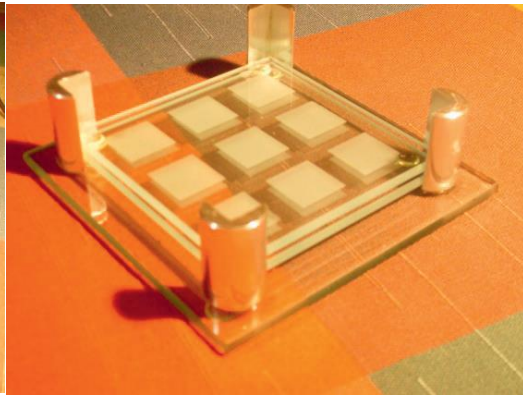


Figure 2.3: Glass/aluminium stand-western design

(Adopted from Gaotlhobogwe, 2012:191)

The models show that some indigenous designs can be useful in teaching graphic design with IKS integrated into TE as it is context based, based on the locally used materials and equipment to process the materials used, such as wood. Based on the models in figures 2.2 and 2.3 above, it can be noticed that IKS have great potential in enhancing the learning of graphic designs when linked together with the western design approaches, as IKS are the cheapest way of producing designs that resonate with the learners' experiences and the environment, even in the production of musical instruments, as shown in figure 2.5.



Figure 2.4: Esther Mahlangu's art work (adopted from De Jager & Loots 2003:27)



Figure 2.5: Indigenous musical instruments

(Adopted from <http://www.thunderboltkids.co.za> accessed November 2018)

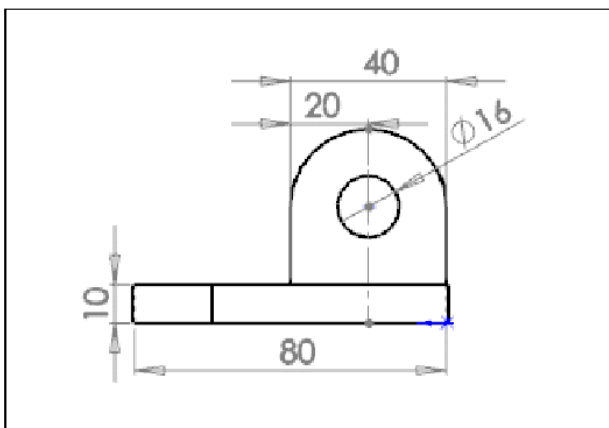


Figure 2.6 Graphic design (Front view of 2D)

(Adopted from [researchgate.net/figure/front-view-of-2D-line-drawing](http://researchgate.net/figure/front-view-of-2D-line-drawing))

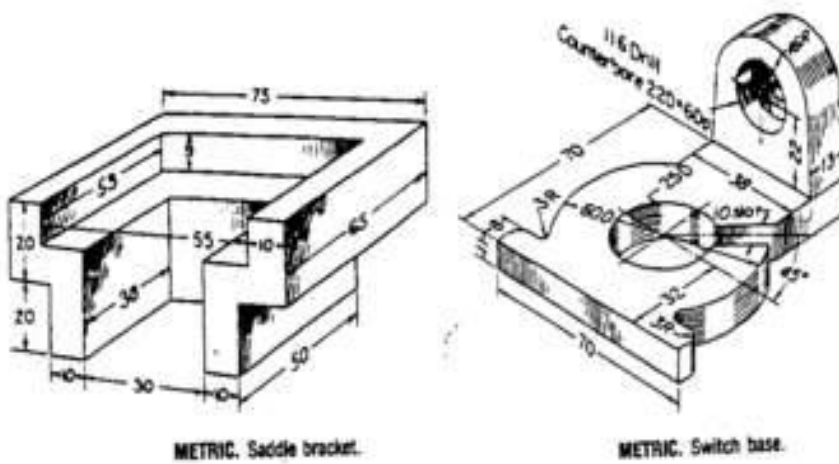


Figure 2.7: Graphic design (3D drawing)

(Adopted from <http://www.isr.umd.edu>. Accessed November 2018)

Figures 2.6 and 2.7 show how western orientated graphic designs are done. Western orientated designs need high cognitive skills, which can be blended with indigenous design skills. Learners should be exposed to both the indigenous way of doing things, and to the more western-oriented world as part of their learning activities. It is advisable that Technology teachers strike a balance when teaching graphic design in class to make sure that both indigenous designs and western-oriented designs are encouraged.

In view of the drawings in figures 2.4 – 2.7, it is clear that indigenous drawings and graphic designs have a close relationship in the sense that the techniques that were used before to produce drawings share a common method with the current techniques, specifically with respect to technical drawings that are used to communicate analytically and graphically in Technology. The indigenous epistemological basis of knowledge construction and the ways of “doing” knowledge are not completely unfamiliar to the learners (Nakata, 2007:10). The indigenous epistemologies may not be embedded in the detailed knowledge of the land and place for all people, environmental or ecological knowledge, but in ways of storytelling, memory making, narrative, art and performance. Taking memory making as an example, the indigenous people can use graphics to create a memory about what happened at a particular time in their lives, e.g., drawings or paintings in caves. Those drawings acted as ways of communicating and making memories. This is an indication that the integration of IKS into the teaching of graphic design can play a significant role in the thinking, behaviour and welfare of communities in Africa (Beidlid, 2009:141). In recognition of Beidlid’s view, Shava (2013:385) points out that IKS still exists in the post-millennium modernising Africa. Ideas such as Afro-politanism and Post-Africanism induce Africans to think along the lines of a globalised, cosmopolitan and essentially modernised Africa. This outlines the importance and value of indigenous knowledge within African communities, which can be employed in the learning of graphic design to enhance Grade 9 learners’ understanding of graphics in Technology Education.

## **2.10 Summary**

The purpose of this chapter was to review the literature on indigenous graphic design and the role indigenous knowledge can play in learners’ learning graphic designs.

Thus, the chapter provided a review on the integration of indigenous graphics knowledge and skills into the curriculum in order to enhance Grade 9 learners' understanding of graphic designs in Technology Education. The literature further underlined the factors from which my thinking was drawn. Additionally, the chapter highlighted the definitions of creativity, design, design process and graphic design, and IKS in learning graphics in Technology Education. In consideration of IKS and the factors discussed in this chapter, it was noticed that IKS is absent in the learning of Grade 9 graphic design. Therefore, integrating IKS in Grade 9 graphic design can enhance the learner's performance. Creativity is also not significantly encouraged in the learning of graphics. Lastly, constructivism was employed as the theoretical framework for the study, and a brief overview of radical and social constructivism as provided as well as indigenous philosophy and IKS. Gaps were identified in the explored literature about the infusion of IKS into the learners' learning of graphic design. This denies learners an indigenous perspective to graphic design and can compromise the understanding of indigenous learners of graphic design.



## CHAPTER 3

### RESEARCH METHODOLOGY

#### 3.1 Introduction

This chapter outlines the research methodology and processes followed in order to answer the research questions. The research approach and design that were followed by the study and reasons for their selection are provided. The chapter also discusses the participant sampling methods and procedures, as well as data collection methods and the data collection instruments used. Trustworthiness, credibility and validity are discussed, and the data analysis method is then described.

#### 3.2 Research paradigm

The philosophical assumptions of any research can be located within the positivist, interpretivist, indigenous and/or critical theory paradigms (Niewenhuis & Smit, 2012:137). This study followed the interpretivist and indigenous paradigms through the implementation of a descriptive single case study. Chilisa and Kawulich (2012:55) describe interpretivist paradigm as that paradigm address the understanding of the world as others' experiences, as in this study in which I described the teacher's and the seven learners' experiences of the integration of Grade 9 graphic design in the classroom. Furthermore, Chilisa and Kawulich (2012:58) describe the postcolonial indigenous paradigm as a world view that focuses on the shared aspects of ontology, epistemology, axiology and research methodologies of disempowered social groups. In this study, I looked at the integration of IKS in the teaching and learning of Grade 9 graphic design as IKS was previously excluded by the colonial setting of the curriculum.

The interpretivist and indigenous paradigms were adopted in order to gain in-depth understanding of the integration of indigenous knowledge and skills into the curriculum in order to enhance the Grade 9 learners' understanding of graphic designs in Technology Education. Kaplan and Maxwell (2005:46) highlight the notion that, in an interpretive research project, there are no pre-defined and independent variables, but rather the focus is on the complexity of human sense making as the situation emerges.

Thus, the study focused on investigating the complexity of the integration of indigenous knowledge and skills through everyday happenings, experiences and social structures, subjective to the learners' Technology classrooms.

Research is well aligned when there is a connection between the ontological position (what can be researched), the epistemological position (what we know about it) and the methodological approach (how do we go about it) (Mack, 2010:6). Table 3.1 delineates the assumptions made with respect to the ontology and epistemology that drove the study.

Table 3.1: Ontology and epistemology of the interpretive paradigm (Adapted from Mack (2010:8) and Merriam (2009:9)

<b>Ontological assumptions</b>	<b>Epistemological assumptions</b>
Individual constructs own reality and reality is subjective	Knowledge is constructed through acknowledging diversity of the participants
Individual forms own opinion of activities and understands activities from own perspective	Researcher grasps subjective meaning of social action
Activities are unique and specific	Knowledge is gained through inductive analysis to construct a theory
Individual constructs own opinion what constitute reality	Knowledge develops when the researcher interacts with individual in their environment
Outcomes are established by means of interpreting the experiences and symbols	Knowledge is created through individual experience

Ontology refers to the nature of the 'knowledge' of 'reality' (Guba, 1990). Assumptions of an ontological kind are based on the living conditions (natural settings) of the participants constructing their own opinion, built on what constitutes reality, subjective to their experiences. Chilisa and Kawulich (2012: 56) describe epistemology from the constructivist point of view as that knowledge which is subjective as well as socially

constructed and mind dependent. The epistemological assumptions lie on the information gathered from the participants, i.e., the seven Technology learners and a teacher in their real school context. In this case knowledge is subjective as it is socially constructed and mind dependent to the participants, through their experiences. I interacted with the participants in their natural setting through interviews and observations in order to gather their experiences regarding the integration of indigenous knowledge and skills into the curriculum in order to enhance the learners' understanding of graphic designs during teaching and learning.

Rajasekar, Philominathan and Chinnathambi (2013:5) define methodology as the study of methods in which knowledge is gained. In this study, interviews and observation protocols were used to collect data. The assumptions made were made based on their natural settings. Data analysis was done in order to establish patterns and themes, which guided the findings report.

### **3.3 Research approach**

In addressing the objectives of this study, a qualitative research approach was followed. Creswell (2014:32) explains qualitative research as an approach used for exploring and understanding the meaning individuals or groups ascribe to a social or human problem. Qualitative research focuses on the broader picture in a quest for a deeper understanding of the phenomenon in order to constitute a compelling argument capable of producing cross-contextual generalities (Mason, 2002; Ary, Jacobs, Sorenson, Irvine & Walker, 2018). A qualitative approach to research is interpretive in nature (Niewenhuis & Smit, 2012:137). Babbie and Mouton (2008:28) state that an interpretive paradigm is an approach that aims to explore the complexity of social phenomena with the gaining of understanding. Therefore, the study adopted this approach because I wanted to understand the teacher's views about integrating, and her efforts to integrate, indigenous graphics knowledge and skills into the curriculum in order to enhance the Grade 9 Technology learners' understanding of graphic design in the same.

### 3.4 Research design

The study followed the case study design. Yin (2003:14) writes that a case study can contain either a single study or multiple studies. According to Yin (2003), it is better to undertake a single case study when the researcher wants to study, for example, a person or a group of people. Also, the researcher can question old theoretical relationships and explore new ones when a single case study is used. This depends on the fact that a more careful study is made (Gustafsson, 2017:9). Yin (2003) also explains that a single case study, with embedded units, can be made if the researcher wants to have the ability to study the case with data analysis within case analyses, between case analyses and using cross-case analyses.

Generally looking deep into case studies, Hays (2004:218) claims that case studies are chosen when the research requires a “close examination of people, topics, issues, or programs” in order to gain an in-depth understanding of their real-life situation. Creswell (2014:43) states that case studies are a design of inquiry found in many fields, especially in evaluation, where the researcher develops an in-depth analysis of a case, often a programme, event, activity, process, or one or more individuals. Case studies strive to portray ‘what it is like’ to be in a particular situation, to catch the close-up reality and ‘thick description’ (Geertz, 1973:6) of participants’ lived experiences of thoughts about, and feelings for a situation (Cohen, Manion & Morrison, 2007:254). Yin (2003) identified three types of case studies, which are, exploratory case studies, explanatory case studies, and descriptive case studies. Yin further describes each as follows:

- Exploratory case studies are often used to define the framework for a future study. “In this type of case study, fieldwork and data collection are undertaken prior to the final definition of study questions and hypotheses” (Yin, 2003:6);
- Explanatory case studies seek to define how and or why an experience took place. Their purpose is to suggest “clues to possible cause-and-effect relationships” (Yin, 2003:7). Because these studies sometimes suggest causality, they risk the chance of being challenged on the basis that one case does not make for a true experiment; and

- Descriptive case studies are used to develop a document that fully illuminates the intricacies of an experience.

Case studies are often used to present answers to a series of questions based on theoretical constructs (Yin, 2003:7).

In the light of the above, this study adopted the single descriptive case study design. The reason for adopting the descriptive case study was that it was suitable to present an in-depth understanding of a phenomenon in the real-life context in which it occurred (Baxter & Jack, 2008:548; Zainal, 2007:3). This descriptive case study was, therefore, used to explore the integration of indigenous graphics knowledge and skills into the curriculum in order to enhance Grade 9 Technology learners' understanding of graphic design in Technology Education.

### **3.5 Population and sample**

#### **3.5.1 Population**

Polit and Hungler (1999:37) refer to population as “an aggregate or totality of all the objects, subjects or members that conform to a set of specifications”. In this study, the target population was Grade 9 Technology teachers and learners in the Ehlanzeni District of the Mpumalanga Province.

#### **3.5.2 Sampling**

The study adopted non-probability sampling because of its very nature as being a qualitative study. Cohen, Manion and Morrison (2007:113) posit that a non-probability sample is derived from the researcher targeting a particular group in the full knowledge that it does not represent the wider population, such as purposive sampling, which simply represents itself. Cohen et al. (2007:115) view purposive sampling as a “feature of qualitative research in which researchers handpick the cases to be included in the sample based on their judgement characteristics being sought”. In many cases, purposive sampling is most effective when one needs to study a certain cultural domain with knowledgeable experts within (Tongco, 2007:147). Patton (1990:182) writes that purposive sampling selects information-rich cases for in-depth study. Purposive sampling is a technique mainly used in naturalistic inquiry studies, and is

defined “as selecting units (e.g., individuals, groups of individuals, institutions) based on specific purposes associated with answering a research study’s questions” (Teddlie & Yu, 2007:77). Purposive sampling helps the researcher to focus on the key informants who are particularly knowledgeable about the issues under investigation (Schutt, 2006), because purposive sampling allows judgmental decisions about the selection of participants to be made (Ary, Jacobs, Razavieh & Sorensen, 2010; Bernard, 2000). Thus, I purposively selected one Grade 9 Technology teacher and seven learners in order to ascertain the state of knowledge they had with regard to graphic design. The reason I chose this particular Grade 9 teacher is because of her good track record of teaching the subject at a school in Ehlanzeni district (see also 4.2). The Grade 9 class in this school became a preferred site for the study. I also facilitated the invitation of an indigenous expert to the school in order to demonstrate to the class the basics of indigenous graphic designs from a cultural perspective. The expert was a senior indigenous person who has vast experience with indigenous knowledge and who is a point of reference in the community when it comes indigenous practices.

### **3.6 Data collection and methods**

Data were collected at a school in Ehlanzeni district of Mpumalanga Province to explore the integration of indigenous graphics knowledge and skills in order to enhance the Grade 9 learners’ understanding of graphic design in Technology Education from an indigenous perspective. This study used interviews and observation methods for data collection. Each data collection method is discussed in the following sections.

#### **3.6.1 Interviews**

Interviews are particularly useful for getting the story behind a participant’s experiences. Cohen et al, (2007:349) describe the interview as a flexible method of data collection, enabling multi-sensory channels to be used, i.e., verbal, non-verbal, spoken and heard channels. Harrell and Bradley (2009:24) highlight the notion that interviews can be used as a primary data gathering method used to collect information from individuals about their own practices, beliefs or opinions. Furthermore, interviews can be used to gather information on past or present behaviours or experiences.

Interviews can also be used to gather background information or to tap into the expert knowledge of an individual (Harrell & Bradley, 2009:24).

According to Bless and Higson-Smith (2000:104-109), the advantages of qualitative interviews include:

- active involvement of the participants in the research process thereby empowering them;
- free interaction between the interviewer and the interviewee;
- opportunities for clarification so that relevant data are captured;
- maximisation of description and discovery; and
- researchers' access to people's ideas, thoughts and memories in their own words rather than in the words of the researchers.

Alshenqeeti (2014:40) identifies four types of interviews which are frequently employed in social sciences, and which include structured interviews, unstructured interviews, semi-structured interviews and focus group interviews. Each is described as follows:

- Structured interview presents participants with the same set of questions, order and wording (Mentz, 2012:102);
- Unstructured interview is open ended in nature, it offers an open situation through which a greater flexibility and freedom is provided to both interviewer and interviewee, in terms of planning, implementing and organising the interview content and questions (Alshenqeeti, 2014:40);
- Semi-structured interview creates an opportunity for depth through probing and responding without any restriction; and
- Focus group can be used to investigate complex behaviour and requires skill to conduct.

This study used the semi-structured interviews to explore the integration of IKS and related factors as a way of enhancing the understanding of Grade 9 Technology learners' learning of indigenous graphic design. The reason I chose semi-structured interviews was to gain an understanding of the setting of the participants, in that the

respondents were expected to answer pre-set open-ended questions (Jamshed, 2014:87). Semi-structured, in-depth interviews were utilised extensively as the interviewing format, possibly with an individual. Additionally, a semi-structured interview is a more flexible version of the structured interview as “it allows depth to be achieved by providing the opportunity on the part of the interviewer to probe and expand the interviewee's responses” (Rubin & Rubin, 2005: 88). Moreover, Edwards and Holland (2013:29) state that, in the semi-structured interviews, the researcher has a list of questions or series of topics that they want to cover in an interview guide, but there is flexibility in how and when the questions are put and how the interviewee can respond. In this study, interview questions were prepared to constitute an interview guide, which directed the interview towards the achievement of the research objectives.

Examples of questions which were included in the semi-structured interview guide include the following:

- What is the teachers' understanding of indigenous knowledge?
- How do teachers value indigenous knowledge and skills?
- What is it that teachers do to integrate indigenous knowledge and skills into graphic design?
- What resources do teachers use to integrate indigenous graphic design knowledge in their teaching”?

*(See appendix F for a detailed interview guide)*

Dörnyei (2007:140) claims that, when conducting interviews, a ‘good’ qualitative interview has two key features which are that the interview flows naturally, and that the interview is rich in detail. In order to attain this, I, as the researcher, remembered that I was there to ‘listen’, and not just to speak. According to Richards (2003:53), interviewers should “always seek the particular”. In doing so, the interviewer should establish an appropriate atmosphere in which his/her interviewees would feel more at ease and thus talk freely. Besides, Barbour and Schostak (2002:42-43) identify the following key concepts that researchers should also take into consideration when using interviews as a tool for data collection:



- Power relations: interrelated power within the interview, which may intentionally or unintentionally, but not necessarily, emerge from the interviewer's side towards his/her interviewees; extending the interview, therefore, would help balancing this relationship;
- Value: value of the interview itself, and the value of the interviewees' words;
- Trust: extent to which the research guarantees objectivity, accuracy and honesty;
- Meaning: meaning the interviewer intends to convey. This process might sometimes be incorrectly done, and therefore an alternative truth or reality might be declared; and
- Wording: wording of questions asked in the interview – shorten interview questions and motivate longer answers and, in that sense, the interview is regarded as better.

Berg (2007:210) suggests that it is important for the interviewers to maintain their “interviewee’s motivation by keeping boredom at bay”. This can be done in various ways, for example by keeping to a minimum the demographic (e.g. age) and personal (e.g. income) questions. As to its typical duration, as Schostack (2002:43) notes, an interviewer would be expected to spend at least half an hour to unravel the investigated phenomenon. Yet, this overlooks the question that Dörnyei (2007:140) refers to, as often not mentioned in research projects, which is whether to have single or multiple interview sessions. Obviously, the answer to this is based on the research questions, sources available and amount of data needed. In this study, a single interview session was conducted with the Grade 9 teacher and seven learners respectively. I first had a pilot session using the interview guide with one of my colleagues, and I also discussed the guide with my supervisor before carrying out the interviews. I did these so as to refine the interview content, but also determine its feasibility and usefulness as a research instrument (Creswell, 2009:23). During the interview sessions the interviewees were given a chance to bring up comments or ask questions at the end of the interviews (Talmy, 2010:25). Additionally, I expressed my gratitude to the interviewees and discussed ways for future contact.

### **3.6.2 Observations**

Urquhart (2015:31) states that observation research is useful, feasible for practitioners, and can be combined with other types of data collection methods. Gorman and Clayton (2005:40) define observation studies as those that “involve the systematic recording of observable phenomena or behaviour in a natural setting”. Moreover, observation can also be helpful in the early stages of analysis in that it allows the interviewer to make a judgement about how signs are read and, thus, locate the data in the context in which they were collected (Scott & Usher, 2011:109-110). There are two types of observation, participant observation and direct observation (Kawulich, 2012:151). Participant observation occurs when the researcher becomes an observer and participant at the same time. Direct observation (non-participant) is done without interaction between the researcher and the people being observed in the research setting. The study was conducted involving the non-participant observation. Non-participant observation means that the observer is “looking on”, and not playing an active role in teaching, for example (Urquhart, 2015:30). Choosing this type of observation gave me an opportunity to capture in-depth information as the class progressed and it was less disruptive.

In observation, the researcher uses all of her/his senses to gather information about the phenomena under study (Adler & Adler, 1994:384). There are a variety of materials that could be used to enhance the capture of sensual observations, such as audio-recorders and video-recorders or cameras. Audio-recorders can be used to record interviews. Video-recorders or cameras can be used to record the activities of the insiders because, according to (Collier & Collier, 1986:7), cameras are an “instrumental extension of our senses” that may help researchers to “see more and with greater accuracy” (Collier & Collier, 1986:5).

The most common type of data collection techniques are logs and field notes (Polit & Hungler, 1987:271). While the former are used to record daily conversations or events, field notes are “much broader, more analytic, and more interpretive” (Polit & Hungler, 1987:271). The researcher may choose to write, or dictate into an audio recorder, her/his field notes, which can be categorised as either observational, method, theory, or personal (Polit & Hungler, 1987; Chatman, 1992). Observational notes detail what the researcher actually saw, while method notes include strategies that were

“employed or that might be employed” in future observations (Chatman, 1992:5). Polit and Hungler (1987:272–273) define personal notes as the researcher’s “own feelings during the research process” and theoretical notes as “interpretative attempts to attach meaning to observations”. Spradley (2016:34) calls notes taken during an event the condensed version, while the expanded version is what a researcher writes after each field session. In this study, I employed observation sheet or guide (see Appendix K), logs and notes to collect data as they were convenient, less disruptive and made for easy recording of my observations. The Grade 9 teacher was observed teaching.

### **3.7 Data analysis**

In this study, I used content analysis to analyse the data collected from personal interviews and observation data. Vaismoradi, Jones, Turunen and Snelgrove (2016:100) indicate that content analysis is a type of research analysis or set of techniques used to analyse textual data and elucidate themes. According to Vaismoradi et al. (2016:100), the key characteristic of content analysis is the systematic process of coding, examination of meaning and provision of a description of the social reality through the creation of themes. Furthermore, content analysis gives the researcher the ability to structure the qualitative data collected in a way that satisfies the accomplishment of the research objectives. I transcribed the interview data and observation data (see Appendices H, I, J) I collated the data obtained from both the interviews and my observations and I assigned codes such as Teacher; and L1-L7. I studied the observation sheet (Appendix K) and put together the points that were relevant to the topic at hand. I also collated the information by organising the data per respondent (using codes Teacher; and L1 up to L7).

I formulated descriptions that provided an in-depth analysis on the sequence of the teacher’s views and the learners’ views to establish the integration of IKS in the teaching and learning of Grade 9 graphic design. I compared and categorised the responses per question through identifying the patterns of the teacher’s and learners’ responses. Group responses per question and observation sheet produced the findings as shown in sections 4.3.1 – 4.3.3. According to Scott and Usher (2011:89), a typical qualitative analytical approach has one of the following aspects: coding or classifying field notes, observations, or interview transcripts. This is achieved by either

inferring from the words being examined what is significant, or by identifying the repeated use of words (phrases) or seeing whether a pattern is developing, to ensure that all activities which have been recorded, are being understood in a similar way.

### 3.8 Trustworthiness of the study

Trustworthiness in qualitative research is used to measure quality of the research. Therefore, trustworthiness is defined as a methodological (research design, data gathering, data analysis) accuracy (soundness) and adequacy of the research inquiry (Lincoln & Guba, 1985; Holloway & Wheeler, 2002). Trustworthiness in qualitative research supports the argument that the inquiry’s results are “worth paying attention to” (Lincoln & Guba, 1985:301). Gunawan (2015:4) states that a study is trustworthy if, and only if, the reader of the research report judges it to be so. Sandelowski (1993:3) maintains that trustworthiness becomes a matter of persuasion, where the scientist is viewed as having made practices of trustworthiness visible and, therefore, auditable. There are several possible strategies and criteria that can be employed to improve the trustworthiness of qualitative research findings (Gunawan, 2015:1). These strategies and criteria are outlined in table 3.2 below. To ensure the trustworthiness of this study the I adopted the four strategies used by several authors or researchers. As stipulated by (Lincoln & Guba 1985:301), trustworthiness is applied to qualitative research to ensure quality is categorised into credibility, transferability, confirmability and dependability, as outlined in table 3.2. Table 3.2 outlines the criteria and strategies required in order to ensure the trustworthiness of the study.

Table 3.2: Strategies for trustworthiness in qualitative research (adopted from Guba in Shenton, 2004:73).

Quality criterion	Strategies
Credibility	<ul style="list-style-type: none"> <li>• Adoption of appropriate, well recognised research methods;</li> <li>• Development of early familiarity with culture of participating organisations;</li> <li>• Random sampling of individuals serving as informants</li> <li>• Triangulation via use of different methods, different types of informants and different sites;</li> </ul>

**Quality criterion    Strategies**

	<ul style="list-style-type: none"> <li>• Tactics to help ensure honesty in informants;</li> <li>• Iterative questioning in data collection dialogues;</li> <li>• Negative case analysis;</li> <li>• Debriefing sessions between researcher and superiors;</li> <li>• Peer scrutiny of project;</li> <li>• Use of “reflective commentary”;</li> <li>• Description of background, qualifications and experience of the researcher;</li> <li>• Member checks of data collected and interpretations/theories formed;</li> <li>• Thick description of phenomenon under scrutiny; and,</li> <li>• Examination of previous research to frame findings.</li> </ul>
Transferability	<ul style="list-style-type: none"> <li>• Provision of background data to establish context of study and detailed description of phenomenon in question to allow comparisons to be made;</li> </ul>
Dependability	<ul style="list-style-type: none"> <li>• Employment of “overlapping methods”; and,</li> <li>• In-depth methodological description to allow study to be repeated.</li> </ul>
Confirmability	<ul style="list-style-type: none"> <li>• Triangulation to reduce effect of investigator bias;</li> <li>• Admission of researcher’s beliefs and assumptions;</li> <li>• Recognition of shortcomings in study’s methods and their potential effects;</li> <li>• In-depth methodological description to allow integrity of research results to be scrutinised; and,</li> <li>• Use of diagrams to demonstrate “audit trail”.</li> </ul>

This study employed multiple data collection methods of interviews and observation (see Appendices F, G and K) to enhance its trustworthiness (Guba in Shenton 2004:73). The study followed these strategies and criteria employed to ensure trustworthiness and are discussed in an elaborative manner in subsections 3.8.1 – 3.8.4.

### **3.8.1 Credibility**

Credibility is defined as the confidence that can be placed in the truth of the research findings (Holloway & Wheeler, 2002; Macnee & McCabe, 2008). Merriam (2009:11) writes that the qualitative investigator's equivalent concept, i.e., credibility, deals with the question, "How congruent are the findings with reality?" Lincoln and Guba (1985:15) attest that credibility is one of the most decisive factors in establishing the trustworthiness that one must ensure. Gunawan (2015:4) claims that credibility corresponds roughly to the positivist concept of internal validity. Credibility establishes whether the research findings represent plausible information drawn from the participants' original data and is a correct interpretation of the participants' original views (Lincoln & Guba, 1985; Graneheim & Lundman, 2004). Credibility can be maintained using the various strategies stated in table 3.2. I employed triangulation and member checks to ensure credibility. Triangulation "involves the use of multiple and different methods, investigators, sources, and theories to obtain corroborating evidence" (Onwuegbuzie & Leech, 2007:239). Triangulation helps the investigator to reduce systematic bias and to cross-examine the integrity of the participants' responses. There are four major triangulation techniques. There is investigator triangulation, which uses multiple researchers in investigating the same problem. The use of multiple investigators brings different perceptions into the inquiry and helps to strengthen the integrity of the findings. The second technique is data triangulation/informants triangulation, which uses different sources of data or research instruments such as interviews, focus group discussion or participant observation or utilises different informants to enhance the quality of the data from different sources. This type of triangulation is relevant to this study as both the teacher and learners were interviewed and the findings from the data from these sources were triangulated. The third triangulation technique is methodological triangulation, which uses different research methods to reduce the effect of biasness (Lincoln & Guba, 1985; Patton, 2002; Phillimore & Goodson, 2004; Denzin & Lincoln, 2005). I triangulated the findings from the interviews and from the observations. The same interview questions were used for all the participants of the same category to ensure the absence of bias.

Member checking is another strategy used to improve the quality of data. Member checking means the “data and interpretations are continuously tested as they are derived with members of the various audiences and groups from which data are solicited” (Guba, 1981:85). After collecting the raw data, transcriptions of the same commenced. Thereafter, the transcriptions, field notes and observations were discussed with the participants to ensure that the information gathered was a true reflection of what transpired during the data collection. Member checking is a crucial process that any qualitative researcher should undergo because it is the heart of credibility (Lincoln & Guba 1985; Onwuegbuzie & Leech, 2007). Researchers are required to include the voices of the participants in the analysed data and in the interpretations made from the data. Member checks in a qualitative research provide a way for the researcher to ensure the accurate portrayal of participant voices by affording participants the opportunity to confirm or deny the accuracy and interpretations of data (Birt, Scott, Cavers, Campbell, & Walter, 2016:1805). This interpretation means that the analysed and interpreted data were sufficiently recent to participants for them to evaluate the interpretations that I made and suggest changes, and to say whether they were unhappy with the interpretations that I made which were not as reported by themselves.

### **3.8.2 Dependability**

According to Bitsch (2005:86), dependability refers to “the stability of findings over time”. Dependability involves participants’ evaluation of the findings, interpretation and recommendations of the study such that all are supported by the data as received from them as informants (Cohen, et al. 2011; Tobin & Begley, 2004). Data were coded and themes were formed as they emanated from the codes. The results from the interviews and observations of the teacher and learners were compared to ensure that the results were inclusive (Chilisa & Preece, 2005:38). The study paid attention to an audit trail to allow the readers to understand the context of the study. This process happened by keeping the raw data from audio recordings, field notes and observations for verification and viewing to ensure the trustworthiness of the study.

### **3.8.3 Confirmability**

Confirmability refers to the degree to which the results of the inquiry can be confirmed or corroborated by other researchers (Baxter & Eyles, 1997:517). Confirmability is “concerned with establishing that data and interpretations of the findings are not figments of the inquirer’s imagination but are clearly derived from the data” (Tobin & Begley, 2004:392). Confirmability can also be established using a reflexive journal (Wallendorf & Belk, 1989; Koch, 2006). Wallendorf and Belk (1989:77) describe a reflexive journal as “reflexive documents kept by the researcher in order to reflect on, tentatively interpret, and plan data collection”. I maintained confirmability by keeping a reflexive journal in which I documented all the events of the fieldwork and my personal reflections in relation to the study. I kept all electronic records (audio-recorded) and non-electronic (i.e., field notes, documentary materials) of the investigation. These records helped to crosscheck the data and writing of the final report of the study.

### **3.9 Ethical considerations**

The study was conducted considering ethics in research as required by the University of South Africa. Dealing with human participants requires researchers to follow ethical considerations rigorously. Ethics focuses on providing the guidelines for researchers, reviewing and evaluating research, and establishing enforcement mechanisms to ensure ethical research (Aguinis & Henle, 2008:35). Basically, the code of ethics aims to protect the rights of individuals used as subjects of research. In the same tone, Cohen et al. (2007), state that interviews are considered as an intrusion into the respondents' private lives with regard to time allotted and level of sensitivity of questions asked; therefore, a high standard of ethical considerations should be maintained. So, in the study ethics was observed by not asking questions that would make the participants feel uncomfortable or humiliated. The selected participants freely consented to participate in the study, and no pressure was placed on them to participate. This means that the participants were well informed about what their participation required. The participants had the right to withdraw from the study. In addition, the study considered the participants’ confidentiality by not disclosing their identity or leaving their information lying around. I applied for ethical clearance at the University of South Africa and permission at the Department of Basic Education Mpumalanga, which were granted. A letter of consent, consent forms and letter of



assent for the learners were designed so that their participation in the study was not compromised. See appendices A, B, C, D, E, F, G about permission to assent letters.

### **3.10 Summary**

In this chapter, I presented a detailed qualitative enquiry and outlined strategies used for case study design involving single case. I discussed the interviews, observations methods that were used to collect and analyse the data. In this chapter, the research design, research paradigm, sampling, data collection methods, data analysis strategies and ethical issues were discussed in detail. I justified the choices I made for the research design, and the samples and data collection methods. I addressed the issues of credibility and trustworthiness based on the standards of rigour such as credibility, transferability, dependability and confirmability.

## CHAPTER 4

### PRESENTATION OF FINDINGS

#### 4.1 Introduction

This case study explored the integration of indigenous graphic knowledge and skills into a Technology Education classroom in order to enhance the Grade 9 learners' understanding of graphic design in Technology Education. In this chapter I present and discuss the findings of the study from the semi-structured interview and observation data which were sourced from the Grade 9 teacher and learners. The chapter firstly presents the description of the participating teacher's biographical information and the school context as shown in table 4.1. The participating learners' biographical information is presented in table 4.2. Then the main findings are presented and discussed.

#### 4.2 Participants' biographical information and institutional contexts

##### 4.2.1 The teacher's biographical information and school context

The description of the participating teacher and school context is given in table 4.1.

Table 4.1: The teacher's biographical information and school context

Aspect	Description
Profile	The teacher is a female teacher at a secondary school in the Mpumalanga Province. She is identified in the study as a Technology teacher with almost 11 years of experience in the teaching of Technology with the background of teaching English, siSwati, Life sciences and geography. She also holds an Advance Certificate in Education (ACE Technology Education) which she obtained years back when Technology was first introduced, and teachers were recruited to enrol in the ACE Technology Education. The teacher acted as a Technology Education convener for years until a Head of Department was appointed.

<b>Aspect</b>	<b>Description</b>
Teaching experience	The teacher started teaching in 1990. She taught social sciences and later Technology up until now. She taught Technology Grades 7 – 9 for almost 11 years after she was given an opportunity by the Department of Basic Education Mpumalanga to further her studies by enrolling in the ACE Technology Education programme. She teaches three classes (A: 54 learners, B: 50 learners and C: 53 learners).
School context	The school at which the teacher teaches is a semi-rural school which falls in the Ehlanzeni District of the Mpumalanga Province. The school started in 1983 and has an enrolment of 1128 learners in the current year, i.e. 2019. The school has 23 classrooms, an administration block, a computer lab and two storerooms. The school does not have a school library and/or a laboratory but does have some technology equipment. It also has a pre-school with two classrooms. The school has 45 staff members (support staff included). The school hours are 7:00 – 14:15 from Monday to Thursday and 7:00 – 13:15 on Friday.
Reasons for choosing teaching as a career	The teacher had an interest in a teaching career because it was one of the careers which were easier to do and affordable to qualify for compared to other careers.
Other duties/responsibilities done by the teacher beside teaching	The teacher serves on the Bereavement Committee for the school. She heads the Learner Christian Organisation (LCO) and serves on the Environmental Committee, which sees to the cleanliness of the school surroundings and classrooms.

#### **4.2.2 Learners' biographical information**

The learners' biographical information is described in table 4.2.

Table 4.2: The biographical information of learner participants

Item	Description
Gender	Male: 4 Female: 3
Age range	13-16 years old
Background	Predominantly Swati; tied to their culture and indigenous knowledge, language and practices
Language	They all speak siSwati
Culture	Swati culture
Performance	Ranges from 60% to 70%

In table 4.2 above, seven learners, comprising 4 males and 3 females, participated in the study. The choice of the participants was based firstly on their Swati culture and language background, which gave an indication that the learners may have a strong background in indigenous knowledge as Africans. Secondly, the choice was based on the learners' good performance which ranged from 60% to 70%, starting from terms 1-3 in Grade 9 Technology Education.

Age of participants: the ages of learners range from 13 to 16 years, 3 of whom were between 13 years and 14 years old, and 4 of whom were between 15 years and 16 years old. It should be noted that the specific criterion used to select the learner participants in terms of their age was the fact that the participants are in Grade 9 and as stated above.

All learner participants came from the semi-urban environments. Therefore, indigeneity was a key criterion used in the selection of the participants.

### **4.3 Semi-structured interviews and observations**

This section presents the findings came from the semi-interviews and observations conducted with the teacher and seven learners. The purpose was to explore the integration of IKS in Technology Education classroom in order to enhance Grade 9 learners' understanding of graphic design.

### 4.3.1 The teacher's interview

The findings are presented in terms of the themes that were generated from data analysis.

#### 4.3.1.1 The teacher's activities in the teaching of graphic design

The teacher claimed that the learners could do any drawing or design that she gave them to do. She claimed that she guided them to first do a preliminary design (produce initial ideas by drawings) before doing their actual designs of the structures. The teacher's activities were taken from previous term's Mini-PAT (mini practical assessment task) which involved first angle orthographic projection. In so doing, the teacher introduced learners to the topic. The teacher also indicated that learners normally did drawings of graphics (orthographic projection) as part of the Mini-PAT: *"especially when we do this Mini-PAT, any structure maybe that they should design, they must do this graphic design first before they design any structure...any structure, anything, it must start with the design."*

#### 4.3.1.2 The teacher's approach to teaching graphics design

During the interview, the teacher claimed that she used demonstration in the teaching of graphic design. The teacher explained that she demonstrated to the learners by providing the meaning of the topic to the learners first and then told them what should be done during the lesson. The teacher did not mention of anything in relation to the inclusion of IKS during her lessons. That could mean that the teacher did not consider the integration of indigenous knowledge. She claimed: *"firstly, I demonstrate, and then I give them grids to do the drawings."*

#### 4.3.1.3 The teacher's understanding of the concept, indigenous technology

The teacher stated that indigenous technology is the technology that was used a long time ago by people in order to solve problems, even though those people were not aware that what they were using to solve their daily problems was technology. According to her, such technology was not formal, but people were able use this technology to solve the problems that they faced. The teacher stated that: *"it started long time ago although it was not formal, but they were able to solve problems using technology."* This teacher seemed to acknowledge the value of indigenous technology

in as far as people used it to solve daily problems. However, confining indigenous technology to the past explains her disregard of the same in her lessons.

#### 4.3.1.4 The influence of indigenous technology on the teaching of graphic design in Grade 9

The teacher believed that indigenous technology would assist learners to master graphic design as Technology has to do with thinking which is communicated through drawings. So, with the use of indigenous knowledge learners would know the difference between modern knowledge and drawings that were done long ago. She had this to say:

*Yes, we cannot say or rule out indigenous technology because it started there. We can bring indigenous technology to modern days. Learners must know that technology did (sic) not start in a vacuum, it started long time ago. From there it was developed into (sic) rules and grids. That's technology.*

#### 4.3.1.5 The inclusion of indigenous graphics/drawings/patterns in teaching graphic design

The teacher felt that including indigenous graphics in her teaching would consume time as there was little time given to the subject in the CAPS, to the extent that CAPS: “does not allow you because of time factor.” Furthermore, the teacher said that the CAPS is confining in that a teacher cannot dwell on considering indigenous graphics or drawings or patterns. However, the teacher felt that, if indigenous graphics could be included in the teaching of graphic design, such inclusion would assist learners as there are areas where this indigenous graphics is important, and people still recognise it. The teacher stated thus:

*But you can because culturally they were doing it.... the learners can be able to differentiate that this culture was (sic) using which designs. Culturally and still they are parts of South Africa.*

#### 4.3.1.6 Ensuring that learners' activities in graphic design are designed to reflect the integration of indigenous graphics knowledge and skills

The teacher said that she did not ensure the integration of indigenous graphics knowledge and skills as there was nothing in the policy document that stipulated the integration of graphics knowledge and skills, although she also said one can integrate indigenous knowledge, if time allows. According to the teacher, the CAPS document does not stipulate the integration of IKS. Her words were captured as follows:

*You cannot divert the policy, it is not in the policy, you cannot include something that is not in, but maybe for enlarging your lesson you can if you have time, you can integrate.*

It was not expected that this teacher would be naïve about the fact that IKS is one of the seven principles undergirding the CAPS. Furthermore, indigenous specifically makes part of the third aim of the Technology curriculum.

#### 4.3.1.7 The role that indigenous elders or experts can play in sharing knowledge and skills about graphic design

The teacher agreed that elders/experts could help the learners in the learning of graphics because tools that were used before can also be used today. According to her, there are some contexts in the country in which people still use indigenous technologies, so, by including indigenous technology, learners will have an opportunity to understand both indigenous technology and modern technology, as indigenous technology cannot be ruled out completely. This claim is supported by her words as follows:

*Yes, they can because tools that they used long time ago for drawing those graphics can also be used even today (sic).*

The teacher was clueless about where to find elderly people to assist her in the teaching of graphics. As a result, she did not consider engaging an elder/expert in her teaching of graphics. However, she said that one could invite elders to teach, although it was hard to get hold of them. She actually asked: “*where can I find them? Do they still live?*” This teacher, who was advanced in years already, stated further:

*Aaah my child, you can see that these people are now busy with alcohol.... But yes, you can invite them in class before teaching learners (sic) about the indigenous graphics so they will relate.*

There is some element of truth in the teacher's claim. However, she only needed to recognise the fact that there are elders, especially in the more rural areas of the Mpumalanga Province, who still stick wholly to their indigenous knowledge and traditional ways of life. The obvious example is the indigenous artist, honourable, Dr Esther Mahlangu.

The teacher also claimed that she did not know that Mpumalanga Province had places that have those indigenous graphics. She claimed that those graphic designs could be found in museums in Gauteng. Moreover, she said South Africa, as a whole, did not have places where those indigenous graphic designs are stored, while other countries do. The teacher claimed:

*I do not know maybe with Mpumalanga do we have one museum. I don't think so.....yes if you can go to Jozi you can find museum maybe where they are books that were kept that are with drawings and those people who drawn the drawings, we only know that it was drawn.... most of them are Italians.*

In contrast, she mentioned Sudwala caves as one of the caves found in Mpumalanga, although she claimed that there was nothing that could be found of indigenous graphic designs in those caves, because some were destroyed. She explained thus:

*Us, we are running short of museums and the caves some of them were destroyed, we only have Sudwala but even it, doesn't have those drawings, some of the things are not there.*

#### 4.3.1.9 Problems that may be experienced about the integration of indigenous graphic knowledge and skills in teaching graphic designs

The teacher articulated the difficulty of integrating IKS in graphic design as being that some of the drawings needed one to bring artefacts and that artefacts were challenging to find. She also claimed that, even if she could organise for the learners



to visit the caves where there are traces of indigenous drawings, she did not believe that the caves had the artefacts. She explained thus:

*It is just that they need to come with artefacts and it becomes difficult to find those artefacts, yes it's not easy to find those artefacts. I do not think in those caves those artefacts are still there.*

She felt that the absence of indigenous museums added to the unavailability of indigenous artefacts: *"it is difficult to get the proper place to see, we do not have places like museums where these things are being kept."*

Additionally, the teacher indicated that a lack of evidence brings confusion to learners as they will not see what the teacher is teaching because no concrete evidence could be provided to show the learners. Moreover, the teacher was confident that learners would have an understanding of drawings if indigenous technology could be considered in the teaching of graphic design. She stated:

*So, here you just tell them because there's no evidence, concrete things that you can show them that's our biggest problem that you teach the learners and something that is obstruct because there's no concrete evidence, that this is the thing it started here then it was developed up until here, now we are here and the learner can be able to relate*

### **4.3.2 Learners' interviews**

#### **4.3.2.1 Learners' understanding of the subject, Technology**

Learners 1, 5, 6 and 7 gave a similar understanding of the concept, technology. They pointed out that technology has a relationship with humans as the use of knowledge caters for people in regard to their current ways of living, in which a need or want is expressed. One of the explanations given by these learners was that technology is the *"use of skills, resources, knowledge in order to meet people's needs and wants."* With this explanation, the learners demonstrated their knowledge of the curriculum, as this is how technology is defined in the CAPS.

Learners 2, 3 and 4 seemed to have a different view of their understanding of the technology. They claimed that technology is about understanding and the application of practical skills in the learning of Technology to enable problem solving. However, learner 4 had a different perspective about the subject altogether, and stated thus:

*The understanding about technology is that, technology works about making our future simple and making our lives easy.*

#### 4.3.2.2 Learners' understanding of graphic design

The learners showed an understanding of the concept, graphic design. They understood graphic design as being about drawings which can be 3D or 2D in which conventions, such as lines and hidden details, could be used. Despite all that is said above, Learner 6 indicated that learners did not do much in the learning of graphics due to the minimal time they had available for this topic. However, she had an understanding of what the concept graphic design entailed. This learner claimed that teaching and learning took place without the inclusion of IKS: *“we didn't learn a lot about Graphic Design but is a concept where are learning about drawings, how to draw and it comes in different forms which is a 3D and 2D.”*

Learner 5 was clueless about what is meant by the concept graphic design. This learner failed to state her understanding, as she claimed that graphic design: *“is about the use of skills, techniques that you can use to develop.”*

#### 4.3.2.3 Types of activities that learners performed in graphic design

The findings with regard to the type of learners' activities were that the learners lacked an understanding of activities that they were assigned to do in the learning of graphic design. Learners 2, 3, 4, 5, 6 and 7 indicated that drawing bridges is what they normally did towards the learning of graphic design. This meant that they did not do much concerning graphics in the form of drawings, they spent their time doing bridges. Learners claim that practical and investigation are some of the activities that they do in learning of graphic design. Learner 1 felt that, to complete these projects, they brought materials to school and they would work, as classmates, to help each other in doing the activities on graphics. Learner 1 claimed:

*We draw bridges, specify them and do projects, and sometimes when we do these projects we are asked to bring materials that you can use to help each other as classmates.*

Learner 1 further claimed that little was done on graphics as it was quite difficult for them to give types of activities that they did towards the learning of graphic designs. According to Learner 1, the step-by-step process followed by the teacher to show them how a certain drawing was done was the only activity given to them, although the learner acknowledged that the teacher demonstrated to them how drawings should be done before the writing of the activities. However, there was not a little was done on graphics during the teaching and learning process. The learner, therefore, claimed not to be familiar with the activities done on graphics. Similar sentiments were shared by Learner 6 who indicated that the teacher showed them how to draw using a step-by-step process, but the activities remained unknown to them. Learner 6 claimed: *“practically our teacher does show how to do them but not activities.”*

#### 4.3.2.4 Learners' understanding of indigenous technology

All 7 learners had an understanding of indigenous technology. They were able to express themselves about what it means when one refers to indigenous technology. Their understanding was presented in different views. Learner 1 said that indigenous knowledge is different from today's way of living: *“it is different from the modern technology and it was easier than modern technology.”*

Learners 2, 4 and 5 saw indigenous technology as the technology that was used before, and even today, to meet people's needs and wants. Learner 4: *“Technology that has being used long time ago and that is still used now in the present and still helps people to move on with their lives.”* Learner 3 explained an understanding of indigenous technology from the point of view of technology that is used in rural situations: *“it is when we speak about the technology from rural areas.”* Learner 6 stated that indigenous technology involves history of people living and represents different cultures. This was expressed thus:

*Indigenous technology includes history, comes from different cultures and understanding of where we coming from basically.*

Learner 7 understood that indigenous technology is all about renewing olden things that were used in the past, in order to fit into today standard of living. The learner also gave examples of things that were used before thus:

*Technology is the system where they use or renew the way they lived in olden days. Long ago way of living like using clay, ostrich eggs for containing then technology came. Renew olden days living.*

#### 4.3.2.5 Teachers approach to assist in learning of graphic design

According to the learners, the teacher demonstrated to them, meaning she took them through a step by step process in the learning of graphic designs, using examples. Thereafter, learners were encouraged to work as a collective or group to assist each another. Learner 7 also added that the teacher used previous projects and demonstrate to the learners how to tackle drawings so they could understand the word graphic design and so that they could do practical projects. This learner stated that *she* (the teacher – sic): *“draws some of the drawings on chalkboard and label were she also consider those lines hidden details, thin lines etc.”*

#### 4.3.2.6 Learners' experience of the teacher's approach in assisting them to learn graphic designs

The learner participants found the teacher's demonstration approach helpful as it assisted them to follow step by step with the teacher on the chalkboard. According to Learner 5, the approach was perfect as the learner found that teaching in this manner was good, thus making the learners to have a better understanding than if they were given a book to read on their own. Learner 5 claimed that: *“is perfect and she teach very well. In this way we are able to learn about graphic design.”* This learner continued to say that the teacher also made use of previous examination papers and textbooks to help learners to learn. The teacher first did everything on the board, while learners observed to see how it was done. In the case where a learner did not understand, the teacher repeated what she had said many times in order to cater for those who were lagging behind. Learner 5 had this to say:

*The teacher uses previous question papers and textbooks. Help us do it on the chalkboard and in our classwork books.*

Learner 6 also claimed that the learners understood graphic design better through demonstration. Therefore, demonstration was helpful as it easily broke the confusion that they had in their previous grade. According to Learner 6: “*she (the teacher – sic) helps us a lot since in previous grade we did not understand so the teacher helps.*” Learner 4 also claimed that demonstration was helpful because those who were good in technology would have a good background. Demonstration also gave a better understanding of graphic designs as this would set a good foundation for anything that the learners may want to do, e.g. building of structures. Learner 4 claimed that they were helped in this manner of demonstration in teaching graphic design. This learner’s words were captured thus:

*It assists because it truly helps some other kids that are good in technology to see the better future of technology.*

4.3.2.7 Indigenous graphics/drawings/patterns that learners were exposed to in learning graphic design

Most of the learners stated that, in their learning of graphic design, they had not come across indigenous graphics, drawings or patterns. Instead, what they did come across were drawings which are modernised, as opposed to drawings from their cultural backgrounds or environment. All learners claimed, they had not been exposed to the indigenous graphics/drawings/patterns in their learning of graphic design. Learners 4 and 6 expressed a different view as they stated that they had come across indigenous drawings in their learning of graphic design, even though Learner 4’s exposure was a little off the point. He stated; “*yes, IK drawings we draw a sketch of some fossils done with objects like syringes and pipes to lift a certain object up and down.*”

Learner 6 said that she came across indigenous graphics from the scenarios that they did each term. For instance, in term 1 they had to design a bridge for a certain community that was in need of it. So, in this case, learners had to come up with solutions to solve a problem that the community faced. In solving the problem, learners had to design bridges that would have also combined indigenous knowledge and

modern technology in order to solve the problem of crossing rivers, rather than focusing on modern technology only. In so doing, the learners were exposed to different indigenous graphics as they designed bridges. Learner 6 claimed that:

*Yes, like mini-pat, every mini-pat has a scenario like in term 1 we came across the problem we have to solve. The scenario was based on the village that needs a bridge so as you have to draw that bridge, you cannot just draw popular bridges you must have solutions that should be based on long ago designs just simple ones that can be easily understood.*

#### 4.3.2.8 The influence of indigenous technology on the learning of graphic design

Learners 1, 3 and 4 felt that indigenous technology has great impact on learning graphic design as it can make them understand how to draw graphic designs and solve problems in technology, claiming thus:

*It is going be good because we can now understand indigenous technology and like how it works, we will learn it and we will know how to interpret it in drawings.*

Furthermore, learner 2 and 6 felt that the learners would have a better understanding of graphic design should indigenous technology be included in their learning. So, with IKS learners, would be able to have a better understanding of graphic design as they would use their background knowledge from home, which would translate into better learning in class. Learner 2 claimed that:

*As we learn more and more in class it helps a lot as learners as we mix it with history and go back as learners to background knowledge because even our forefathers were also using technology.*

Learner 5 said that indigenous technology would improve the learning of graphic design as some learners found it difficult to understand modern designs, so if IK can be integrated into the learning of graphic design it would influence the learners' learning. Learner 7 supported this by saying: *“have a chance to know more about what they were doing long ago and what is it like now.”*

#### 4.3.2.9 Indigenous cultures represented in the learning of graphic design

There is diversity in the teacher's class, with Swati being the most common culture. Swati culture is common at Ehlanzeni District of Mpumalanga Province. Learner 7 thus, stated:

*Swati, cause our home language is Swati we use the way in which they were living like reed to construct bridges so reed if am not wrong is a Swati and then technology brought concrete so they are no longer using reed.*

#### 4.3.2.10 Indigenous graphic designs that learners know from their cultures

Learners 1 and 2 expressed the notion that none of the indigenous designs they know from the Swati culture. Learners 3, 4, 5, 6 and 7 indicated that they knew indigenous graphic designs from the Swati culture, as Learner 3 claimed:

*I know that Swati's use patterns when they are making their cultural clothes, they use patterns which comes in the form of triangulations.*

In view of the learners' responses to the interviews, it became clear that the teacher should have taken advantage of the learners' background to develop activities which promote the understanding of the concepts technology, and graphic design and an awareness of their cultural settings. Teaching graphics within the context of the learners' cultural environment could have made the content more meaningful to their learning. This could have been possible if experts in IK were involved to guide the teaching and learning of graphic design.

In conclusion, the teacher was aware of indigenous technology and its value in Technology. However, she was inconsiderate of the integration of IKS in teaching graphics. Moreover, the teacher stated that the integration of IKS was problematic as resources to be used in the learning of graphics could not be easily accessed. Additionally, learners understood indigenous technology and its importance in the learning of graphics. Learners were familiar with indigenous graphic design from their cultural backgrounds. Thus, consideration of IKS can enrich their learning of graphics.

### **4.3.3 Lesson observation**

Observation of the Grade 9 lessons took place at the sampled school. The lesson topic was on “Working Drawing 3D (Orthographic Drawing)”. The observation instrument comprised of four levels, i.e., the understanding of concepts, design of teaching and learning activities, integration of Indigenous graphics knowledge and skills and learners’ culture as a basis for indigenous graphics knowledge and skills (see Appendix H). The findings within the four levels are discussed in the sub-sections that follow.

#### **4.3.3.1 Understanding of concepts**

The teacher’s lesson plan objectives addressed the aspects of graphic design which did not include aspects of IKS. During the lesson presentation, the teacher managed to touch on some tools that were used by indigenous people for drawings, such as rocks and feathers used for drawings. Although the teacher managed to reflect on the IKS tools, little emphasis was placed on the IKS elements of drawing with respect to the shape, space, value, form, texture and colour. The lesson activities were solely based on orthographic drawings which did not include any IKS. The teacher, however, managed to explain IKS to the learners by citing places of recognition, such as the Sudwala caves.

#### **4.3.3.2 Design of teaching and learning activities**

The lesson activities were designed to communicate and support learning of the topic, working with 3D-orthographic drawings. The teacher took advantage of special indigenous contexts when explaining but she did not give concrete examples or show examples to the learners. The assessment tasks given to the learners did not cater for any IKS aspects of orthographic drawings. The task given focused on isometric drawing.

#### **4.3.3.3 Integration of indigenous graphics knowledge systems**

With respect to the integration of indigenous knowledge systems, the teacher gave some information and insights from different contexts. The teacher managed to open up to the knowledge forms from the learners’ contexts.



#### 4.3.3.4 Learners

During the lesson, learners expressed their answers with no reference to IKS, as the learners were responding to the teachers' demonstration of isometric drawing. The non-inclusion of IKS in learners' answers did not come as a surprise as the teacher did not take full advantage of integrating IKS during the demonstration of isometric drawings. Based on the teacher's approach to the lesson, only a few learners were able to answer and understand different aspects of the lesson. Proof that learning took place was found in their written tasks. However, the learners' work did not reflect any evidence of the integration of IKS in their written work. There were no reflection activities that allowed learners to reflect on the highlights and lowlights of their learning during the lesson. The teachers' comments on the learners' written work only dealt with how to tackle the next activity but, in that, the teacher did not use IKS to improve on the learners' work for the next activities.

Overall, the teacher had laid the foundation of IKS to the learners as a starting point though, but the learning itself did not have a concrete background of the IKS integration as the activities given to learners did not highlight the aspects of IKS.

## 4.4 Discussion

The discussion of findings in this section is based on an analysis of the teacher's and learners' interviews and on the lesson observations. This section presents a detailed discussion of the findings of the study.

The literature has shown that the indigenous forms of technology can instil interest in learners to learn Technology, as they will learn about their communities' contributions to Technology (Gumbo, 2015:67). The integration of indigenous knowledge into graphic design can help restore and preserve the identities and cultures of indigenous societies through learners learning about them. Based on the analysis of findings, the teacher seemed not to know the contents of CAPS, as she claimed that: "*the policy document does not allow expansion of the content up to the integration of indigenous technology.*" Furthermore, the teacher's claim was that time would not allow for IKS integration, as the subject is allocated only two hours per week. Hence, the teacher thought of IKS integration as an "add-on" to the curriculum. This is not necessarily the

case. IKS integration is more about presenting the current content enshrined in CAPS by making indigenous knowledge the first reference point. At the same time, the teacher would have space for IK integration during teaching (as shown in the next paragraphs), the teacher said: *“policy sometimes is confined, does not allow you because of time as you won’t be able to enlarge but you can because culturally they were doing it.”*

In contrast, the lesson observation confirmed what the teacher said in the interview on this aspect of IK integration. The way the lesson objectives were captured showed that the teacher did not have an understanding of how to factor aspects of IK into the lesson on orthographic drawings. The teacher had, however, drawn on some IK examples when dealing with orthographic drawings, linking with the fact that indigenous people used to draw things in the past. The teacher further explained these drawings in the context of IK, citing places such as the Sudwala caves in the Mpumalanga Province, even though the integration of IK was not part of the lesson objectives. Reference to the Sudwala caves demonstrates the need for Technology teachers to explore indigenous technology in indigenous knowledge-rich Mpumalanga. This calls on the teachers to divorce themselves from thinking negatively about indigenous technology.

This teacher demonstrated an understanding of the development of technology from the past to Technology as a subject. The teacher needs to translate the understanding of technology from past through integrating the indigenous technologies of other cultures. However, this did not come through as the teacher under investigation in this study had difficulty understanding the integration of indigenous technology into the teaching of graphic designs during the development of Technology activities. This suggests that the integration of indigenous knowledge should become the norm in Technology teacher training, especially since CAPS is supported by seven principles, one of which is IKS and that, specifically, the third aim of Technology Education includes indigenous technology (DBE, 2011). This licenses Technology teachers to take full advantage in order to centre their teaching of Technology on IKS. Although the teacher in this study mentioned IKS during teaching, her lack of understanding of IK and its integration into the Technology curriculum remains a major problem as she seems not be clear on how IK should be integrated into the curriculum in order to enhance the Grade 9 learners’ understanding of graphic design. Therefore, the

understanding of IK might lead to compromising the teaching of the Technology subject.

Technology Education aims to introduce learners to the world of engineers and how engineers apply their skills to solve problems, firstly through the use of graphics (DBE, 2011). The learners participating in this study were aware of this as their views exhibited an understanding of the subject, that is, that the subject creates an opportunity for the learners to solve technological problems through the design process, with the use of drawings to form visual representations of their ideas. The learners' understanding of graphic design is based on drawings which are supposed to be done in 2D and/or 3D, as outlined in CAPS. This finding could create a sufficient opportunity for the integration of IK. Technology Education can, in this way, connect learners to their real contexts by designing solutions that are representative of these contexts and which address the technological problems experienced within these contexts. This is in line with Semchison (2001:10), who claims that learning is part of the process, not only in acquiring new knowledge, but also of accessing that encoded or stored knowledge. This means that, where indigenous knowledge learning experiences are used to mediate learning, the potential for social harmony is greater than when unfamiliar learning experiences are employed. From the learners' background, IKS can promote the potential for learners to learn with recognition of what is known to them from their everyday experiences and relating this to the knowledge that they use in 2D and 3D drawings, such as cars, houses, and bridges. Hiatt (1984:786) stresses that learners learn through exploration, therefore, it is the duty of the teacher to encourage learners to become actively engaged in discovering what the world of basic design skills (graphics) is like. This can be effectively achieved when they are guided to tap into what their familiar contexts can offer. Tyler (1949:63) maintains that learning takes place through the experiences which the learner has. This would set a base for learners to construct new knowledge based on what is already known, as Gumbo (2015) said earlier.

Furthermore, the teacher raised concerns about the difficulty of teaching Technology without the necessary resources. This is taken as a self-limiting perception about the availability of resources, since indigenous contexts are rich in resources if teachers could look around them, rather than far away to the DBE to provide always. The claim

by the teacher of the lack of necessary resources does not, however, suggest exoneration of DBE from its primary responsibility. Ironically, the teacher in this study admitted that IKS integration can address the problem of lack of resources. Significantly, Gaotlhobogwe (2012:190) posits that Africa is gifted with indigenous materials and technologies that could help in Design and Technology related curriculum systems. Mpumalanga Province is rich in cultural diversity and elders who could assist in the learning of graphics. Furthermore, the cultural background of the learners would be a great asset in learning of graphics. Dym et al. (2005:103) claim that the leaders of engineering departments and schools are unwilling to recognise the intellectual complexities and the resources required to support good design education. Their study established a challenge relating to the non-inclusion of IKS in teaching. This was evident when the participating teacher claimed not knowing indigenous places and elders who could be drawn on to help in the teaching of graphic designs. It was observed that the teacher's lesson was resource-hungry, especially with respect to indigenous resources, motivated by her claim that there was a lack of resources. The little chance the teacher had to refer learners to the Sudwala caves for indigenous drawings, proved to provide a starting point for the teacher to explore available indigenous technologies locally, even though she saw resources as a limiting factor. For instance, teachers should consider engaging the elders as the holders of indigenous knowledge to assist in unlocking the wealth of indigenous knowledge, as stated in the previous paragraph. Even the learners had an idea about indigenous knowledge and noticed that the teacher compromise this knowledge in terms of resource identification and use. They yearn to be taught this knowledge in their learning of graphic designs. It would appear as if the teacher's claim that there were no experts/elders in indigenous knowledge to assist in the teaching of graphic design was an excuse not to make such effort to involve such individuals.

The findings reveal a dearth of teacher education and training in the field. The CAPS Technology provides an opportunity to teach and learn about the interaction between people's values and attitudes towards technology, society and the environment (DBE, 2011:8). It further outlines the topics and core content areas, of which indigenous technology is part. These will, however, remain written statements if teacher education does not see the value of implementing this aspect of the curriculum policy. Learners

will be underserved by the not implementing the same, rendering the curriculum irrelevant to their contexts.

It is interestingly noted that, despite the teacher's no-space-in-the-curriculum views, she believed that culture has a great influence in the learning of graphic design, and that culture is important in design, as learners will be able to see the relationship between technology before and modern technology. Indigenous knowledge does not even have to be taught in its past as it still exists and is benefiting its custodians today. Teaching it in its present will be a reason for acknowledging its lively vibrancy and modernity. It does not have to be relegated to the past and the so-called western knowledge to the present. Indigenous knowledge deserves the same recognition status as western knowledge. It is, thus, argued in this study that integrating IKS in the learning of graphic design could make it much easier for learners to understand this topic, as this would be relevant to their cultural backgrounds.

The lesson observation which was conducted illuminated the understanding of the effort of integrating indigenous knowledge into the graphic design topic. It was observed that learners were minimally taken through the notion of indigenous technology in the teaching of the topic. This is an indication that the teacher did not take the advantage of learner's background knowledge and culture. This goes against Shava's (2013:384) argument that culture is embedded in learners' daily life experiences rather than something which is inherited from other cultures or backgrounds.

The literature further alludes to constructivism as the theoretical framework in tandem with the indigenous paradigm. Teachers should, therefore, take advantage of the opportunity afforded by CAPS to teach Technology by integrating IKS into the curriculum. Constructivism focuses upon individuals building up representations of their knowledge, which is then tested against experience (McCormick, 1997:148). Therefore, constructivism promotes learning in which the learners' learning is attuned to the cultural practices of the societies which they are members of. The application of this theory could provide learners with an opportunity to generate a variety of solutions using graphics or drawings (Yilmaz, 2008:162) as they add to their design knowledge sourced from their indigenous contexts. The present study found that the teacher

understood the cultural practices in societies and the importance that culture can play in the understanding of graphics by the learners. On the contrary, the findings from the lesson observation showed that the lesson did not open opportunities for learners to explore this culturally based knowledge. This was evident in the manner in which the teacher failed to give concrete examples based on the learners' cultural context, as many of them are from the Swati culture. The Swati culture is rich in symbols and arts. Even learners' assessment tasks did not cater for IK, except for a minimal reference to IK in the orthographic drawings content.

The teacher managed to use more demonstration as an approach to teaching. The constructivist approach came through well in her teaching as she extended her demonstration to learners' active learning when she planned the learning activities, such that learners would tackle the task by themselves. This finds truth in her statement that: *"firstly, I demonstrate, then I give them the grids, then they do themselves."* Demonstration was the most suitable approach which boosted the learners' understanding, short of inclusion of indigenous knowledge. During the lesson observation the teacher minimally managed to develop a relationship between the topic and indigenous knowledge practices through an explanation of concepts. However, the explanation lacked clear examples. Hence, even the assessment task given to the learners concentrated on orthographic drawing without the support of IKS. The definition of IKS should incorporate key aspects, such as people, context, culture, language, knowledge, practices and dynamism (Shava, 2013) as enablers when considering various approaches that can motivate learners in their learning, and arouse their interest, as they would then be learning about their own social context. This would ensure that the drawings would be influenced by the learners' diverse socio-cultural backgrounds when learning graphic design in conjunction with indigenous technology.

According to Bresnahan (2015:6), in support of Dym et al. (2005:103), pedagogy is one of the factors that contributes to the difficulties of learning graphic design and which leads to the low performance of learners in the learning of graphics. This notion is also in line with Makgato and Khoza (2016) who reveal that the poor pedagogical practice is a problem in the teaching of Engineering Graphic Design. In relation to the above, I hold a view that the teachers' involvement in Africanising graphic design could

lead to the employment various approaches/pedagogies, rather than relying on demonstration only.

Furthermore, this study revealed that demonstration encouraged learner participation. However, during lesson observation learner participation was partial. Ellemers (2014:iii) assert that reflective practice is important in the learning of graphic design and that reflective practice provides learners with multiple opportunities to learn graphic design skills. However, this requires sufficient time. Based on the study's findings, this reflective practice was not encouraged in learners as the teacher claimed the few hours given to the teaching of Technology was insufficient.

Indigenous technology is one important aspect that sets context during the teaching and learning of Technology. In this light, it is very important that learners should be made aware of different coexisting knowledge systems. Learners should also be exposed, through learning, to how indigenous cultures use specific materials and processes to satisfy needs and solve problems, as well as the important concept of indigenous intellectual property rights (DBE, 2011:10). The findings suggest that lack of the teacher's understanding of teaching in context results in the of depriving proper learning by the learners in graphic design through an indigenous perspective. Observing learners learning during the lesson, the teacher failed to create a conducive atmosphere in which to expose learners to an exploration of different indigenous cultures with respect to graphics.

On the aspect of creativity in the teaching and learning of graphic design, it was observed that cognitive, personal, motivational and social interactive approaches were not considered. Cognitive, personal, motivational and social interactive approaches are a wide range of methods within educational contexts employed to increase creativity (Bull, Montgomery & Baloch, 1995, cited in Hokanson, 2007:354). Therefore, this study's findings show an underestimation of the importance of creativity in learning graphic design. This was because there was a shortage of pedagogically structured programmes to promote creativity, thus providing a supportive environment that provides opportunities and motivation for learning (Alhajri, 2016:422).

Moreover, the study revealed from the learners' tasks that the learners had difficulty in producing orthographic drawings. This suggests that their learning did not allow for the sort of creative practice that would lead to a systematic approach to arriving at a solution to the activity given. According to Visser, Chander and Grainger (2017:54), the activity of creative practice plays an important role in producing the ideas and products resulting from manipulating and transforming the resources through a creative process.

#### **4.5 Summary**

This chapter presented and discussed the findings which emanated from the semi-structured interviews and the lesson observation. The chapter outlined the biographical details of the participants based on their contexts of the study. The findings from the interviews and the lesson observation showed that IKS are almost absent in the teaching and learning of graphic design, and that culture could play a role in the integration of IKS into teaching and learning. This chapter shows that, with the teacher's commitment to draw from IKS, learners can enjoy their learning. This is self-expressive from the learners' verbatims. The next conclusive chapter summarises the study and highlights the main findings.



## CHAPTER 5

### SUMMARY OF THE STUDY, LIMITATIONS, RECOMMENDATIONS AND CONCLUSION

#### 5.1 Introduction

This chapter presents a summary of the study, highlights the main findings, reflects on the research questions, deals with the limitations of the study, and provides recommendations and conclusions. The study aimed to explore the integration of indigenous graphic knowledge and skills into the Technology curriculum in order to enhance the Grade 9 Technology learners' understanding of graphic design in Technology Education from an indigenous perspective. The study was conducted in the Ehlanzeni District of Mpumalanga Province.

#### 5.2 Summary of the study

This thesis began by outlining the background, rationale, problem statement and research questions, aim and objectives, motivation for the study and definition of key concepts in Chapter 1. The study identified the research problem with respect to the lack of learners' understanding of graphic designs in Technology Education from an indigenous point of view. Therefore, the need arose to explore the integration of indigenous graphics knowledge and skills into the Technology curriculum in order to enhance the Grade 9 Technology learners' understanding of graphic design in Technology Education from an indigenous perspective. The statement of the problem led to the main research question: *How can the integration of indigenous graphics knowledge and skills enhance Grade 9 learners' understanding of graphic design in Technology Education from an indigenous perspective?* This research question was further divided into two sub-questions, as stated in 5.4.

Firstly, a pertinent scholarly literature review was conducted. The review assisted the researcher to engage with, and discuss, studies that addressed the research problem. The review further extended into the choice of, and justification for, constructivism as the theoretical framework guiding the study, in tandem with the indigenous paradigm. Constructivism and the indigenous paradigm are based on learning in which learners

learn through the use of the cultural practices of the societies in which they live. The theoretical framework assisted a great deal in directing the enquiry and setting the context, which led to a discussion of the methods employed in the study, e.g., the development of the data collection instruments and the selection of participants. The theoretical framework and the reviewed literature also helped the researcher with the focus of the study on the integration of indigenous knowledge in the teaching and learning of graphic design in a Grade 9 classroom.

The study employed the qualitative research methods in a single case study design to explore the integration of indigenous graphics knowledge and skills into the Technology curriculum in order to enhance the Grade 9 Technology learners' understanding of graphic design from an indigenous perspective. A teacher and seven learners from the Grade 9 class were purposively selected to participate in the study. Interview and observation data collection methods were used to understand, in-depth, the phenomenon under inquiry in this study. All data collection protocols were followed taking proper ethics into consideration, in accordance with UNISA and the Department of Basic Education's requirements. The data were analysed through content analysis and the establishment of themes that guided the discussion of findings, as outlined in Chapter 4. The study report concluded with the reflection on the research questions, a summary of the findings, a discussion on the limitations of the study, the drawing of relevant conclusions and the making of recommendations, in this chapter.

### **5.3 Main findings**

The study's findings established that the teacher had an understanding of cultural practices in societies and the importance of the role that culture can play in the understanding of graphics by learners. However, the teacher found it difficult to incorporate cultural practices into the teaching and learning of graphics with the use of indigenous technology, which suggests the need for the teacher to be trained on how this can be achieved.

The study also established that demonstration approach was used to teach activities in graphic design. Although demonstration was the teacher's approach towards the activities done in class, the study further revealed that, in the teaching and learning of

graphic design, little was done to integrate IK in the learning process. These activities should have incorporated the key important aspects of indigenous knowledge, such as people, context, culture, language, knowledge, practices and dynamism. The key important aspects of indigenous knowledge are enablers to support various approaches that motivate learners in their learning. This would have ensured that the drawings of the learners from the diverse socio-cultural backgrounds are enhanced towards the learning of graphics and indigenous technology. Furthermore, the study revealed that the demonstration approach encourages participation among learners although, during the lesson observation, participation was only partially noticed as learners were not given an opportunity to reflect on, and to demonstrate, their learning in this regard. The engagement of reflective practice could provide learners with multiple opportunities to learn graphic design skills, even though the process requires sufficient time, time which could have been found, despite the two hours' allocation per week to the teaching of Technology, in terms of the CAPS.

The findings revealed that learners had an understanding of the subject content, i.e., the subject Technology and graphic design. This was an opportunity for the teacher to use the learners understanding effectively in order to integrate indigenous knowledge into the classroom. The learners showed that they had an idea of the subject Technology and the opportunities that this subject has in their learning, i.e., to apply the design process to solve civil, electrical, and mechanical problems analytically and graphically. Furthermore, the findings indicated that learners had a basic understanding of the concept graphic design. Therefore, learners' cultural background and knowledge could be used to their advantage when learning graphic design. In this regard, the teacher could build a strong foundation, through the integration of indigenous knowledge into the learners learning of graphic design.

The findings revealed that learners were not aware of the activities undertaken in order to learn graphic design. If the teacher could properly cite the activities that are aligned to the learners' cultures and drawings, patterns and graphics found in cultural backgrounds, this would enable the learners to learn graphic design with a clear understanding of the concept.

The study established that the teacher found it difficult to teach Technology without the necessary resources. It is a fact that without resources there is no concrete evidence of the learners learning about drawings, leading to no proper foundation about the integration of indigenous knowledge into design concepts. Furthermore, the lack of resources could become the biggest challenge in the teaching of graphics but, with the aid of indigenous resources and knowledge, effective integration could be realised.

The CAPS stipulates the specific aims of Technology Education as providing the learners with an opportunity to appreciate the interaction between people's values and attitude towards technology, society and the environment. It further outlines the topics and core content areas, of which indigenous technology is one. This provides a starting point for teachers to be guided on how to amass and mobilise indigenous resources for use in the classroom. However, the teacher seems not to be aware of this policy pronouncement. The researcher noticed that, even though the teacher was aware of indigenous technology, she did not find it easy to integrate indigenous graphics knowledge and skills into her teaching. This created a need for the teacher to be assisted to identify resources from indigenous environments.

The study further revealed that learners showed partial creativity, as their learning lacked supportive environments, suitable opportunities and enthusiastic motivation. The lack of creativity was based on the given examples of indigenous places but with no practical examples of indigenous graphics given on the chalkboard. It is on this basis that that learners' learning should be supported by providing suitable opportunities to promote creativity for the proper learning of graphic design by integrating indigenous knowledge into the classroom.

Constructivism can lay a proper foundation for the learning and teaching of graphic design. This theoretical framework could support the learners' cultural background and increase their interest to learn graphics. The constructivist theory may also promote learning to take place within the learners' communities, which are endowed with indigenous forms of technology. Constructivism is thus the basis on which the integration of indigenous knowledge can take place in order to help learners construct knowledge from their own backgrounds, cultures and beliefs.

## 5.4 Research questions

As stated above, the main research question was divided into the following sub-questions which were addressed ultimately:

Sub-question 1: What indigenous graphics knowledge and skills exist which can help enhance Grade 9 learners' understanding of graphic design in Technology Education from an indigenous perspective? The study provides an idea about the existing indigenous graphics on which the learning of graphic design in Technology Education could be built on. South Africa is, however, rich in indigenous materials and technologies which could help with the requirements of the Technology curriculum. The study established that, despite the teacher's no-space-in-the-curriculum views, this teacher believed that culture has a great influence on the learning of graphics, and that culture is important in design as learners will be able to see the relationship between technology before and modern technology. The teacher had the view that the tools that were used a long time ago for drawing those graphics, and even used now, can still be used to draw patterns to differentiate indigenous drawings from modern drawings. However, regardless of their knowledge about indigenous cultures, none of the learning activities in the graphics lesson incorporated cultural practices.

Sub-question 2: In what ways can these indigenous graphics knowledge and skills be used in the learning of graphic design in Grade 9 Technology?

The study established that learner's indigenous background and/or culture can be used in the learning of graphics. The study revealed that a lack of resources is a major constraint, as stated in 5.3. The Mpumalanga Province is one of the provinces that are rich in cultural diversity, with elders who could assist in the learning of graphics, e.g., the well-known artist, Esther Mahlangu. The demonstration method stuck out as a method that can be extended to integrate indigenous knowledge. In that way, the pedagogy of Technology Education could be transformed to acknowledge the richness of indigenous pedagogies and knowledge. A pedagogy which is detached from the learners' cultural backgrounds may not help much in providing the learners with opportunities for contextually meaningful understanding of what they learn.

Africanising the curriculum, such as graphic design, can lead to various approaches/pedagogies being employed in teaching and learning.

### **5.5 Limitations of study**

The study involved one school and a single Grade 9 class in Mpumalanga Province's Ehlanzeni District. This study used qualitative research methods as stated in Chapter 3. However, qualitative research approaches are subjective in their nature. That is a limitation on its own. The fact that the subjective interpretation of data brings an element of bias, the inclusion of curriculum implementers and elders in the sample could have brought a balance towards exploring the integration of indigenous graphics knowledge and skills into the Technology curriculum in order to enhance Grade 9 Technology learners' understanding of graphic design in Technology Education.

The study did not target the custodians of indigenous knowledge. Involving them could have enhanced an understanding of the nature of indigenous graphic designs available in and around the site under investigation. The study was limited to a single case study design in order to gain an in-depth understanding of IKS and their importance in teaching and learning graphics in a Grade 9 Technology classroom.

Interviews and observations were the two instruments used for data collection. I admit that the administering of these instruments was not easy as the data were collected towards the end of the term. The school was preparing for the end of third school calendar term; hence I was limited to undertake only one lesson observation session. Observation of more lessons may have provided more information about the trends towards the integration of indigenous knowledge into the teaching and learning of graphic design.

The study could have tapped into the other curriculum materials, beyond the CAPS document, such as pace setters/work schedule, lesson plans and learners' workbooks and/or project portfolios. This could have afforded me an opportunity to interact with these curriculum materials at the core phase of curriculum implementation towards exploring the integration of indigenous graphics into graphic design.

## **5.6 Recommendations**

The following recommendations are made based on the nature and findings of the study:

### **5.6.1 Practice**

- Teachers should familiarise themselves with the CAPS document; they need training to do this. The Department of Basic Education Mpumalanga should organise workshops where teachers can be assisted with how to integrate indigenous knowledge into their classrooms;
- Teachers should plan activities that cater for the incorporation of indigenous technology, as stipulated in the CAPS. Doing this should not limit attempts to integrate indigenous knowledge in accordance with the CAPS document only, but complete the integration should be aimed at by ensuring integration at the implementation level as well;
- Teachers should identify indigenous graphics resources and archives which can help them integrate indigenous knowledge into their teaching, including the elders and/or other custodians of indigenous knowledge; and
- Teachers should design lessons that consider indigenous knowledge and recognise the learners' cultural backgrounds.

### **5.6.2 Further research**

- Studies on the practical integration of indigenous knowledge could help guide the integration of indigenous knowledge into the curriculum;
- More studies are recommended which cover other schools to showcase the integration of indigenous knowledge into the curriculum in order to enhance the learners' understanding of graphic design; and
- Further studies about the teachers' views on the integration of indigenous knowledge should also be considered.

## **5.7 Summary**

The findings show that the integration of indigenous knowledge is almost absent in the studied teacher's teaching of graphic design to Grade 9 learners. These findings confirm the teacher's lack of know-how to integrate indigenous knowledge into her

classroom. The integration of indigenous knowledge into the curriculum could enhance meaningful learning of graphic design, and the Technology subject as a whole. Given the predominantly rural nature of Mpumalanga, and its inhabitation mainly by black Africans, opportunities prevail to teach Technology from an African cultural perspective and this should be considered as a priority. Currently, teacher education and training is approached conventionally (more western perspectives) which, in turn, makes qualifying teachers teach Technology conventionally. Indigenous environments and communities are endowed with a plethora of knowledge. Technology teachers should tap into such knowledge in order to contextualise the subject, firstly, and then make relevance thereof in the global context. Teachers who are able to notice the wealth of indigenous knowledge can transform the teaching of graphic design in Technology Education, thus making learners feel that they belong in the classroom. The study's aim was achieved as an understanding was created about the studied teacher's efforts to integrate indigenous knowledge into the teaching of graphic skills to Grade 9 learners and an understanding was gained of the learners' views about such integration. The present study casts light on the gap that exists between the integration of IKS and the teaching of graphic design, hence the above recommendations.



## **My research reflections on the study**

The topic of my study was to explore the integration of indigenous graphics and skills into the Technology curriculum in order to enhance the Grade 9 learners' understanding of graphic design. The question which was pursued in the study is: How can the integration of indigenous graphics knowledge and skills into the Technology curriculum enhance the Grade 9 learners' understanding of graphic design in Technology Education? I chose this particular study because I was worried by the absence of indigenous perspectives in the teaching of Technology. This portrayed a false picture that Africans are not technological in nature, yet designs of many kinds flood African environments as people engage in the technological activities of problem solving and meeting their needs on daily basis. This encouraged me to explore the integration of indigenous knowledge into the curriculum in order to make the teaching and learning of graphic design more meaningful to the learners. The greatest opportunity that this study created was the opportunity to influence the transformation of Technology Education with respect to its relevance in indigenous contexts.

Conducting the study, and putting together these chapters, required plenty of time, hard work and dedication to stay focused on the task at hand. All this was made possible by the encouragement I received from my supervisor. He gave me feedback on my submitted work timeously. I appreciate a meticulous and hardworking supervisor like him. He always kept me on my toes. The success of the study was also as a result of the granting of permission by the Department of Basic Education Mpumalanga and from the participating school, that took into consideration the study's ethical clearance. It was a welcoming experience by the school environment as permission was granted to conduct the study.

The Grade 9 teacher and learners who participated in this study made it possible for me to conduct the study. The collected data made it possible to analysis the data, to write up the findings and to ultimately complete the study. The use of the interviews and observations has left me with a lifetime experience. This experience was a little challenging though, but the two data collection instruments made it possible for me to collect the data and to come up with the findings of the study.

Finally, it was a great journey for me to explore the integration of indigenous knowledge in the teaching of Technology.

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## APPENDIX A: ETHICAL CLEARANCE CERTIFICATE (UNISA)



### UNISA COLLEGE OF EDUCATION ETHICS REVIEW COMMITTEE

Date: 2019/02/13

Dear Ms. Blose

**Decision:** Ethics Approval from  
2019/02/13 to 2022/12/13

Ref: 2019/02/13/56712715/17/MC

Name: Ms. P Blose

Student: 56712715

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**Researcher(s):** Name: Ms. P Blose  
E-mail address: bloseprincess@yahoo.com  
Telephone: +27 82 362 3826

**Supervisor(s):** Name: Prof MT Gumbo  
E-mail address: gumbomt@unisa.ac.za  
Telephone: +27 12 429 3339

**Title of research:**

**The integration of indigenous graphics knowledge and skills to enhance Grade 9 learners' understanding of graphic designs in Technology Education**

**Qualification:** M. Ed in Curriculum Studies, <mailto:eoobed@unisa.ac.za>

Thank you for the application for research ethics clearance by the UNISA College of Education Ethics Review Committee for the above mentioned research. Ethics approval is granted for the period 2019/02/13 to 2022/02/13.

*The **low risk application** was reviewed by the Ethics Review Committee on 2019/02/13 in compliance with the UNISA Policy on Research Ethics and the Standard Operating Procedure on Research Ethics Risk Assessment.*

The proposed research may now commence with the provisions that:

1. The researcher(s) will ensure that the research project adheres to the values and principles expressed in the UNISA Policy on Research Ethics.



2. Any adverse circumstance arising in the undertaking of the research project that is relevant to the ethicality of the study should be communicated in writing to the UNISA College of Education Ethics Review Committee.



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3. The researcher(s) will conduct the study according to the methods and procedures set out in the approved application.
4. Any changes that can affect the study-related risks for the research participants, Particularly in terms of assurances made with regards to the protection of participants' privacy and the confidentiality of the data, should be reported to the Committee in writing.
5. The researcher will ensure that the research project adheres to any applicable national legislation, professional codes of conduct, institutional guidelines and scientific standards relevant to the specific field of study. Adherence to the following South African legislation is important, if applicable: Protection of Personal Information Act, no 4 of 2013; Children's act no 38 of 2005 and the National Health Act, no 61 of 2003.
6. Only de-identified research data may be used for secondary research purposes in future on condition that the research objectives are similar to those of the original research. Secondary use of identifiable human research data requires additional ethics clearance.
7. No field work activities may continue after the expiry date **2022/02/13**. Submission of a completed research ethics progress report will constitute an application for renewal of Ethics Research Committee approval.

*Note:*

*The reference number 2019/02/13/56712715/17/MC should be clearly indicated on all forms of communication with the intended research participants, as well as with the Committee.*

Kind regards,



**Prof AT Motlhabane**  
**CHAIRPERSON: CEDU RERC**  
motlhat@unisa.ac.za



**Prof V McKay**  
**EXECUTIVE DEAN**  
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template- updated 16 Feb 2017

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## **APPENDIX B: LETTER OF PERMISSION MPUMALANGA DEPARTMENT OF BASIC EDUCATION**

### **REQUEST FOR PERMISSION TO CONDUCT RESEARCH AT ....**

Title of Study: The integration of indigenous graphics knowledge and skills to enhance Grade 9 learners' understanding of graphic designs in Technology Education.

Date: 26/10/2018

The Director  
Research and Development Unit  
Mpumalanga Department of Basic education  
Block 5 Riverside  
Nelspruit  
1200

Dear Sir/Madam

I, \_\_\_\_\_, am doing a study towards a MEd at the University of South Africa under the supervision of Prof MT Gumbo, Senior Professor in the Department of Science and Technology Education. The aim of the study is to explore the integration of indigenous graphics knowledge and skills to enhance Grade 9 Technology learners' understanding of graphic design in Technology Education from the indigenous perspective.

I therefore ask for permission to interview one Grade 9 teacher and hi/her learners, as well as observe his/her lesson at Sibambisene Secondary School. The school has been selected because of the teacher's good track record in teaching Grade 9 graphic design; and learners are selected based on their good performance in graphic design. This choice is also because Grade 9 has learners who are more experienced to can respond to the interview questions given the fact that they are now in their third year in Senior Phase doing Technology Education as a separate subject. Both the teacher's and learners' interviews will take approximately 30 minutes at times that will be negotiated with the participants and will be recorded with the participants' consent. Class observations will be conducted during the allocated time or period for Technology.

The benefits of this study will come in the form of the research findings that will be communicated to the school and Department of Basic Education in the form of feedback; and recommendations will be made that might give light about the integration of indigenous knowledge in the teaching of graphic design in Technology Education.

The potential risks are minimal in that confidentiality, privacy and anonymity of participants will be highly upheld. No photos or videos will be taken during the study. The participants have a right to participate or not to participate in the study, and they can withdraw at any stage of the study. There will be no reimbursement or incentives for them to participate in the study.

Feedback procedure will entail giving the participants the opportunity to comment on the interview transcripts before they are finalised for analysis. The final report on the study will also be communicated to the parties involved.

Yours Sincerely

\_\_\_\_\_ (Signature of researcher)

\_\_\_\_\_ (Name of the above signatory)

\_\_\_\_\_ (Signatory's position)

## APPENDIX C: LETTER OF PERMISSION FOR THE SCHOOL

### REQUEST TO CONDUCT RESEARCH AT ....

Title of Study: The integration of indigenous graphics knowledge and skills to enhance Grade 9 learners' understanding of graphic designs in Technology Education.

Date: 26/10/2018

The School Principal

Dear Sir/Madam

I, \_\_\_\_\_, am doing a study towards a MEd at the University of South Africa under the supervision of Prof MT Gumbo, Senior Professor in the Department of Science and Technology Education. The aim of the study is to explore the integration of indigenous graphics knowledge and skills to enhance Grade 9 Technology learners' understanding of graphic design in Technology Education from the indigenous perspective.

I therefore ask for permission to interview one Grade 9 teacher and hi/her learners, as well as observe his/her lesson at. The school has been selected because of the teacher's good track record in teaching Grade 9 graphic design; and learners are selected based on their good performance in graphic design. This choice is also because Grade 9 has learners who are more experienced to can respond to the interview questions given the fact that they are now in their third year in Senior Phase doing Technology Education as a separate subject. Both the teacher's and learners' interviews will take approximately 30 minutes at times that will be negotiated with the participants and will be recorded with the participants' consent. Class observations will be conducted during the allocated time or period for Technology.

The benefits of this study will come in the form of the research findings that will be communicated to the school and Department of Basic Education in the form of feedback; and recommendations will be made that might give light about the integration of indigenous knowledge in the teaching of graphic design in Technology Education.

The potential risks are minimal in that confidentiality, privacy and anonymity of participants will be highly upheld. No photos or videos will be taken during the study. The participants have a right to participate or not to participate in the study, and they can withdraw at any stage of the study. There will be no reimbursement or incentives for them to participate in the study.

Feedback procedure will entail giving the participants the opportunity to comment on the interview transcripts before they are finalised for analysis. The final report on the study will also be communicated to the parties involved.

Yours Sincerely

\_\_\_\_\_ (Signature of researcher)

\_\_\_\_\_ (Name of the above signatory)

\_\_\_\_\_ (Signatory's position)

## **APPENDIX D: LETTER OF CONSENT FOR THE TEACHER**

### **PARTICIPANT INFORMATION SHEET**

Date: 26/10/2018

Dear Sir/Madam

Title of Study: The integration of indigenous graphics knowledge and skills to enhance Grade 9 learners' understanding of graphic designs in Technology Education

### **DEAR PROSPECTIVE PARTICIPANT**

My name is \_\_\_\_\_ and I am doing a study towards an M Ed at the University of South Africa under the supervision of Prof MT Gumbo, a Professor in the Department of Science and Technology Education. We are inviting you to participate in a study entitled: *The integration of indigenous graphics knowledge and skills to enhance Grade 9 learners' understanding of graphic designs in Technology Education.*

### **WHAT IS THE PURPOSE OF THE STUDY?**

This study is expected to collect important information that could help understand the integration of indigenous graphics knowledge and in the teaching of graphic designs to enhance Grade 9 learners' understanding of graphic design in Technology Education. The study will also determine ways in which these indigenous graphics knowledge and skills can be used in the learning of graphic design in Grade 9 Technology Education.

### **WHY AM I BEING INVITED TO PARTICIPATE?**

You are invited to participate in the study because of your good track record in teaching graphic designs in Grade 9 Technology class. I obtained your contact details from the District Curriculum Advisory Section. You were selected with your Grade 9 classroom based on the reason stated above in order to allow us establish how you integrate indigenous graphic knowledge and skills in teaching graphic design through interviews and class observation. Interviews will be audio recorded with your consent. Your seven Grade 9 learners will also participate in the interviews.

### **WHAT IS THE NATURE OF MY PARTICIPATION IN THIS STUDY?**

The study will involve semi-structured interviews. You will be asked to respond to the interview questions that will be asked. There might be a need to ask follow-up questions in the interview. Please note that there will not be right or wrong answers. You will therefore be encouraged to respond to the questions freely. The interview will last about 30 minutes.

**CAN I WITHDRAW FROM THIS STUDY EVEN AFTER HAVING AGREED TO PARTICIPATE?**

Participating in this study is voluntary and you are under no obligation to consent to participation. If you do decide to take part, you will be asked to sign a written consent form. You are free to withdraw at any time and without giving a reason.

**WHAT ARE THE POTENTIAL BENEFITS OF TAKING PART IN THIS STUDY?**

You will be able gain an insight on how to integrate the indigenous graphics knowledge and skills in order to enhance Grade 9 learners' understanding of graphic design in Technology Education. Also, you will be exposed to the possible ways in which indigenous graphic knowledge and skills can be used in the learning of graphic design in Grade 9 Technology Education. Findings of the study will be communicated to you as well.

**ARE THERE ANY NEGATIVE CONSEQUENCES FOR ME IF I PARTICIPATE IN THE RESEARCH PROJECT?**

There will be no negative consequences. In addition, your choice to withdraw your participation will also not imply certain consequences.

**WILL THE INFORMATION THAT I CONVEY TO THE RESEARCHER AND MY IDENTITY BE KEPT CONFIDENTIAL?**

Yes, you have the right to insist that your name not be recorded anywhere and that no one, apart from the researcher and the supervisor will know about your involvement in this research. Your answers will be given a code number or a pseudonym and you will be referred to in this way in the data, any publications, or other research reporting methods such as conference proceedings.

Only my and I supervisor will have access to the data and we will maintain confidentiality, but we will not disclose your name and the name of the school, even on recording there will not be any mention of your name or school. The reports will only show the name of the district, not the school. Your answers may be reviewed by people responsible for making sure that research is done properly, including the transcriber, external coder, and members of the Research Ethics Review Committee. Otherwise, records that identify you will be available only to people working on the study, unless you give permission for other people to see the records.

The outcome of this study may be presented through a research report, journal articles and/or conference proceedings.

**HOW WILL THE RESEARCHER(S) PROTECT THE SECURITY OF DATA?**

Hard copies of your answers will be stored by the researcher for a period of five years in a locked cupboard/filing cabinet at Unisa. Office duplicate in various storage facilities in the computer and external hard drive will be accessible by me and the supervisor for future research or academic purposes. Electronic information will be stored on a password protected computer for the period mentioned above. Future use of the stored data will be subject to further Research Ethics Review and approval if applicable. The data will be discarded when it will have sell by date using the following methods hard copies will be shredded and/or electronic copies will be permanently deleted from the hard drive of the computer through the use of a relevant software programme.

**WILL I RECEIVE PAYMENT OR ANY INCENTIVES FOR PARTICIPATING IN THIS STUDY?**

There will be no reimbursement or incentive for participating in this study.

**HAS THE STUDY RECEIVED ETHICS APPROVAL?**

This study has received written approval from the CEDU Research Ethics Review Committee at Unisa. A copy of the approval letter can be obtained from the researcher if you so wish.

**HOW WILL I BE INFORMED OF THE FINDINGS/RESULTS OF THE RESEARCH?**

If you would like to be informed of the final research findings, please contact P. Blose on email [bloseprincess@yahoo.com](mailto:bloseprincess@yahoo.com). The findings are accessible for 6 months. Should you require any further information or want to contact the researcher about any aspect of this study, please contact P. Blose on e-mail [bloseprincess@yahoo.com](mailto:bloseprincess@yahoo.com).

Should you have concerns about the way in which the research has been conducted, you may please contact the supervisor, Prof MT Gumbo, on e-mail [gumbomt@unisa.ac.za](mailto:gumbomt@unisa.ac.za).

Thank you for taking time to read this information sheet and for participating in this study.

Thank you.

\_\_\_\_\_  
(Signature)

\_\_\_\_\_  
(Name)



**CONSENT TO PARTICIPATE IN THIS STUDY** (Return slip)

I, \_\_\_\_\_ (participant name), confirm that the person asking my consent to take part in this research has told me about the nature, procedure, potential benefits and anticipated inconvenience of participation.

I have read (or had explained to me) and understood the study as explained in the information sheet.

I have had sufficient opportunity to ask questions and am prepared to participate in the study.

I understand that my participation is voluntary and that I am free to withdraw at any time without penalty (if applicable).

I am aware that the findings of this study will be processed into a research report, journal publications and/or conference proceedings, but that my participation will be kept confidential unless otherwise specified.

I agree to the recording of the interviews.

I have received a signed copy of the informed consent agreement.

Participant Name and Surname (please print): \_\_\_\_\_

\_\_\_\_\_  
Participant Signature

\_\_\_\_\_  
Date

Researcher's Name and Surname (please print): \_\_\_\_\_

\_\_\_\_\_  
Researcher's signature

\_\_\_\_\_

## **APPENDIX E: LETTER OF ASSENT FOR THE LEARNERS**

### **PARTICIPANT INFORMATION SHEET**

Date: 26/10/2018

Title of Study: The integration of indigenous graphics knowledge and skills to enhance Grade 9 learners' understanding of graphic designs in Technology Education

#### **DEAR PROSPECTIVE PARTICIPANT**

My name is \_\_\_\_\_ and I am doing a study towards an M Ed at the University of South Africa under the supervision of Prof MT Gumbo, a Professor in the Department of Science and Technology Education. We are inviting you to participate in a study entitled: *The integration of indigenous graphics knowledge and skills to enhance Grade 9 learners' understanding of graphic designs in Technology Education.*

#### **WHAT IS THE PURPOSE OF THE STUDY?**

This study is expected to collect important information that could help understand the integration of indigenous graphics knowledge and in the teaching of graphic designs to enhance Grade 9 learners' understanding of graphic design in Technology Education. The study will also determine ways in which these indigenous graphics knowledge and skills can be used in the learning of graphic design in Grade 9 Technology Education.

#### **WHY AM I BEING INVITED TO PARTICIPATE?**

You are invited to participate in the study because of your good track record in teaching graphic designs in Grade 9 Technology class. I obtained your contact details from the District Curriculum Advisory Section. You were selected with your Grade 9 classroom based on the reason stated above in order to allow us establish how you integrate indigenous graphic knowledge and skills in teaching graphic design through interviews and class observation. Interviews will be audio recorded with your consent. Your seven Grade 9 learners will also participate in the interviews.

#### **WHAT IS THE NATURE OF MY PARTICIPATION IN THIS STUDY?**

The study will involve semi-structured interviews. You will be asked to respond to the interview questions that will be asked. There might be a need to ask follow-up questions in the interview. Please note that there will not be right or wrong answers. You will therefore be encouraged to respond to the questions freely. The interview will last about 30 minutes.

**CAN I WITHDRAW FROM THIS STUDY EVEN AFTER HAVING AGREED TO PARTICIPATE?**

Participating in this study is voluntary and you are under no obligation to consent to participation. If you do decide to take part, you will be asked to sign a written consent form. You are free to withdraw at any time and without giving a reason.

**WHAT ARE THE POTENTIAL BENEFITS OF TAKING PART IN THIS STUDY?**

You will be able gain an insight on how to integrate the indigenous graphics knowledge and skills in order to enhance Grade 9 learners' understanding of graphic design in Technology Education. Also, you will be exposed to the possible ways in which indigenous graphic knowledge and skills can be used in the learning of graphic design in Grade 9 Technology Education. Findings of the study will be communicated to you as well.

**ARE THERE ANY NEGATIVE CONSEQUENCES FOR ME IF I PARTICIPATE IN THE RESEARCH PROJECT?**

There will be no negative consequences. In addition, your choice to withdraw your participation will also not imply certain consequences.

**WILL THE INFORMATION THAT I CONVEY TO THE RESEARCHER AND MY IDENTITY BE KEPT CONFIDENTIAL?**

Yes, you have the right to insist that your name not be recorded anywhere and that no one, apart from the researcher and the supervisor will know about your involvement in this research. Your answers will be given a code number or a pseudonym and you will be referred to in this way in the data, any publications, or other research reporting methods such as conference proceedings.

Only my and I supervisor will have access to the data and we will maintain confidentiality, but we will not disclose your name and the name of the school, even on recording there will not be any mention of your name or school. The reports will only show the name of the district, not the school. Your answers may be reviewed by people responsible for making sure that research is done properly, including the transcriber, external coder, and members of the Research Ethics Review Committee. Otherwise, records that identify you will be available only to people working on the study, unless you give permission for other people to see the records.

The outcome of this study may be presented through a research report, journal articles and/or conference proceedings.

**HOW WILL THE RESEARCHER(S) PROTECT THE SECURITY OF DATA?**

Hard copies of your answers will be stored by the researcher for a period of five years in a locked cupboard/filing cabinet at Unisa. Office duplicate in various storage facilities in the computer and external hard drive will be accessible by me and the supervisor for future research or academic purposes. Electronic information will be stored on a password protected computer for the period mentioned above. Future use of the stored data will be subject to further Research Ethics Review and approval if applicable. The data will be discarded when it will have sell by date using the following methods hard copies will be shredded and/or electronic copies will be permanently deleted from the hard drive of the computer through the use of a relevant software programme.

**WILL I RECEIVE PAYMENT OR ANY INCENTIVES FOR PARTICIPATING IN THIS STUDY?**

There will be no reimbursement or incentive for participating in this study.

**HAS THE STUDY RECEIVED ETHICS APPROVAL?**

This study has received written approval from the CEDU Research Ethics Review Committee at Unisa. A copy of the approval letter can be obtained from the researcher if you so wish.

**HOW WILL I BE INFORMED OF THE FINDINGS/RESULTS OF THE RESEARCH?**

If you would like to be informed of the final research findings, please contact P. Blose on email [bloseprincess@yahoo.com](mailto:bloseprincess@yahoo.com). The findings are accessible for 6 months. Should you require any further information or want to contact the researcher about any aspect of this study, please contact P. Blose on e-mail [bloseprincess@yahoo.com](mailto:bloseprincess@yahoo.com).

Should you have concerns about the way in which the research has been conducted, you may please contact the supervisor, Prof MT Gumbo, on e-mail [gumbomt@unisa.ac.za](mailto:gumbomt@unisa.ac.za).

Thank you for taking time to read this information sheet and for participating in this study.

Thank you.

\_\_\_\_\_  
(Signature)

\_\_\_\_\_  
(Name)

**CONSENT TO PARTICIPATE IN THIS STUDY (Return slip)**

I, \_\_\_\_\_ (participant name), confirm that the person asking my consent to take part in this research has told me about the nature, procedure, potential benefits and anticipated inconvenience of participation.

I have read (or had explained to me) and understood the study as explained in the information sheet.

I have had sufficient opportunity to ask questions and am prepared to participate in the study.

I understand that my participation is voluntary and that I am free to withdraw at any time without penalty (if applicable).

I am aware that the findings of this study will be processed into a research report, journal publications and/or conference proceedings, but that my participation will be kept confidential unless otherwise specified.

I agree to the recording of the interviews.

I have received a signed copy of the informed consent agreement.

Participant Name and Surname (please print): \_\_\_\_\_

\_\_\_\_\_  
Participant Signature

\_\_\_\_\_  
Date

Researcher's Name and Surname (please print): \_\_\_\_\_

\_\_\_\_\_  
Researcher's sign

\_\_\_\_\_

## **APPENDIX F: SEMISTRUCTURED INTERVIEWS FOR THE TEACHER PARTICIPANT**

### **Semi-structured- Interview protocol: Teacher**

1. What is your highest qualification in Technology Education?
2. How long have you been teaching Technology in Grade 9?
3. What type of activities do you engage in the teaching of graphic design in Grade 9?
4. What approach (es) do you use to teach these activities in graphic design in Grade 9?
5. What is your understanding of the concept, indigenous technology?
6. How could indigenous technology influence the teaching of graphic design in Grade 9?
7. Have you ever thought of including indigenous graphics or drawings or patterns in your teaching of graphic design? Why?
8. How do you make sure that learners' activities in graphic design are designed in a manner that they reflect the integration of indigenous graphics knowledge and skills?
9. Tell me about the role that indigenous elders or experts can play in sharing knowledge and skills about graphic design?
10. How, then, can you engage indigenous elders or experts in the teaching of graphic design in Grade 9?
11. Are there any specific or general problems that you experience towards the integration of indigenous graphic knowledge and skills in teaching graphic designs?
12. Is there anything else that you want to say that this interview has not covered?

Thank you for sharing your knowledge in this interview!

## **APPENDIX G: SEMI-STRUCTURED INTERVIEWS FOR THE LEARNER PARTICIPANTS**

### **Semi-structured interview protocol: Learner**

1. What is your understanding about the subject Technology?
2. Graphic design is part of Grade 9 Technology content. Explain your understanding about this concept.
3. What type of activities do you do towards the learning of graphic design in Grade 9 class?
4. What approach (es) does your teacher use to assist you learn about graphic design?
5. How do you find the teacher's approach towards assisting you to learn graphic design? Why?
6. Indigenous technology forms part of the curriculum in Technology Education. What is your understanding of indigenous technology?
7. Have you ever come across the indigenous graphics or drawings or patterns in your learning of graphic design and if so, which ones?
8. How could indigenous technology influence the learning of graphic design in Grade 9 class?
9. Which indigenous cultures are represented in your Grade 9 class?
10. What are the indigenous graphic designs do you know of from the cultures that you mentioned?
11. Is there anything else that you want to say which this interview has not covered?

Thank you for sharing your knowledge in this interview!

## APPENDIX H: TEACHER TRANSCRIPT



### **Semi-structured- Interview protocol: Teacher**

1. Researcher: What is your highest qualification in Technology Education?  
Teacher: Ace Technology  
Researcher ACE Technology  
Teacher Yes  
Researcher ok meaning you didn't do a degree in technology  
Teacher it is equivalent with a degree ACE technology
2. Researcher: How long have you been teaching Technology in Grade 9?  
Teacher: 15 years, I think is more or less. I can't say 15 let me say 11 years.  
Researcher: 15 years, in grade 9  
Teacher: yes, in grade 9
3. Researcher: What type of activities do you engage in the teaching of graphic design in Grade 9?  
Teacher: Normally, agh especially when we do this Mini Pat, any structure maybe that they should design, they must do this graphic design first before they design any structure.....any structure, anything it must start with the design.
4. Researcher: What approach (es) do you use to teach these activities in graphic design in Grade 9?  
Teacher: what do you mean?  
Researcher: the method that you use to teach GD  
Firstly, I demonstrate then I give them the grids then they do  
Researcher: demonstration then from learners engage themselves in drawings  
Teacher: ja, normally they start with mmmh.....rough sketches then after they've done with the rough sketches then they proceed to do the proper design that is the final drawing  
Researcher: the working drawing
5. Researcher: What is your understanding of the concept, indigenous technology?  
Teacher: Indigenous technology I would say haaaaa (sign of breath) that the technology that was done long time ago but those people didn't know that was technology, they were just addressing the problem that they were facing by then, actually it was technology. It started long time ago although it was not formally but they were able to solve problems using technology.



Researcher: it was not formally but they were able to solve problems, they even had drawings but then they didn't know that was technology

6. Researcher: How could indigenous technology influence the teaching of graphic design in Grade 9?

Teacher: Because technology has to do with thinking its where you communicate your thinking through drawings so is..... what was the question again?

Researcher: reading question and elaborated, is it going to be helpful to the learners or teaching

Teacher: mmh (breath) yes because we cannot say or rule out indigenous technology because it started there, if we can bring aaaa (thinking) this indigenous technology into our modern days, is it the learners must know that technology was not started in a vacuum, it was started long time ago and from there it was developed then it come rules and grids that's technology. We are now doing it formally so, so the learner must know that from long time drawings and nowadays drawings, what is it that has changed because now they are using computers than long ago, they were drawing rough sketches and from the rough sketches to modern technology. You see...so it relates and can assist learners to learn

Researcher: so meaning if a child has a grandparent who was able to solve problems using indigenous way can also assist the learner in learning in nowadays like GD, it can assist learners the background from home

Yes, because, you see especially they improvise those you see the graphics on the walls those, most of them.... what can I say? They can assist, yes they can use, they can also use the....

Researcher: the knowledge they had

Teacher: yes

7. Researcher: Have you ever thought of including indigenous graphics or drawings or patterns in your teaching of graphic design? Why?

Teacher: Although policy sometimes is confined. Does not allow you because of time factor not be able to enlarge but you can because culturally they were doing it.... the learners they can be able to differentiate that this culture were using which designs.... yes, there is this known as samowas ( ), samowas they are still doing it. Indigenous technology has moved with it, when they have those designs which communicate that this person is heading which position,



they don't use modals to show that you are a star in what<sup>1</sup>? They just do this tattooing of designs in their skin and you can be able to see samowas they respect each other based on the patterns/designs so which means some places those indigenous designs assist because they continue with them...yes samowas it is important tattoo's when you look those who are playing wrestling have drawings of those, they have a meaning and Xhosa's you see they have drawings so you know that the meaning of the design says what? Culturally and still they are parts of South Africa that continue with it.

8. Researcher: How do you make sure that learners' activities in graphic design are designed in a manner that they reflect the integration of indigenous graphics knowledge and skills?

Teacher: Aah then that aa (breath) you cannot direct to the policy, it is not in the policy you cannot include something that is not in but maybe for enlarging your lesson you can it you have time, you can integrate.

9. Researcher: Tell me about the role that indigenous elders or experts can play in sharing knowledge and skills about graphic design?

Teacher: Jah they can because tools that they used long time ago for drawing those graphics and even now they can also use those tools and also patterns to differentiate like some parts of countries those designs and very important so they are still using them, so the learners to say we not leaving all of the indigenous and that many is improved and put it in modern technology but this things is from indigenous technology only they have involve this modern technology such as computers in order to save the indigenous knowledge

10. Researcher: How, then, can you engage indigenous elders or experts in the teaching of graphic design in Grade 9?

Teacher: Where can I find them? Do they still live? Aaah my child you can see that this people are no more existing, those elders are now busy with alcohol....

Teacher: what was the question again?

Researcher: repeated the question

Teacher: Because.....yes, you can invite them in class before teaching them about the indigenous graphics so they will relate and say and say that then....and now is modern technology we are doing it the modern way and them were using it how and then see that how did it improve

11. Researcher: Are there any specific or general problems that you experience towards the integration of indigenous graphic knowledge and skills in teaching graphic designs?

Teacher: Mmmh is just that it is some they need to come with artifacts and that examples it becomes difficult to find those artifacts, yes it's not easy to find those artifacts archive's that you will go to caves and even if you can go to.... I don't think in those cave's they are still there those artifacts, it is difficult to get the proper place to see, sometimes we don't have places like museums where these things are being kept

12. Researcher: Is there anything else that you want to say that this interview has not covered?

Teacher: Aah you know, is that the indigenous technology is as is not in the policy you see talking you see..... what is difficult is that if you touch it, learners when you in graphics you must tell them that this thing was taken back by.... what can I say? From long time ago because this was done by our forefathers so it became modernised then it was named that is technology, long time it was said to be drawings, there was no name it was just drawings like art but then it was moved to where we are today, wherein some of the designs were stored in modern machines you see, the were ways and developed and in that haven't started here, firstly developed there was this olden day's machines were they place a paper the big ones. It was still improving until computers and now is very much easy to draw, so many like sometimes museums we do not have, I don't know maybe with Mpumalanga do we have one museum, I don't think so.....yes if you can go to Jozi you can find museum maybe where they are books that were kept that are with drawings and those people who drawn the drawings, we only know that it was drawn....most of them are Italians those who were in drawings, it was started by this European people especially Italians they have this names of things, one known as the drawing were they draw a baby crying, their drawings maybe they have, us we are running short of museums and the caves some of them were destroyed, we only have Sudwala but even it doesn't have the drawings, some of the things are not there. So with artifacts we have a problem with them. We don't have so when teaching learners it becomes obstruct and books of the drawings we don't have that's our problem but if ever we had artifacts that there's a museum close by we were going to visit and show them and the learners see the drawings that have



moved from there which is from 80s and 90s then were improved and those drawings started to have meaning and able to see cause some long ago were not understandable but the more years goes on and the people started to improve so if ever the was a museum it was going to be easier for us to teach the learners about indigenous technology, normally when it comes to drawings it is a bit tougher because they are.....even myself I don't know the well-known person in Africa that was an artist, most of the artist were from Italy and other countries up there so it is easier and find the things are stored and learners they can use and its easy for you to relate and show them and they can relate to well that they see where we are now from where you see...so here you just tell them because there's no evidence, concrete things that you can show them that's our biggest problem that you teach the learners and something that is obstruct because there's no concrete evidence that this is the thing it started here then it was developed up until here now we are here and the learner can be able to relate and see that when time goes on it started and improved the stages of improvement and have understanding that it started here then it was improved up until here, now we are here and the learners see that oh this is technology and is something started now because technology even us we didn't do technology at school. So it....and in this learners it seems as.... and technology was there long time when people were trying to address their problem, when you address a problem that's technology, it starts there when you are trying to address any problem. Cooking was one of technology, that cooking it was technology although they didn't know that was technology that was invented long time ago that's technology has being developed later so think that is new and if you can have a look in Italy it had more scientist, more artist and more things were made but knowledge that it was technology was little/not knowing at all the were just addressing problems that they were facing by then whereas now when we look at it, it was technology so because technology was not formally, not formalized we say is indigenous technology

Signature



Date

20/09/2019

## APPENDIX I: LEARNER 1 TRANSCRIPT

### Semi-structured interview protocol: Learner. 1..

1. Researcher: What is your understanding about the subject Technology?

Learner: Uses of knowledge or resources to meet human needs or wants

2. Researcher: Graphic design is part of Grade 9 Technology content. Explain your understanding about this concept.

Learner: Easy and simple just look at instructions

Is about drawings

3. Researcher: What type of activities do you do towards the learning of graphic design in Grade 9 class?

Learner: We didn't do much, but mam teaches us before the day of exams

4. Researcher: What approach (es) does your teacher use to assist you learn about graphic design?

Learner: (Quiet for some time) .... the learner is clueless with activities done in class

5. Researcher: How do you find the teacher's approach towards assisting you to learn graphic design? Why?

Learner: The teacher uses previous question papers and textbooks. Help us do it on the chalkboard and in our classwork books. It assists in learning graphic designs.....(quiet) because she teaches. She firstly does the drawing and then ask if someone who doesn't understand it, if you can't she will maybe do it three times or four times and that's helping us

6. Researcher: Indigenous technology forms part of the curriculum in Technology Education. What is your understanding of indigenous technology?

Learner: (Quiet)..... it is different from the modern technology and it was easier than modern technology

7. Researcher: Have you ever come across the indigenous graphics or drawings or patterns in your learning of graphic design and if so, which ones?

Learner: No

8. Researcher: How could indigenous technology influence the learning of graphic design in Grade 9 class?

Learner: It will make it easier for us to understand

9. Researcher: Which indigenous cultures are represented in your Grade 9 class?

Learner: (Quiet)..... Africans

10.Researcher:What are the indigenous graphic designs do you know of from the cultures that you mentioned?

Learner: None

11.Researcher: Is there anything else that you want to say which this interview has not covered?

Leaner: Nothing

Signature

A handwritten signature in black ink, consisting of several overlapping loops and a horizontal line extending to the right.

Date 20/09/2019



## APPENDIX J: LEARNER 7 TRANSCRIPT

### Semi-structured interview protocol: Learner 7

1. Researcher: What is your understanding about the subject Technology?

My understanding?

Researcher: yes

Learner: I can say technology is the usage the way they lived on years ago and renewed to meet people's needs and wants

Learner: In short I can say technology is the system where they use, the way they lived years ago so that they can meet people's needs and wants

Learner: Also technology is based on renewing things from ages

2. Researcher: Graphic design is part of Grade 9 Technology content. Explain your understanding about this concept.

Learner: Is whereby we construct graphics using 3D and 2D to view the sides which is front, top and side and we use lines, hidden details

Researcher: shortly is about drawings?

Learner: yes

3. Researcher: What type of activities do you do towards the learning of graphic design in Grade 9 class?

Learner: We learn and do practical's we bring materials and do some of the things the teacher wants us to do. Last term which term 2 we did the bridge. As we were doing the teacher started by telling us how to do it and all that and talked about materials to be used, also she did come with some bridges from last's work to show what to do. We do practical's

4. Researcher: What approach (es) does your teacher use to assist you learn about graphic design?

Learner: She draws some of the drawings on chalkboard and label were she also consider those lines hidden details, thin lines etc. examples are not based on the paper then copy what was taught with understanding. This is for the first time to learn about this graphic designs.

5. Researcher: How do you find the teacher's approach towards assisting you to learn graphic design? Why?

Learner: Is helpful, because I will see what the teacher does in the board as I won't be able to do the drawing without having an example so preferable the teacher drew first on the board then tackle some question on my own so is helpful a lot.

6. Researcher: Indigenous technology forms part of the curriculum in Technology Education. What is your understanding of indigenous technology?

Learner: As I said before like you asked my understanding about technology I said technology is the system where they use or renew the way they lived in olden days. Long ago way of living like using clay, ostrich eggs for containing then technology came. Renew olden days living

7. Researcher: Have you ever come across the indigenous graphics or drawings or patterns in your learning of graphic design and if so, which ones?

Learner: No

8. Researcher: How could indigenous technology influence the learning of graphic design in Grade 9 class?

Learner: Have a chance to know more about what they were doing and have long ago and what is it like now

9. Researcher: Which indigenous cultures are represented in your Grade 9 class?

Learner: Swati, cause our home language is Swati we use the way in which they were living like reed to construct bridges so reed if am not wrong is a Swati and then technology brought concrete so they are no longer using reed

10. Researcher: What are the indigenous graphic designs do you know of from the cultures that you mentioned?

Learner: Only clay pot as they were using it and triangle as used now to make structures to be rigid.

11. Researcher: Is there anything else that you want to say which this interview has not covered?

Learner: I think mm what is the difference between graphic design and indigenous technology

Researcher: Those questions were tackled and the interview

Signature 

Date 20/09/2018

## APPENDIX K: OBSERVATION SHEET

Grade being observed			
Time and date			
Lesson Topic			
	<b>Aspects of teaching and learning for observation</b>	<b>Yes or No</b>	<b>Comment(s)</b>
Understanding of concepts	Are the lesson objectives addressing the aspects of indigenous knowledge and graphic design?		
	Is the lesson linking well with the concepts of graphics, design and indigenous knowledge in design?		
	Do the lesson say anything about indigenous knowledge?		
	What are the lesson activities?		
	Do the lesson activities integrate indigenous knowledge?		
	Is there any integration of indigenous knowledge explaining the graphic design concepts?		
	Does the lesson build on learner's interest and understanding of indigenous knowledge concepts?		
	Does the teacher demonstrate sufficient understanding of the subject content?		
Design of teaching and learning activities	Are learning activities communicating and supporting learning towards the topic?		
	Does the teacher develop the relationships between the topic and indigenous knowledge?		
	Does the teacher take advantage of especially indigenous contexts in the delivery of the lesson activities?		
	Do the assessment tasks integrate indigenous knowledge?		
Integration of IGKS	Does the teacher offer information and insights from the different contexts?		
	Is the teacher open to the knowledge forms from the learners' contexts?		
Learners	Do the learners express their answers by also making reference to indigenous knowledge?		
	Does the teacher's approaches to the subject matter content help learners		

	to understand different aspects of the subject content?		
	Do learners deliver proof of learning, i.e. written or oral task?		
	Are the highlights and low lights of the lesson stated?		
	Did the teacher comment on the general lesson presentation and suggest improvements in the next lesson?		

## APPENDIX L: EDITOR'S AFFIDAVIT

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Date: 26 November 2019

To Whom It May Concern



I hereby confirm that I have proof-read the document entitled: "The integration of indigenous graphics knowledge and skills to enhance Grade 9 learners' understanding of graphic designs in Technology Education" authored by Princess Blose, and have suggested a number of changes which the author may or may not accept, at her discretion.

Each of us has our own unique voice as far as both spoken and written language is concerned. In my role as proof-reader I try not to let my own "written voice" overshadow the voice of the author, while at the same time attempting to ensure a readable document.

A handwritten signature in black ink, appearing to read 'Princess Blose'. The signature is stylized and cursive.

Please refer any queries to me.