PERCEPTION OF TECHNICAL COLLEGE TEACHERS ON INTEGRATING INDIGENOUS KNOWLEDGE IN MALAWI'S FORMAL TECHNICAL, ENTREPRENEURIAL AND VOCATIONAL EDUCATION AND TRAINING (TEVET) SECTOR: THE CASE OF LILONGWE TECHNICAL COLLEGE

MASTER OF TECHNICAL AND VOCATIONAL EDUCATION THESIS

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MASTER OF TECHNICAL AND VOCATIONAL EDUCATION THESIS

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DECLARATION

I **Rose Mbeye** declare that this thesis is my own original work. Where other sources of information have been used, they have been acknowledged. I hereby certify that this work has not been submitted before in part or full for any other degree or examination.

SIGNATURE **:** 

DATE **:** 25th October 2017

CERTIFICATE OF APPROVAL

We, the undersigned, certify that we have read and hereby recommend for acceptance by the University of Malawi a thesis entitled; "Perception of Technical College Teachers on Integrating Indigenous Knowledge in Malawi's Formal Technical, Entrepreneurial and Vocational Education and Training (TEVET) Sector: The Case of Lilongwe Technical College".

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Date : _____

DEDICATION

This thesis is dedicated to my dear mother Juliet Lwinga, my son Atusaye Kachikho, my nephew Precious Mkwanda and my brother Ndositwe Mbeye.

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ABSTRACT

The study investigated teachers' perception on the integration of Indigenous knowledge (IK) in Malawi's formal TEVET sector as a way of achieving sustainable development. The need for IK is currently viewed as a valued resource that can alleviate poverty and create wealth. Malawi's TEVET sector advocates the integration of IK in formal TEVET to enable individuals acquire relevant skills towards enhancing local production processes (TEVET, 2013). Even though Malawi's TEVET sector embraces IK, it appears that integrating it in the formal TEVET sector has not yet been achieved. This paper presents an exploration of how IK can be integrated in the formal TEVET curriculum as one way of developing TEVET training programs and improving its relevance to learners' development needs. The study also examined IK and its relevance in formal TEVET and in harnessing sustainable development. The repositioning of IK could help balance off knowledge acquisition in formal TEVET and improves learner's knowledge and skill retention towards enhancement of their socio-economic opportunities.

The study adopted a qualitative paradigm in order to generate a holistic understanding of the integration processes and its merits. Data were generated through open-ended questionnaire and workshop discussion with eight teachers working for Lilongwe Technical College. The respondents of the study were purposefully selected and given the guide questions in order to gain their insights on how they understand IK, its relevance and strategies of integrating it in the curriculum. The study revealed that the majority of the respondents had a common interpretation of IK which was inspired by their social cultural upbringing as well as practical aspects of technological subjects. The study also exposed the need for IK in enhancing knowledge and skills acquisition of learners, creativity and innovations in achieving socio-economic and environmental sustainability. In addition, the need for research, documentation and infusing of IK in the curriculum coupled with the use of learner centered methodologies were viewed to be vital for successful integration of IK and the delivery of formal TEVET curriculum. The study recommends the incorporation of IK in the curriculum, capacity building of teachers, raising awareness and furthering an action based research where IK's are explored and integrated in a specific subject matter.

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ACRONYMS

SD	Sustainable Development
IK	Indigenous Knowledge
IKs	Indigenous Knowledge Systems
MGDS	Malawi Growth and Development Strategy
SK	Scientific Knowledge
TEVET	Technical, Entrepreneurial and Vocational Education and Training
UNEP	United Nations Environmental Program
UNESCO	United Nations Educational Scientific and Cultural Organization
ZPD	Zone of Proximal Development

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CHAPTER 1

INTRODUCTION

1.1 ORIENTATION TO THE STUDY

Recent literature on development studies considers knowledge as a key resource that can help alleviate poverty, promote innovations, enhance competitiveness and create wealth (Al-Roubaie, 2010). Thus, for the past decade up to date Indigenous Knowledge (IK) has been receiving increasing attention on the global agenda. Factors contributing to this responsiveness include the recognition of IK's prominence in the lives of the majority of the world's population and in management of biodiversity; concerns about the rapid loss of IK and global cultural diversity; concerns about unauthorized and inappropriate laying out and use of IK with little or no sharing of subsequent benefits with the original holders of IK and interest in harnessing the potential of IK for achievement of Sustainable Development (SD) (Twarog & Kapoor, 2004). Malawi being part of the global world is becoming more aware of the need to integrate IK concepts in its Technical, Entrepreneurial and Vocational Education and Training (TEVET) sector as one way of advancing the knowledge system by helping people to creatively improve local production process which will in turn enhance the competitiveness of the products (Ministry of Labour and Vocational Education, 2014).

Furthermore, Malawi's TEVET sector recognizes that effective and efficient utilization of IK in TEVET and its marginal outcome enables the country to adapt technologies and external knowledge that suits local conditions (Ministry of Labour and Vocational Education, 2014). Al-Roubaie (2010) emphasize that building indigenous capacity in developing countries like Malawi requires investment in education and training with increasing access to global knowledge and technology transfer so that we can catch up with the industrialized countries. In line with investing in education and training, Malawi acknowledges the pivotal role of TEVET as it emphasizes the application of skills, knowledge and attitudes required for employment in a particular occupation or cluster of related occupations in any field of social and economic activity (Gu, Gomes, & Brizuela, 2011; Ministry of Natural Resources and Environmental Affairs, 2004).

Thus, learning about local methods and alternative techniques in TEVET enhances the country's capabilities to innovate and create new knowledge.

IK is mainly denoted as a tacit type of knowledge that has evolved within the local grassroots community and has been passed on from one generation to another (Al-Roubaie, 2010; Rahman, 2000; Siyanbola et al., 2012). This entails that the tacit knowledge that exists in the mind of people is developed, this enables them to join local knowledge with learning in order to create appropriate knowledge that is applicable for production. However, Malawi's commitment to achievement of effective utilization of IK in TEVET has been an ongoing issue and may not have been fully realized. There is now a growing consensus that some of the solutions to problems currently plague African societies like Malawi, must proceed from understanding the dynamics within the local context. Such dynamics include the role of IK and practices in development processes (Dei, 2002; UNESCO, 2006). This is summed up in a UNESCO (2006, p. 6) document which posits that; "it is especially an attempt to promote SD of African societies where cultures and ways of life are balanced with global and international pressures and demands". Thus, SD refers to development that meets the needs of the present without compromising the ability of future generations to meet their own needs (Grenier, 2005). TEVET is therefore, acknowledged as being instrumental in harmonizing the different forms of knowledge bases and creating a social fabric for societies that can engender social, economic and environmental SD (Bempong, Constance, & Fofie, 2014; Owuor, 2007). Yet, for Malawi's TEVET sector there has been a wide gap between IK acquisition which is through non-formal way of training and TEVET which is acquired through formal education by teaching with structured curricula (Asayhgn, 2012; Kamwendo & Kamwendo, 2014). Observation has shown that learners in formal TEVET system fail to use and apply IK and its practices as a complementary knowledge system to Scientific Knowledge (SK) which attempts to construct general explanations and is one step removed from the daily lives of people in the search for universal validity (Lanzano, 2013). This has rendered them having no alternative means of survival resulting in increase of youths that are neither self or wage employed.

Today Malawi is confronted with a number of interconnected crises: struggling, inequitable economies, growing poverty and social inequity, and an increasingly overtaxed environment including the imminent specter of climate change (Ministry of Natural Resources and

Environmental Affairs, 2004). Malawi is thus in dire need of socio-economic transformation towards the development of sustainable communities and societies. Thus, IK has now become a central issue in global discourses as a strategy to solutions on social, economic and environmental problems of African states. The integration of IK advocates for educational process that is based on a holistic perspective, practically based and conceptualized to the local and national needs of learners. The purpose of this is to establish an appropriate balance between cultures, knowledge, values, economic needs, social pressures, demands of the national, localized and global development strategy (Ajibade, 2011; Owuor, 2007; Sipos, Battisti, & Grimm, 2008). It is imperative to recognize the need to inculcate this understanding into Malawian youths in order for them to improve their creativity and innovation for achievement of SD by re-discovering themselves within their own traditions, language, history and environment (Dei, Hall, & Rosenberg, 2002). Indeed, the wealth of IK presents unique and inimitable opportunities for innovation to occur and significant avenues for growth. As Olayinka (2007), stressed that the application of that knowledge is to be emphasized rather than its acquisition. In this case, there is a need to reposition and balance knowledge acquisition in TEVET as the best means of improving students' knowledge and skill retention which can in turn advance the economic opportunities for the teaming individuals which will eventually enhance economic development of the country (Ajibola & Jumoke, 2012).

1.2 CONTEXT OF THE STUDY

Developments and growth in Malawi are guided by the Malawi Growth and Development Strategy (MGDS). This development strategy spells out that education and training are some of the major catalyst for socio-economic development. Also, the Malawi government recognizes the role of TEVET as a necessity for development and a gate way by which people can acquire relevant knowledge, skills, expertise and competencies to actively participate in socio-economic activities (Ministry of Economic Planning and Development, 2012). Ministry of Labour (2013) very well supports this by stressing the need to recognize and value IK and traditional skills as they enable individuals to join local knowledge with learning so as to create appropriate knowledge, environmentally friendly tactics that are applicable in production. For thousands of years IK has been viewed as a significant resource which can contribute to the increased efficiency, effectiveness and progression of the development process (Kimbwarata, 2010). Hence, the long term progress of indigenous cultural system lies in the result of integration of

indigenous systems in formal TEVET sector. All these are a response to agenda 21 of the earth summit in Rio de Janeiro in 1992 which stipulate the need to reorient TEVET training system so that it reflects the economic wellbeing with cultural traditions and respect for earth and its resources (Dubois et al., 2011; UNESCO, 2002).

Rahman (2000) and Warren and Rajasekaran (1993, p. 6) defines IK as local knowledge or traditional knowledge that is unique to a given culture or society and is handed over orally from generation to generation. Basically IK is the systematic body of knowledge acquired by local people through the accumulation of experiences, informal experiments, and intimate understanding of the environment in a given culture. This saves as the information base of a society in facilitating communication and decision making. Malawi has for the past years demonstrated its commitment in promoting IK by identifying TEVET as one of the key areas of focus as it creates an enabling environment for society growth. Thus, TEVET provides the basis for local level decision making about many fundamental aspects of day to day life; for example education, adaptation to the environment and social change (Ministry of Economic Planning and Development, 2012). This forms part of TEVET Authority's 2013– 2018 Strategic Plan, which in principle inspire the TEVET sector towards creating a situation in Malawi where there is adequate dissemination of knowledge and sustainable generation. Thus, "the plan emphasizes on promoting utilization, innovation and documentation of IK and skills as one way of enhancing quality and relevancy of TEVET being offered" (TEVETA, 2013, pp. 20, 41).

Malawi recognizes that a good foundation for understanding the value of IK in the context of SD in its entirety is through quality graded levels of literacy among the population. Malawi delivers formal technical skills and knowledge in technical colleges and community colleges. All colleges utilize the same curriculum and all TEVET programs possess elements that might allow integration of IK. Hence, SD in TEVET which aims to engage democracy, negotiation and pragmatism is achieved since IK helps in confronting people with reality of their locality, assesses what is truly happening in their home environment and helps them to demand change and take action (Parker & Wade, 2008). UNESCO & UNEP argue that education is a key instrument for bringing changes in values, behavior and lifestyles consistent with justifiable development within the society (UNEP, 2005). TEVET as an integral part of the education system helps in training young people and adults with life skills necessary for labor market and

provides support to keep up with the fast changing market by expanding necessary skills and competencies. Thus, TEVET plays a crucial role in this new era as an effective tool to realize the objectives of a culture of peace, environmental sound sustainable development, social cohesion and international citizenship (Gu et al., 2011; UNESCO, 2009). SD in TEVET is about holistic thinking, that does not see the environment as merely a natural system, and instead it looks at the totality of the surroundings and the links between lifestyle and the use of nature. This is supported by Tilbury (2002) who posits that SD values certain beliefs that support sustainable living and its relevance to the needs of the society. All these shows that individuals in TEVET can use their IK and innovation to live in balance with the environment as well as promoting their social wellbeing through proper utilization of the knowledge gained.

It is noteworthy to stress that Malawi is endowed with so many IKs such as; wood carving, masking, dying, forging, knowledge on soil selection for various activities and weaving which presents themselves in many places but formal TEVET learners fail to produce them. Recent studies have stressed the importance of including this traditional logic of the local population in addition to the scientific logic specifically in dealing with issues of defensible utilization of resources provided by African civilization (Sabola, Henry, Kayambazinthu, & Wilson, 2007). This is in view that IK systems are dynamic and that they are influenced by internal creativity and experimentation as well as by contact with external systems. Thus, effective and efficient utilization of IK plays a crucial role in achieving participatory approaches to development. Currently, various case studies and research projects (for example, a case study of an attempt to validate the ability of indigenous systems of land evaluation, and a project on exploring the link of IK technology and TEVET in Ghana) have shown that there are no general technical western solutions for solving specific local problems. In addition, new insights have revealed that development interventions have failed to induce people to participate because these interventions have lacked both the will and the instruments to allow people to use their own knowledge (Ajibade, 2011; Boven & Morohashi, 2002). This entails that maximum effort need to be made in TEVET as a way of strengthening the capacity of local people that are capable of developing their own knowledge base and methodologies that improves their livelihoods. Nevertheless, the challenge for Malawi still remains that there has not been adequate break-through in incorporating IK in formal TEVET sector as one way of complementing the existing ideas which

induces attainment of development and growth in all spheres of human life. This particularly calls for the need to integrate IK in TEVET as one way of achieving SD.

For the past years countries in Sub-Saharan Africa like Malawi have advocated on the value of incorporating IK in formal education systems due to its potential contribution to viable development at the micro level and poverty alleviation (Dei, 2002; Semali, 1999; UNESCO, 2006). Dei (2002) and Shiva (2002) agrees by arguing that if African states are to play a central role in directing the goals of SD, then there is a need to integrate the African perspectives of knowledge as a reciprocal body of knowledge to western knowledge in order to ensure relevance and practicality in addressing local problems affecting societies especially poverty. Dei (2002) suggests that in order for local governments and international communities to find solutions to socio-economic problems facing African states and Malawi in particular, there is a need to explore the contribution of the culturally based knowledge resources as alternatives to local sustainable development. This demand understanding of the capability of IK in the development process of communities, and ways in which indigenous people strategize their own survival within specific setting. All these can best be achieved if TEVET manages to impart this knowledge and skills to the vast population of the country.

The role of IK especially in providing the basis for viable approach to development is now been recognized in Malawi. Even though the move is appreciated, it is necessary to spread this to formal TEVET sector. Fadeeva, Payyappallimana, Petry, and Dirksen (2012), explains that once this knowledge is gained and is put into practice it reduces reliance on scarce-trained scientific manpower and extend the range of observations upon which science itself can be drawn. Hence, a diverse TEVET system need to accommodate structured training programs that will incorporate the acquisition of IK (African Union, 2007). It is vital to recognize that the basic component of any country's knowledge system is its IK. This encompasses the skills, experiences and insights of people, applied to maintain or improve their livelihood. IK is an important part of the lives of the poor and an integral part of the local ecosystem. As such it is a key element of the social capital of the poor; their main asset to invest in the struggle for survival, to produce food, to provide for shelter or to achieve control of their own lives. Thus, IK provides problem solving strategies for local communities and helps shape local visions and perceptions of environment and society.

1.3 STATEMENT OF THE PROBLEM

Agenda 21 of the Rio Declaration on Environment and Development emphasizes much about training as one of the most important tools to develop human resource and facilitate the transition to a more sustainable world (Gu et al., 2011; Majumdar & Khambayat, 2010). More emphasis is on the need to reorient TEVET training system so that it signifies the economic wellbeing with cultural traditions, creative use of local knowledge and respect for earth and its resources (Dubois et al., 2011; UNESCO, 2002). Malawi's TEVET sector embraces the need for promoting IK acquisition in TEVET and advocates human resource development as the only tool in harnessing the deployment of other resources which can happen if necessary techniques and skills are provided (Ministry of Labour, 2013; TEVETA, 2013). Whilst IKs have been viewed to have the potential in harnessing sustainable development, little seem to have been done to promote and utilize it neither has it been developed in the present formal TEVET curriculum to allow teachers integrate it in their teaching and learning process. This has resulted in production of TEVET learners who fail to understand the viability use of IKs at their dispose; rendering them having no basic alternative means of developing their skills and knowledge which are vital in both wage and self-employment. All this stems from the fact that there has not been adequate break-through in integrating IK in formal TEVET and that professionals in the TEVET circle are yet to appreciate the value of IK as being a valid mode of application for viable development and socio-economic transformation of the rural community and society at large (Asayhgn, 2012; Kamwendo & Kamwendo, 2014). Further, very little is known pertaining to practices and strategies involved in the integration of IKs and the need to utilize IK in Malawi's formal TEVET curriculum as evidenced by lack of literature on whether any research was conducted on this area. Barnhardt (2005); Bisong and Andrew-Essien (2012) emphasizes that the fit of this knowledge in formal education promotes local level decision processes which are critical for development and growth. It is imperative to note that the future of IKs in TEVET will not only reflect an appreciation of the cultural diversity of the world, but it will enable individuals in TEVET in determining alternative methodologies unto which various products can be developed using locally available resources. Hence, there is a need to develop critical integrative IKs as a basis for socio, political, and education practices.

1.4 RESEARCH OBJECTIVES

The study looked at ways and the need for integrating IK in Malawi's formal TEVET sector and it addressed the following specific objectives:

- To explore views of teachers on their understanding of IK.
- To explore views of teachers on the importance of IK in formal TEVET in promoting SD.
- To analyze ways of integrating IKs and approaches to teaching and learning of formal TEVET curriculum.

1.5 PURPOSE OF THE STUDY

The study purported at investigating ways and the need for integrating IK in Malawi's formal TEVET curriculum for achievement of SD. The study explored the meaning of IK and benefits of integrating IK as being a potential for successful delivery of TEVET programs and in achieving SD. It is agreed that the use of IK in formal education provides learners with an opportunity to relate their experiences outside the classroom to technical concepts and processes, and relate culturally specific activities encountered in their everyday lives and learning activities (Nkopodi & Mosimege, 2009). Hence, the paper wants people in TEVET to clearly understand various ways unto which IK can find its voice in formal TEVET system and the additive worth that IK can bring to the lives of individuals who shall in turn transform the society. This to a greater extent will create familiarity on how IK can complement scientific knowledge which will in turn impact the socio-economic developmental wellbeing of the teaming individuals. Also, the paper purports at coming up with approaches to teaching and learning of TEVET curriculum when IK is integrated. In this case, those in TEVET cycle will better understand the practicality of IK practices in real life situations. Owuor (2007) supports this by contending that by developing positive initiatives in raising IK in formal education system, will assist African countries in realizing alternative solutions to current pressing issues such as alleviating poverty and the challenges of environmental degradation attributed to climate change at grassroots level.

1.6 SIGNIFICANCE OF THE STUDY

For many years, TEVET training in African countries like Malawi has been based mainly on western values. This has resulted in sidelining learners from disadvantaged background who cannot see the connection between the education they receive at TEVET institutes and their everyday experiences (Abah, Mashebe, & Denuga, 2015; Nkopodi & Mosimege, 2009; Rahman, 2000). It then appears that IK acquisition by these learners could help in promoting and enhancing their knowledge understanding of various issues surrounding their communities and raise their academic performance. This assertion is well reflected in Malawi's major policy documents such as MGDS, Malawi National Strategy for Sustainable Development and TEVET Policy. This research is very important and strategic one especially at this point in time when IK is viewed as a basis for developing individual understanding about their environments which informs and support proper decision making. The study would therefore help in contributing to knowledge base that would better enlighten and support TEVET practices and fill the literature gap which may further inform further studies. Again, the study would help TEVET professionals in understanding relevance of IK and recognize that advanced growth can only be achieved by developing skills based on the priorities of the local people, and by creating a technological base that includes both traditional and modern approaches to problem solving. This would assist those in TEVET to be creative and mindful to the opportunities that exist and be able to solve problems based on the accepted values of the society. Furthermore, the study contributes to knowledge and understanding of the critical role of integrating IK in formal TEVET in order to change attitudes and behavior of people as individuals and as citizens carrying out their collective activities so that they transform their visions of society into operational realities.

1.7 LIMITATIONS

The discussion of IK in formal education and training is a large area of research; therefore this research focused on issues of IK that were relevant to formal TEVET and that might provide a fertile ground for channeling it in TEVET programs for achievement of SD. This being the case, anything outside this was not tackled. This challenge was mitigated by clearly understanding and selecting IK concepts that gave a breakthrough for its integration. In addition, the study adopted a case study approach; as such only teachers working with Lilongwe Technical College took part in exploring various ideas related to the presence of IK in formal TEVET. This was dealt by

purposively selecting participants that were conversant with knowledge and skills delivered in TEVET such that the required information was generated. Again, the data collection exercise was affected by respondents' busy schedules and insufficient material resources. This being the case, the available time and resources that were there were properly utilized. Having explained the introduction, background of the study, statement of the problem, the research rationale and the limitations, the next chapter two discusses the literature review of the research.

CHAPTER 2

LITERATURE REVIEW

2.1 INTRODUCTION

Many scholars are counting on various knowledge acquisitions in formal education to lead us towards SD. Indeed, IK can act as a powerful tool in formal education and training in teaching learners how to balance his/her role between the place of work and the community in which he/she lives and serves, thereby contributing to social, economic and environmental SD. This would allow learners to unlock their potentials, expand their horizons and adapt to the changes of the dynamic world (Ansah & Ernest, 2013; Gough, 2008; Rowe, 2007). Thus, IK need to be integrated so that it assists learners in recognizing their culture and values there by building their local communities (World Bank, 2005). This chapter reviews literature related to IK and its relevance in formal TEVET system, strategies that might be employed in utilizing IK in the curriculum and approaches to teaching and learning process. These might act as stepping stones to help learners succeed both academically and practically. In addition, a description of the theoretical framework of the study was reviewed.

2.2 INDIGENOUS KNOWLEDGE

Knowledge is defined in various ways, Bear (2009) described knowledge as the state of knowing, cognition, understanding, or that which is known. In terms of context, Burrows (2008) viewed knowledge as the sum total of what is known by an individual, group, cultural and otherwise, community, society and humanity. Thus, IK is part of the collective genius of humanity. It presents the accumulated experience, wisdom and know-how unique to nations, societies and communities of people living in particular ecosystem. This knowledge is best understood from an indigenous context based on the view that knowledge is not a solid thing; but its manifestation may be solid. Thus, it appears that IK can have various meanings based on what people in specific society values.

Various authors have presented diverse views of what IK is, for instance; Nakashima, Prott, and Brindgewater (2000), looked at IK as the local knowledge, folk knowledge, people's knowledge, traditional wisdom or traditional science that is unique to a culture or society. For the World Bank (2013), IK implies a large body of knowledge and skills that have been developed outside the formal education system. IK is passed from generation to generation, usually by word of mouth and cultural rituals, and has been the basis for agriculture, food preparation, health care, education, conservation and the wide range of other activities that sustain a society and its environment in many parts of the world for many centuries. In favor of Africans, IK implies what local people know and do, and what local communities have done for generations and is built not only on theoretical basis but also on experience (Omolewa, 2007). Mapara (2009), observes that IK is a body of knowledge of the indigenous people of particular geographical areas and that they have survived on for a very long period of time. They manifest themselves in various dimensions such as agriculture, medicine, security, botany, zoology, craft skills and linguistics. These are forms of knowledge that have failed to die despite the racial and colonial onslaught that Africa has suffered at the hands of western imperialism and arrogance, hence they are linked to communities that produce them and are characterized by complex kinship systems of relationships among people, animals and the earth from which knowing emanates (Hammersmith, 2007).

According to Dei (2000), "IK is all about the common sense ideas and the cultural knowledge of local people concerning day to day life. This is critical to the way communities regard and live in their environment and presents communities with ways of managing their environment be it natural, cultural, or political" (p.5). This is concurred by Berkes (2001) and Berkes and Folke (2002) who state that IK is an attribute of societies with historical continuity in resource use on a particular land, particularly in non-industrial and less technologically oriented societies. Corresponding to this, is what Convention on Biological Diversity (2007) posits that IK denotes knowledge, innovations and practices of indigenous and local communities around the world. It is imperative to note that IK really has various meanings. However, certain aspects in a fore mentioned definitions seem to give a clear view of what IK is. Aspects like local knowledge, innovation and practices, uniqueness to particular society, is based on experience and passed from generation to generation. These aspects when synthesized together give a working definition of IK. For this study, IK refers to a cumulative body of knowledge, technologies,

innovations, practices and beliefs that have been and are still used by indigenous and local people for existence, survival and adaptation in a variety of environments and are evolving by adaptive processes and handed down through generations by cultural transmission, about the relationship of living beings (including humans) with one another and with their environment (Mosimege & Onwu, 2004, p. 2).

As an emergent field of study, various terminologies for IK are used that connotes same meaning. Words like local knowledge, indigenous technical knowledge, ethno-science, local science, traditional science, traditional knowledge, people's science and village science are used interchangeably with IK. In many cases, IK is apprenticeship based and orally passed from generation to generation through stories, legends, folklore, rituals, art, crafts and even laws. Indeed, holders of IK often claim that their knowledge cannot be separated from the natural and cultural context within which it has risen, including their traditional lands and resources, and their kinship and community relations. It is worthy while to emphasize that IK is not a static phenomenon, but one that is continually evolving with changes in the external and internal environment of the community concerned (Kothari, 2007; Williams & Muchena, 2005). This suggest that IK is generated through adaptation of one's environment, as the ecosystem changes addition knowledge systems are developed in order to cope up with change and sustain our lives. This forms the basis for decisions and strategies in many practical areas such as art, technology, education, physical sciences and agriculture. IK is a valuable assert for human well-being specifically in conservation of biodiversity, socio-economic and cultural development (Cetinkaya, 2009).

Being holistically based, IK is dependent upon the relationships within personal and social contexts. On a personal level, IK relies upon subjective interpretations and experiences. The primary goal is self-knowledge. Giving a more detailed explanation, Hart (2007) identifies that the goal of IK is to understand and attempt to contain the energies that infuse everything in order to create a self-sustainable lifestyle that is harmonious with the local ecosystem. Knowledge is developed on a personal level through subjective reflection and participating in ceremonial and stage based processes. On a social level, IK is highly localized in that knowledge is based upon the environment and situations encountered by learners. It has a focus on "the web of relationships between humans, animals, plants, natural forces, spirits, and land forms in particular

localities, as opposed to discovering particular laws" (Battiste & Henderson, 2000, p. 44). Indeed, IK is dependent upon people's experiences with their local ecosystems. Battiste and Henderson (2000), have even suggested that the changing ecosystem is the ultimate source of knowledge and that the common expression of IK lies in the vibrant relationship between the people, their ecosystem, and the other living beings and spirits that share the land. IK is developed through people's attempts to understand their relationship with local ecosystems, thus indigenous ways of coming to know are orientated to a space and place. As such, the ecosystem itself is another key aspect of the holistic base of IK (Hart, 2007).

2.3 RELEVANCE OF INDIGENOUS KNOWLEDGE IN FORMAL TEVET

Recent studies acknowledges beyond any dispute that formal TEVET system is a key aspect of development and can address the vital component of IK capacity particularly in dealing with challenges of development (Ndlovu, 2008). TEVET being a major resource consumer and a training provider takes on a complex, distinctive character and carries with it the inherent idea of implementing programs that are locally relevant and culturally appropriate. This historical commitment gives TEVET a foundation upon which to build future commitments through inculcation and acquisition of IK (Anaele, Adelakum, Olumoko, & Kanu, 2014; Majumdar & Khambayat, 2010). Indigenous knowledge is a valuable assert and forms a set of interactions between economic, ecological and social within a group or groups with a strong identity, drawing existence from local resources through patterned behaviors that are transmitted from generation to generations to cope with change (Eyong, 2007). Thus, formal TEVET is a powerful tool in realizing this, and socializes people to their cultural heritage and value systems. This will enable people to appreciate and understand their history, way of life and cultural identity: who they are, where they come from, where they are now, where they will be tomorrow, and how they will get there. Indigenous knowledge embodies people's way of life and national identity (Shizha, 2014). Hence, there is a need to incorporate the IK in formal TEVET system.

For many centuries, IK has been the basis for agriculture, food preparation, health care, education and training, conservation and the wide range of activities that sustain a society and its environment in many parts of the world. This knowledge is built on experience and not on theoretical basis. Dipholo and Biao (2013), argues that knowledge is experience and everything

else is information. Indigenous knowledge reminds us that knowledge does not only come from books, computers but from the interpretation of our environment. For instance, in construction courses forest management techniques can firstly be explained using local knowledge this should be followed by ways of exploiting this resource in a sustainable way. This repositions learners' knowledge in conserving their ecosystem which has a greater impact on their socio-economic activities. Research done Dipholo and Biao (2013), bemoans the way IK has been neglected and suffered as much of it is being lost and, along with it are valuable know-how about ways of leading a sustainable life both ecologically and socio-economically. Therefore, it appears that the inclusion of IK in TEVET training curricula helps in strengthening the effectiveness of training programs, empower learners and supplement the knowledge currently gained by learners in schools. In doing this, learners are better positioned in aligning the acquired knowledge and skills they need for daily life and connect this with their socio-cultural context (Nowotny, Scott, & Gibbons, 2001). Gorjestani (2000) supports this by contending that, utilizing IK in training programs helps in increasing the sustainability of development efforts because the IK integration process provides mutual learning and adaptation which in-turn contributes to the empowerment of individual learners. Empowerment of learners who mostly lives in local communities cannot be over-emphasized because each and every development effort is meant to empower communities especially the poor. These people consider IK as the only asset and certainly one with which they are familiar with. Hence, the teaching and learning in technical colleges need to move from known to unknown, and this will help learners in relating easily the training they receive and activities in their communities (Dipholo & Biao, 2013).

Indigenous knowledge covers all forms of knowledge such as technologies, know-how, skills, practices and beliefs. African countries are advocating the use of IK in formal education and training as a vital resource that contributes to sustainable development of local communities. As such IK is viewed to contain sets of perception, information and behavior that guide members in society to use land and creatively exploit natural resources (Iyoro & Ogungbo, 2013). Results from Pawilen (2013) research, explains that integrating IK in formal education and training does not literally mean to completely localize or change the current curriculum. However, it aims at promoting the understanding of technical and scientific concepts in a given socio-cultural perspective and context. This kind of situated pedagogy increases the chance for the learners to feel ownership of their education and reduces the conditions that produce their alienation.

Incorporating IK in TEVET programs therefore, might help students feel ownership of the knowledge they bring to learning environment which in-turn could make TEVET graduates execute their services in a contextually relevant manner. This is supported by Paulo Friere in the pedagogy of the oppressed, where he suggested that by allowing individuals to have ownership of their knowledge is equivalent to respecting their culture, tradition and identity. This will mean that teaching and learning will not be done merely as banking information, learners will have the opportunity to understand the relevance and meaning of the knowledge they are being taught (Ndlovu, 2008; World Bank, 2005).

Chitere (2011) and Pavlova (2009), asserts that the recognition of IK as part of technological training programs cannot be over emphasized. It signifies an important component of global knowledge and development issues. Thus, technology development involves extension of human capability in order to satisfy socio-economic needs. This denotes that it is the making, modification, usage, knowledge of tools, machines, techniques, crafts, systems, and methods of organization, in order to solve a problem and improve a pre-existing solution to a problem that helps one in achieving a goal and successfully perform specific tasks. All this seems to be geared at improving understanding of local conditions and provide a productive context for activities that are designed to help the community. According to Wangu, Nyariki, and Sakwa (2015, p. 36), "inclusion of IK is being embraced as a catalyst for knowledge acquisition in formal TEVET system, based on the fact that the majority of learners comes from local communities which is in dare need for development". As such learners will hold fast what is dear to them for SD and improved standards of living by entrepreneurship which encourages saving culture, innovation and skills development. IK, being the kind of knowledge that evolves in response to environmental challenges has been established as being effective in meeting the needs of end users. The World Bank asserts that, the presence of IK in formal education and training is a powerful social capital of the poor (World Bank, 2013). This suggests that what learners will acquire will be their main asset to invest in the struggle for survival through entrepreneurial activities and wage employment there by meeting their daily needs.

The call for the integration of IK in formal education and training is based on the view that it promotes knowledge diversity which is very beneficial. This holistic approach to knowledge production and dissemination has the potential of placing human needs at the core of technical

education (kaya & Seleti, 2013). Battiste (2002), explains that the assimilation of IK in formal education and training provides students with opportunities to learn appropriate community attitudes, sensitivity for the environment and caring values for sustainable livelihood. Furthermore, involving community knowledge holders in research, teaching, and learning enables students to learn across generations. Hence, making them appreciate and respect the knowledge of elders and other community members. In this context, formal education and training becomes an agency for transferring culture from one generation to the next. This is concurred by Kante (2004) who posits that the integration of IK at all levels of formal education in Africa will be beneficial to learners because it will enhance the relevance and effectiveness of education by providing with information that adheres to their own inherent perspectives, experiences, language, and customs. In terms of educational content, the inclusion and interfacing of IK and modern knowledge systems within the curricula, instructional materials, and textbooks will help to prepare learners for the greater world.

Several case studies have indicated a number of important issues pertaining integration of IK in formal education and training. All these point out that effective utilization of IK in formal education and training helps in raising the prestige and perceived validity of local knowledge. Also, it facilitates adaptation of new structures for IK transmission where social networks are no longer functional (Batibo, 2009; Van Eijck & Roth, 2007). Ruiz-Mallen, Barraza, Bodenhorn, De la Paz Ceja-Adame, and Reyes-Garcia (2010) agree with this by positing that integration of IK in formal schooling has a positive impact on educational outcomes by contextualizing curricular content. This will mean reconnecting students with the surrounding environment which will act as a path of countering the acquisition deprivation that is thought to result from removing learners from traditional learning context (McCarter, Gavin, Baereleo, & Love, 2014). Indeed, certain scientific and technical concepts can best be understood by learners and the meanings easily contextualized within the learning environment if complimented by IK. This approach has the potential to support learners carry out various activities which will enable them construct a sustainable understanding of the subject matter, hence making them responsible for building their own knowledge and understanding. This will allow learners to appreciate what is known about scientific knowledge and what is known and valued by local people and communities. Therefore, their inclusion in formal education will enable learners to recognize and acknowledge the existence of multiple forms of knowledge rather than one, standard, benchmark system based on

western values and ways of knowing (kaya & Seleti, 2013). This view is supported by Odora-Hoppers (2001), who state that it is crucial that Africa builds on all the valuable indigenous capital of the past and relinquishes all that is deskilling or disempowering and disastrous to her development, advancement and sustainability.

Furthermore, proper utilization of IK in formal education and training assists teachers and learners in making extensive use of hands-on activities, investigative activities and cooperative learning (Abah et al., 2015; Lemus, Seraphin, Coopersmith, & Correa, 2014). Thus, it appears that the presence IK will enhance teachers' capabilities in developing learners' understanding beyond simple memorization of facts since critical concepts will be presented in local meanings. In this way, learners will acquire analytical and creative skills that could be used to solve specific challenges and situations within their local communities. Valuing IK in formal education and training seems to be vital in empowering learners to be critical endogenous thinkers due to provision of background knowledge. This is confirmed in many works, which explicitly suggest that IK provides a good starting point for establishing context required to get learners from the 'known' to the 'unknown' which leads to grounding and contextualizing the learning process (Ntšekhe, Terzoli, & Thinyane, 2014).

2.4 INTEGRATING INDIGENOUS KNOWLEDGE IN FORMAL TEVET CURRICULUM

TEVET is a vital resource in enhancing achievement of SD through inculcation of technological and scientific concepts to learners. Science and technology are global, touching almost every part of our lives, our communities, our homes. While TEVET is still the dominant paradigm when it comes to issues dealing with environment and raising the socio-economic status of individuals, the scientifically and technologically community is equally raising questions about the validity of technological knowledge as a sole basis for knowledge development and are suggesting that it is important to recognize the role that IK play (Kulnieks, Longboat, & Young, 2013). Understanding IKs and its perceptions can point to some ideas and practices that are necessary for living but are often missing by the formal TEVET curriculum, and can enhance knowledge and skills acquisition of learners. According to Sarangapani (2006) and Shizha (2014), the formal TEVET curriculum is developed with an aim of imparting technical and scientific

knowledge, processes and skills that lead to production of goods and services during the period that learners attends the educational institution. Hence, the relationship between the school and the world in which it is situated, the world of the child's home and community, is an object of the theorizing the curriculum so that it reflects socio-cultural context of learners (Mateso, 2014). Therefore, curriculum developers need to be more aware of this aspect of schooling as a way of overcoming social stratification and inequality.

Integrating IK into formal training methods and practices is a process of blending IK and scientific knowledge into rational decision-making, sharing of information and understanding of different viewpoints between the local communities and western trained technicians (Roba, 2008; Ruheza, Mattee, Chingonikaya, & Kilungwe, 2013). Using the term co-management, Ruheza and Kilungwe (2012) argues that integration of indigenous and the scientific knowledge systems is a process of active participation of local people and their knowledge and equal sharing of power and responsibilities between scientists and the local people. This is supported by Kaya (2013), who elaborates further that the integration of IK into formal education enables learners and educators to re-evaluate the inherent hierarchy of knowledge systems because historically IK are depreciating. Therefore, their inclusion in the formal education and training curriculum requires an acknowledgement of the existence of multiple forms of knowledge rather than one, standard, benchmark system. In order to fully integrate IKs into formal education and training curriculum it is critical to involve the elders who are bearers of the knowledge. The information gained from elders can thus be reconciled with the type of knowledge that exists in the curriculum (Hays, 2009). This is followed by the realization and acknowledges that in this age of globalization and knowledge society, knowledge is no longer available from only one source. Knowledge mobility is cutting across borders and what we are currently experiencing is a collection of various knowledge systems. This is what is known as a hybrid of knowledge and its synthesis is known as hybridization (United Nations, 2005). It is important to emphasize that the TEVET curriculum should be a hybrid of local, regional and international knowledge. However, what the curriculum should emphasize, legitimize and validate are IKs. Local cultural knowledge should not be viewed as additive to western knowledge. They should form the foundation of the curriculum and knowledge construction by selecting content that can allow this. The curriculum should emphasize indigenous philosophies, which is based on respect of self and community, participation in community life, respect of African spirituality, holism and philanthropism

(Magagula & Mazibuko, 2004). An inclusive or blended curriculum is likely to improve not only the academic success of learners but also reduce disconnections and misrepresentations that are historically presented in the curriculum. A rethinking and redefinition of legitimate knowledge, school knowledge, curriculum development and implementation are necessary processes for transforming the predominantly colonial learning contexts that are the major feature of the postcolonial African curriculum (Shizha, 2014).

For curriculum hybridization to materialize there is need for proper selection of IKs and its practices. That is only those that are relevant to TEVET and those that will promote sustainability of resources need to be favored. Essentially, formal TEVET programs are associated with training and development of effective human resource, who are well equipped with technical and scientific skills for improvement of life and national development (Asayhgn, 2012). It is hoped that those that pass through formal TEVET should have ideas that will enable them to exercise the concepts of renewal, recycle and regenerate for improvement of their lives and the societies. Some scholars argue that, by identifying content at which IK can be integrated is vital in managing local practices that can provide links for developing ways of increasing productivity and sustainability of local resources and may reveal missing information which can assist TEVET learners in developing alternative technologies that are ecologically friendly (Afeti, 2008). Kagoda (2009), suggest that topics such as conserving and managing forests, forging, producing decorative features and realizing various products gives room for IK integration. This suggests that the presence of IK in formal TEVET curriculum can make learners feel at home and this will go a long way in restoring and maintaining the integrity of people and its culture. However, for this to materialize there is a need to conceptualize the tools and contents that will enable us to understand the composition of the curriculum in terms of whose knowledge is selected for inclusion and how it is going to be represented and its consequences to learners. By doing this, IK will play a significant role in developing creative and manipulative skills and thinking behavior that can promote innovation and entrepreneurship in our local communities (Bear, 2009; Sarangapani, 2006; Tshwane University of Technology, 2013).

The inclusion of IK in formal TEVET curriculum is based on the necessity to develop and equip TEVET learners with technological and scientific knowledge and skills they need for daily life. This aims at connecting technological and scientific knowledge with the socio-cultural context of

the learners especially in local communities by devising patterns of IK and its practices that can fit in formal content. This adheres to the idea that technology, science and society are inseparable (Nowotny et al., 2001). This is vital in bringing training programs to the level of understanding and experience of learners, so that they better transform ideas or natural phenomena from the context of their environment. This inclusion dictates the use of instructional materials based on culture and history of the local people. These can be used to illustrate principles and methodologies of technical and scientific concepts that are used in the present curriculum. Integrating IK in the curriculum is something that has to do with a passion of making cultural knowledge, language and values a prominent part of it. This aims at developing and nurturing an effective, creative, innovative, intuitive and soulful understanding of the natural world in the present curriculum (Pawilen, 2013).

Currently, Africa is overcrowded with many TEVET graduates who are unemployed, whereas there are enormous potential opportunities in harnessing the abundant natural resources which are embedded in IK. Aspects of IK and technologies such as weaving, wood carving can easily be seen in formal TEVET system (Abah et al., 2015; Gbenda, 2010; Okorafor, 2014). Hence, for formal TEVET learners to learn with meaningful applications within his/her communities there is a need to extend curricular activities beyond the current practice of western indoctrination to facilitating subject matter learning through integration of the learner's IK in order to transform the subject matter knowledge into comprehensible form that the learner can easily grab and apply. Lemus et al. (2014), concurs with this by positing that the integration of IK ways of understanding with western scientific ways of understanding, results in contextualizing the course content whilst enabling learners to better understand the host culture. This allows learners who are less connected to the local culture to view culturally responsive curriculum as a way of connecting what is known about western terminologies with what is known and valued by local people and communities.

2.5 INDIGENOUS KNOWLEDGE AND APPROACHES TO TEACHING AND LEARNING PROCESS

The existence of IK in formal TEVET system has great value in mitigating environmental, social and economic challenges. As Movarej, Hashemi, Hosseini, and Rezvanfar (2012), emphasizes

that IK is part of the definition of indigenous autonomy socially, economically and environmentally. Recognizing the distinction between IK and SK supports and stresses the integration of the two as complementary knowledge systems, rather than treating them as similar bodies of information or separate subsystems. The view is that by integrating IK as a reciprocal body of knowledge to SK, TEVET trainees will be trained to accept, practice and embrace sustainable concepts. These are hoped to create future desirable workplaces, engage in the right culture in order not to deplete existing resources, try to exercise positive behaviors and innovate in order to transform and sustain existing resources for the continual use by future generation. As the world has gone through industrial and information age, TEVET is now poised and better positioned to engage innovations using the accumulated knowledge and experiences. New kinds of competencies need to be addressed and inculcated in the minds of future workforce which TEVET has a big stake and role to play. The right knowledge which is aligned to their context must be delivered in the right manner by teachers (Hassan, 2010). Therefore, in order to support sustainable skills development, formal TEVET sector need to work systematically on ways unto which IKs can be utilized so that economic gain, social acceptability and environmentally sound aspects of SD are achieved. The integration of IK has pedagogical importance in the content and methods of teaching and learning. It is noteworthy to recognize that co-management of IK and scientific knowledge in specific subjects, pedagogies and participatory learning, developing teaching practices that contextualize authentic learning, having centers for indigenous knowledge's and indigenous medium of instruction as an educational cultural tool are ways that can help educators in infusing IK in the teaching and learning process. This section discusses these as approaches to teaching and learning of formal TEVET curriculum.

a) Co-Management of IK and Western SK in Specific Subjects

Having considered the need to put together various knowledge systems, it is of value to recognize that in order to bring significance to learning, explanations of scientific and technical concepts are best understood by learners if they are taught first in indigenous terms to which they can be related and then explained in western terms (Barnhardt & Kawagley, 2005). Chika (2015) admits that teaching supported with prior knowledge increases students ability to grasp materials taught to them and they are likely to retain information. This suggests that there is a need for proper selection of IK which tallies with the specified scientific knowledge. For example, timber seasoning, it can be explained initially in indigenous way of understanding selection of timber,

stacking it and explaining reasons for such a pattern and its impact on increasing or decreasing moisture content and preventing rotting so that the required moisture content is achieved. Once the learners understand the relevance of the knowledge being presented, it can then be described in western terms, such as flow of moisture, mathematical calculation of moisture content and using instruments to get the required moisture content. In this case, learning will start with what the student and community already know and have experienced in everyday life. Learners will then become more motivated to learn when the subject is based on something useful and suitable to the livelihoods of the community and is presented in a way that reflects a familiar world view (Battiste, 2002). World Bank (2005), advises educators to utilize IK as the basis of introducing new concepts.

b) Pedagogics and participatory learning

Co-management of IK and SK cannot be achieved with ineffective pedagogy. Pedagogics, the science or art of teaching or education (Shizha, 2014), is very crucial to learners' academic performance and school achievements. Indigenous perspectives on teaching and learning are constructed on the basis of strengthening the relationships between the learner and the community and the ability of the learner to contribute to the community. Learners engaged in negotiating a space where common ground can be determined, have the potential of building a challenging culturally safe environment for their survival. Knowledge of the social, cultural and ecological realities is necessary for everyday interactions, personal and community survival. Local knowledge of land and place work synergistically to construct multiple social realities and ways of knowing. Knowledge of space, land, language, culture and community intersect with and informs participatory learning and action-oriented educational practices. IKs are scripted on the consciousness of the people who recognize that human beings are not detached from their ecological environment. Therefore, knowledge is consciously created and it reflects life in a local community or society (Shizha, 2014).

Participatory learning is a strong component of formal education system and it is critical and relevant in contextualizing local activities. Participatory learning is largely a learners' engagement rather than an individualistic, private and personal pursuit as promoted in western education systems. Indigenous researchers (Shizha, 2009; Smith, 2009) assert that participatory action in knowledge construction and learning is a model that is deeply connected to indigenous

ways of knowing and to the decolonization process. Evidently, participatory education has production. The input from members of the class assists in preparing oneself to be an active participant of every aspect of community life (Shizha, 2014).

Participatory learning is strongly linked to productive skills and socio-economic development unlike capitalist education that creates a pool of unemployed youths and poverty, thus endangering society (Armstrong, 2011). Ideally, social development for Africans had a humanist approach, development of the people toward their greater freedom and wellbeing, an approach consistent with indigenous cultural perspective on working for the betterment of society. All members of society had to participate in the task of community building and share in its rewards. Active participation generates harmonious relationships between communities through sharing ideas, knowledge and goods thus creating a balanced society. Participatory development is linked to participatory learning that children learned from adults. It involves young members observing adults at work and then taking part in the activities, or when the young went out into the forests, rivers, mountains to practice the knowledge they had learned from adults. Learners, who acquire a deep knowledge of a particular place, care about what happen to the landscape, creatures, and people in it. African traditional cultures were inclusive when it came to knowledge (Sharan & Associates, 2007). Thus, it seems that effective and efficient utilization of IK in formal TEVET can be materialized if teaching and learning methodologies highly involves the learner who is already conversant in being an active participant in their communities.

c) Developing Teaching Practices that Contextualize Authentic Learning

Developing teaching practices that contextualize authentic learning is an important tool in developing appropriate indigenous methodologies. This may include a range of resources and methods; for example, active learning integrated in the classroom provides opportunities for reflective and blended approaches where learners engage with diverse knowledge systems through observation and interaction. This can include a range of methodologies such as problem-based learning, or derivatives such as case-based learning or inquiry-based learning employed through observation and hands-on experience. Incorporating real-life experiences to enhance the inclusion of multiple perspectives is paramount to a successful approach. Teachers can facilitate opportunities for learners' self-efficacy, teamwork and interdisciplinary collaboration through a variety of interactions including small group work, collaborative learning, peer learning groups,

peer assessment and special interest groups (EL-Ayoubi, 2008). These processes allow dynamic engagement with fundamental questions about how knowledge is taught and how learners engage with such knowledge. The process of collaboration and consultation described is an active mechanism that supports the development of content, methodology, assessment and delivery, and integrates as well as blends western and indigenous frameworks within formal education curricula. These inputs to production and methodology of curricula are at the core of an inclusive process. Thus, the formal TEVET curriculum provides opportunities to learn by doing. In the teaching and learning process emphasis should be on showing or modeling rather than explaining, and use models and examples to demonstrate concepts, in particular from the local environment and resources (Nichol, 2005, p. 6). Thus, to increase learner success, it is imperative for teachers to help students bridge the gap between home and school cultures and contexts (Ketlhoilwe, 2010). For example, Kaiwi and Kahumoku (2006), institutes that the use of collaboration in analyzing concepts that holds IK and scientific Knowledge, empowers learners by demonstrating a sustained connection of the concepts in relation to their environment which leads to an increased desire to learn. Gilbert (2011), found in his research on Apache, Hopi, Navajo, and Zuni students that cultural knowledge fosters order and understanding to the individual within the community and also sustains order and survival within the larger context of the natural environment. This is supported by Kaya (2013) and Reyhner, Martin, Lockard, and Gilbert (2013) who posits that the use of active learner methodologies enhances acquisition of knowledge and skills of learners. Thus, it appears that IK can be successfully integrated with scientific knowledge to improve the quality of formal education and this can happen if learners are exposed to variety of teaching and learning methodologies that a rose their interest, and matches with their everyday situated aspects of human living. This will have a greater impact in them as they appreciate the learned concepts and will thrive to practice and develop their own knowledge base.

d) *Centers for Indigenous Knowledge's*

Dei (2014), explains that formal TEVET training is supposed to be informed by the history, geography and socio-cultural context of learners. In order to realize quality and enhance skills and knowledge acquisition in TEVET institutes, educators and policy makers have to recognize that learning and sense making depends on socio-cultural realities, practices and experiences that are situated in the historical commemorations of the society in which the TEVET system

operates. Therefore, it is important to have centers where research on indigenous philosophies and perspectives are conducted in the process of knowledge production, mobilization and translation. These centers can enhance development by conducting both archival and contemporary knowledge on African thinking. Dei argues that such centers will stress relevant and appropriate science education and technological innovations specifically devoted to the exploration of indigenous science, technology and culture for the purpose of contributing to the development process through African human cultural development and indigenous resource applications. The centers would facilitate the growth of enhanced research and development (McCallum, 2013).

As scientists and educators, we train our students to thoroughly examine all the available evidence and to consider alternative explanations for physical and biological phenomena. These centers would provide culturally-appropriate settings for exploring and examining knowledge that were previously ignored in western education curricular. IK has always been the bedrock of African IKs and everyday life experiences. This knowledge has been largely ignored in school curricular in Africa. Many students are reportedly not competent in school science and technical innovations, not because of innate inability, but because of knowledge constructions, pedagogies, methodologies and practices that alienate students from their experiential knowledge. Currently, TEVET curriculum and its pedagogical practices are not based on familiar IK but on foreign knowledge's that discriminate against IK systems (Shizha, 2011). Therefore, the centers will give students the opportunity to experiment and interact with contextualized knowledge constructed from their local communities. This forms a basis for experiential education and place based education. (O'Connor, 2010) defines experiential education as a process through which a learner constructs knowledge, skill, and value from direct experiences. Thus it is a process of actively engaging students in an experience that will have real consequences. On the other hand, place based education usually includes conventional outdoor education methodologies so as to help students connect with their particular corners of the world. Proponents of place-based education often envision a role for it in achieving local ecological and cultural sustainability (Woodhouse & Knapp, 2005).

The centers would be vital to the study of indigenous African peoples' philosophies on socio-economic development and environmental stewardship, conservation and sustainable use. The

model of educational development being advocated will require a strong interaction among institutions of higher learning for human capacity building through sustained research and applied knowledge of indigenous science, technology and culture (Dei, 2014). In addition, learners can visit the centers not only for appreciating what is there but also practicing with those that develop the technologies present. This is supported by Bempong et al. (2014) research where he found out that learners at the University of Education Kumasi campus learn some of their skills through visitation of indigenous centers for skill training and short training workshops organized by these formal institutions for practitioners in indigenous technology. This is done as a way of improving their skills with modern technologies such as the handling of modern tools and machines. And in some circumstances learners are attached to these centers for practical skills training. Indeed such type of teaching and learning provides learners with opportunity to practice and this offers solutions to problems and creates positive outcomes with respect to learners' achievement.

e) Indigenous Medium of Instruction as an Educational Cultural Tool

Africa suffered linguistic imperialism in the hands of colonizers who imposed their languages on the continent. Most of the scientific books used in high schools and higher education have been written by Europeans and Americans in their particular contexts and in their specific languages. The knowledge and meanings assigned to this literature through stories, examples, theorization, application, analogies, metaphors, and the style of writing are primarily embedded in their social realities. Language plays a pivotal role in the production and transmission of knowledge. Shizha describes language as "a societal vehicle for life stories, historical commemorations, communication, and meaningful social activities" (Shizha, 2013). The language that is used in schools determines the extent to which students will participate in contributing their knowledge to the learning situation. In most African classrooms formal learning is conducted in foreign languages that continue to dominate the education systems as the media of instruction (Shizha, 2013, 2014). Shizha (2014), suggest that indigenous languages can be used in African schools in three main ways; firstly through code-switching, the practice of selecting or altering linguistic elements so as to contextualize talk in interaction can be used in African classrooms; secondly is to make the language spoken by the majority of people in a particular community where the school is located the medium of instruction and lastly zoning schools according to language

zones can assist parents and students to choose schools where their indigenous language is the medium of instruction.

It is noteworthy to emphasize that for successful implementation of the afore-mentioned strategies special attention should be given on how TEVET institutions function and what is learned in them. This should also include who teaches, in what way, with what technology, with what pedagogy, with what governance, as well as what is taught, to which learners, at what cost and who pays. We also need to reflect on how effective technical schools are developing cognitive, social and emotional competencies, what learning environments are like, and how learners are treated by their peers, by teacher and by others in the school. Other relevant considerations include how children engage with schools and the process of school learning, and how school learning fits with other aspects of learners lives (Reimers, Cooc, & Hashmi, 2011). Establishing an interchange between IK and western knowledge makes the process of pedagogy explicit, by allowing various methodologies to be practiced in the classroom, thus integrating multiple approaches to learning**.** The formal inclusion of indigenous voices in teaching methodology will enhance indigenous participation and provide avenues for the presentation of IK and practices that go beyond token gestures and mainstream practices that only pay lip service to indigenous involvement. In this way, indigenous issues, knowledge and experiences can be understood from various domains of identity and differences. The inclusion of indigenous voices allows for alternative representation and subjectivities, eroding homogenized assumptions regarding indigenous identity and knowledge (EL-Ayoubi, 2008).

2.6 THEORETICAL FRAMEWORK

The discussion of integrating IK in formal TEVET sector finds its base in social constructivism theory which focuses on the contextual nature of knowledge construction. From the social constructivist perspective, knowledge is viable not only personally, but also in social-cultural contexts (Karagiorgi & Symeou, 2005; Kim, 2001) while reality is viewed as a constructive process embedded in socio-cultural practices (Corich, 2004), culture provides different types of tools to help us construct meaning and learning occurs when individuals are engaged in social activities. Social constructivism emphasizes the importance of culture and context in understanding what occurs in society and constructing knowledge based on this understanding.

Therefore, learning is intimately tied to experience and the contexts of experience irrespective of where learning takes place (Bransford, Brown, & Cooking, 2006; Kukla, 2005, p. 27; Swan, 2005).

A foremost influence underpinning this perspective is Lev Vygotsky‘s socio-cultural theory of higher mental processes. Vygotsky’s theory stresses the interaction of interpersonal, cultural–historical, and individual factors as the key to human development (Mogashoa, 2014). Thus, the interaction between individual and the environment stimulates developmental processes and foster cognitive growth. In this way people transform their experiences based on their knowledge and characteristics and reorganize their mental structures. The cultural–historical aspects of Vygotsky’s theory illuminate the point that learning and development cannot be dissociated from their context. The way that learners interact with their worlds, with the persons, objects, and institutions in it transforms their thinking. The meanings of concepts change as they are linked with the world. Thus, school is not simply a word or a physical structure but also an institution that seeks to promote learning and citizenship (Karagiorgi & Symeou, 2005; Schunk, 2012). The emphasis is on values, collaboration, social interaction and socio-cultural activities that hold the society together. Culture embodies what the society values and considers important. Thus, culture includes the language, beliefs, and skills of that culture that strongly shapes the nature of knowledge and understandings created by learners (McLeod, 2007; Swan, 2005). This is supported by Reyhner et al. (2013), who posits that the inclusion of IK in formal education and training is vital in situating all learning programs so that the cultural setting of human life is appreciated and further developed. This is built around how human beings learn by connecting and integrating new knowledge into what learners have previously learned outside the school. This depicts the flow of information in the classroom.

Vygotsky advocates the idea that learning should start from what learners already know and experienced (Lowenthal & Muth, 2008). Therefore, integrating IK in the formal TEVET curriculum is very important. It is anchored on the principle and framework of a learner centered education that pays attention to IK and scientific knowledge, skills, attitudes, and beliefs of the learners (Bransford et al., 2006). This aims at making TEVET programs culturally responsive, culturally relevant, culturally appropriate, and culturally compatible where the language and indigenous knowledge and systems of learners are respected and utilized in the curriculum. Based

on Vygotsky ideas, scientific and technological literacy of learners of diverse backgrounds will be improved as educators address the goal of instruction, classroom management and interaction and relations with the community (Au, 2005, p. 28; Pawilen, 2013). Schools are the socio-cultural settings where teaching and learning takes place and where cultural tools and certain modes of discourse are utilized. This theory assumes that theory and practice do not develop in a vacuum; they are shaped by dominant cultural assumptions. The incorporation of IK embraces the need for teachers to use various teaching and learning methodologies that spice up the lesson which leads to learners' academic achievement. Vygotsky theory views learning as a social process and knowledge as a human product. Hence, the thinking abilities of TEVET learners can be developed by interacting with teachers and fellow peers (Mogashoa, 2014).

I found this theory vital to my study as it emphasizes on culture as a base to human development and the theory's view of learning encourages learners and teachers to bring prior knowledge and experiences to class. Lowenthal and Muth (2008) support the need for teaching from the known to the unknown as one way of making education and training more effective. I therefore support this assertion as it could bring authentic learning there by improving theoretical and practical acquisition of knowledge and skills. This attainment would reposition learner's thinking abilities and the way they view the world, hence development of their communities could be triggered. In addition, the theory suits my study as it stressed the need to come up with a certain kind of individuals equipped with rational package of cultural skills, values, motives and attitudes well adapted to the tasks of creating, increasing and sustaining technical and scientific knowledge of the developed society through proper use of resources.

Another important concept in Vygotsky's learning theory is his notion of the Zone of Proximal Development (ZPD), the distance between the actual development level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers. Vygotsky claimed that all learning occurs in this zone, which bridges the gap between what is known and what can be known, through adult/instructor guidance or peer collaboration (Swan, 2005). Vygotsky suggested two types of concepts that learners construct during this experience: Pseudo-concepts (everyday concepts naturally developed by the learner) and scientific concepts (originating from instruction). He postulates that since the pseudo-concepts are culturally

developed by the learners, their presence in educational institutions can help in absorbing the scientific concepts that are introduced in the learning process (Yilmaz, 2008). Schunk (2008), explains that as the pseudo-concepts are impressed onto the learner by the instructor, the learners scientific concepts evolve upward to meet the pseudo-concepts. The ZPD is where the two meet. This reciprocity generates a more culturally acceptable conception. Meanings derived are inherently cultural, and, when these new meanings are subjected once again to the cultural environment of the learner, they may be transformed upon reflection. The integration of IK in formal TEVET system calls for curriculum change so that it is designed to accommodate experiences that are matched complementary to the development of the learner and encourage the learner to pursue activities that goes just beyond their capabilities. This calls for the use of active learner centered methodologies with the view that learners will be ingested in appreciating and valuing their ecosystem.

It is evident that the way TEVET programs are structured in various schools around the globe, makes it a major source of economic progress, transmission of culture to young ones and enhancing learner's intellectual and moral development. It is hoped that the socio-interaction that would exists amongst teachers, learners and cultural tools like models and artifacts, leads to personal growth which in turn raise leaners' understanding of their culture and help build upon well-articulated knowledge and skills that reconciles with SK, as they find improved ways of sustaining their lives. Thus, the study used the socio-cultural theory in order to bring in the idea that technical colleges are places where socio activities takes place through learning as such the incorporation of IK ways of knowing is deemed appropriate in reconstructing knowledge and skills that are geared for viable development.

2.7 CONCLUSION

Indigenous knowledge is used at local level by communities as the basis for decisions pertaining to our everyday activities. Thus, IK is the key element of the social capital of the poor, as such it needs to be protected and developed. Therefore, the inclusion of IK and its practices in formal TEVET sector is vital as it will assist in realizing low cost approaches that aims at increasing efficiency of developmental activities since IK is a managed resource and is locally owned. This section has clearly explained that IKs are tools that can help learners conceptualize knowledge,

assist in developing and enhancing self-identities, confidence, academic achievement and performance. Individuals in Africa need to learn about our own social-cultural tactics, ways of life, traditions and practices before learning SK. Thus, redesigning a culturally appropriate formal TEVET curriculum will assist learners and educators in enhancing their creativity, innovation and restore the voices of the diversified society. However, for this to materialize teachers need to embrace active learner centered methodologies that brings out authentic appreciation of the knowledge and skills being represented. The next chapter three illuminates the methodologies that were used in gathering data for the study.

CHAPTER 3

RESEARCH METHODOLOGY

3.1 INTRODUCTION

Research methodology is defined as "the strategy, plan of action, process or design lying behind the choice and use of particular methods and linking the choice and use of methods to the desired outcomes" (Creswell, 2012, p. 13). This chapter presents an overview and outline of the research methodologies that were employed in investigating the integration of IK in Malawi's formal TEVET sector, towards achieving SD. It presents a discussion of the research design and the philosophical assumption underpinning the study. Population and sampling techniques, data collection instruments and procedures and data analysis are discussed. Furthermore, explanation of ethical issues, validity and reliability of the study are presented, with clear description of the stages and processes that were involved in maintaining credibility of the study.

3.2 RESEARCH DESIGN

Creswell (2007), defines research design as the entire process of research from conceptualizing a problem to writing research questions, and on to data collection, analysis, interpretation and report writing. The research design provides a framework for data collection and analysis. In view of this, a qualitative paradigm was the overarching paradigm underpinning the methodological processes and approach that were used in the study. Merriam (2009) and Ritchie and Lewis (2003), defines the qualitative paradigm as an inquiry process that aims at providing an in-depth understanding of the world as seen through the eyes of the people being studied. Creswell (2007), explains that a qualitative research approach is best suited when a complex, detailed understanding of an issue is needed and this detail can only be established by directly talking to people and empowering them to share their stories. The key idea behind qualitative research is to learn about the problem or issue from participants and to address the research in order to obtain that information. Hence, it was imperative to use this approach as it helped gain an in depth understanding of IK in the context of a formal TEVET system specifically in the curriculum. Again, the approach was viewed to be appropriate to the study because of its interactive nature and its focus on the cultural everyday situated aspects of human thinking,

learning, knowing, acting and ways of understanding ourselves as opposed to the technified approaches to the study of human life (Kvale, 2009, p. 12).

According to Creswell (2013) and Bryman (2008), qualitative research approach explores and discovers issues about a problem because very little is known about it or virtually no research has been done in the past. The area of IK in formal TEVET system is one of the least researched areas which is in its sprouting stages and very little is known about the issue. Therefore, given the exploratory nature of the topic and my own curiosity in hearing and getting an insight into the respondents' perspectives, developing meaning and understanding rather than precise numerical values, the qualitative approach was deemed appropriate. Myers, (2009) in Tuli (2010), posits that the qualitative strategy is designed to help researchers understand people, their social and cultural contexts within which they live. This study investigated the integration of IK in formal TEVET system towards achieving SD, and SD deals with people and specific places and is sensitive to contextual circumstances. Therefore, it was through conversation, interpretation and negotiation of questions and responses that I managed to gain respondents insights into their world and useful knowledge was established. It is reasonable to argue that a qualitative methodology which focuses on understanding through dialogue in place is the most suitable approach to the research topic. This allowed the complexities and differences of worlds under study to be explored and represented, adding richness and depth to the data. Thus, qualitative methodologies are inductive, that is, they are oriented towards discovery and process, have high validity, are less concerned with generalizability, and are more concerned with deeper understanding of the research problem in its unique context (Ulin, Robinson, & Tolley, 2004).

While there are various research approaches rooted in the qualitative paradigm, a case study approach was employed in exploring in-depth understanding of the context of the subject (Sharma, 2011), hence gave avenues of analyzing IK in the context of formal TEVET system. A case study is the development of detailed knowledge about a single "case" or a small number of related "cases" (Merriam, 2009). Owing to this description, the philosophy that underpins this qualitative research paradigm is interpretivism. Interpretivists support the view that there are many truths and multiple realities and social reality is constructed. For interpretivists, the world is too complex to be reduced to a set of observable laws and generalizability is a less important issue than understanding the real conditions behind the reality (Coll & Chapman, 2000). Their

main goal is to understand the meaning of the social situation from the point of view of those who live in it. They attempt to derive their constructs from the field by an in-depth examination of the phenomenon of interest. Merriam (1998), argues that interpretivists assume that knowledge and meaning are acts of interpretation; hence there is no objective knowledge which is independent of thinking and reasoning of humans. Tuli (2010), contends that the premise of interpretive researchers is that access to reality is only through social constructions. Interpretive paradigm is underpinned by observation and interpretation, thus to observe is to collect information about events, while to interpret is to make meaning of that information by drawing inferences or by judging the match between the information and some abstract pattern. It attempts to understand phenomena through the meanings that people assign to them (O'Donoghue, 2007). Thus, interpretive qualitative research design was adopted in recognition to the fact that IK is subjective, as such exploration becomes vital in producing an understanding and drawing conclusions based on respondents feedback.

3.3 POPULATION

IK in Malawi's TEVET sector is one of the least researched areas as evidenced by limited literally documents. Owing to this it was not pragmatic to undertake the study to all technical colleges as this could have made the study too wide and time consuming. Thus, the study was conducted at Lilongwe Technical College by virtue of being the largest technical college in Malawi and offers majority of TEVET courses. In addition, the college aspires in delivering high quality education and training that produces responsible citizens that are vibrant to the development of the local communities. The college values respect, individualized support, diversity, integrity, accountability, lifelong learning, social responsibility and equity. The college believes on expression of fundamental values, ethical code that strives to create a climate of mutual respect among learners, parents, staff and community members and seek to understand individuals and co-create right support for each person's development (Lilongwe Technical College, 2011). This is concurred by Battiste (2002), who explains that IK instills a sense of responsibility, respect, appropriate attitudes, caring values for sustainable livelihoods. Furthermore, the college has faith in assisting all Malawians regardless of race, ethnicity, and religion and upholds high level of integrity in its everyday activities. Again, the college believes that learning does not begin or end with school rather encourages learners to acquire skills that

will allow them to continue to direct their own learning and transfer the skills to the next generation. The essence of this is independence and self-reliance which is supported by Hart (2007) who postulates that the goal of IK is to understand and attempt to contain the energies that infuse everything in order to create a self-sustainable lifestyle. Thus, members of staff encourage learners to take responsibility of themselves and be aware of the contributions they ought to make to the society through interactions with the resources they might found at their dispose. This is in line to what Battiste and Henderson (2000) advances that IK is highly dependent on social interactions among the people and the presence of it in training institutions could trigger learners participation with fellow peers, teachers and the environment which shall evidently improve their way of thinking.

In addition, the institution enrolls learners from diverse cultures which mean that teachers understands the education process, social cultural context of learners and have knowledge of the current social-cultural challenges that TEVET learners are facing. Lilongwe technical college was opted due to its involvement in combining social and cultural factors such as mutual teaching, intellectual development processes and collaborative learning processes. This is concurred by Lev socio-cultural theory which highlights the need for social basis of learning and interactive processes that promote development. Thus, the socio-cultural theory contends that schools' activities are embedded in cultural context of beliefs, expectations and values and that taking proper techniques from learners roots can trigger thinking abilities of learners. The college has thirty five teachers working in various departments; as such the study targeted these teachers. Teachers were viewed to be in close contact with learners, implement the curriculum and are more sensitive to the various cultural contexts which could be embedded in understanding the values, norms, beliefs, knowledge and skills of people in a society. Again, teachers construct meanings and engage learners in social activities and help them understand and construct knowledge based on concepts delivered to them.

3.4 SAMPLE AND SAMPLING PROCEDURE

Different sampling techniques are employed in qualitative research, such as snow ball sampling, quota sampling, theoretical sampling, purposive sampling and convenience sampling. In order to determine relevant sample size for the study, purposive sampling was used. Teddlie and Yu

(2007, p. 87) and Patton and Cochran (2002), defines purposive sampling as a type of sampling in which, ‘‘particular settings, persons, or events are deliberately selected for the important information they can provide that cannot be gotten as well from other choices’’.

Maxwell (2013), gave three guidelines for selecting a purposive sample; namely one should select the informants who are knowledgeable about the issues being investigated, willing to talk and representative of range of points of view. Thus, to ensure that the sample was credible and covers the main groups I was interested in, the target population of employees working for Lilongwe Technical College was categorized into two groups; those that have a teaching experience of less than five years and those that have a teaching experience of five years and above. Only teachers who have had a teaching experience of five years and above were considered to be eligible for the study. These were opted due to their capacity and good aptitudes in understanding what happens in formal TEVET and are well conversant with knowledge and skills delivered to learners. It then transpired that from the group there was only one female teacher who was knowledgeable on IK and SD concepts. This one was automatically considered as one of the respondent’s by virtue of her knowledge and expert opinion on the research topic. The remaining teachers were given papers where they wrote their names, and then they folded the papers and put them together. Three teachers of teaching experience of less than five years were asked to pick the papers; two teachers picked two papers each and one picked three papers. Since the study was exploratory, only eight teachers were involved, one female teacher and seven male teachers. Eight teachers were sampled to enable data saturation and extraction of thick data. I used purposive sampling to make sure all papers had the right data I designed to extract, but I had to use random sampling for all the papers that seemed fit to avoid bias from the selection procedure so that a representative sample of eight teachers was obtained. The total number of respondents by name, sex, trend and years of experience are illustrated in table (3.1) below. Fictitious names of all respondents and their trend of teaching are used throughout the study.

Table 3.1: Background Information of the Respondents

RESPONDENT'S NAME	SEX	TREND	TEACHING EXPERIENCE
Lwendi	Male	Conventional Science	18 years
Mwandi	Male	Manufacturing Engineering	20 years
Psaska	Male	Technology Studies	15 years
Swawu	Male	Designing	16 years
Zwao	Male	Material Construction	21 years
Xheme	Male	Tubing Construction	7 years
Twangu	Male	Ecological Studies	10 years
Rwawele	Female	Human Economics	13 years

3.5 DATA COLLECTION

Since qualitative researchers place strong emphasis on better understanding of the world through first-hand experience, truthful reporting and quotations of actual conversation from insiders perspectives Merriam (1998) than testing the laws of human behavior Bryman (2001), they employ data gathering methods that are sensitive to context (Neuman, 2003; Creswell, 2013). Also, qualitative researchers work on data which can enable rich and detailed, or thick description of social phenomena by encouraging respondents to speak freely and understand the investigators quest for insight into a phenomenon that the participant has experienced (Krauss, 2005; Tuli, 2010). Owing to this, open-ended questionnaire and workshop were used in gathering data for the study. In the course of collecting data notes were taken in order to make sure that all information has been collected.

An open-ended questionnaire was used in the course of exploring teachers' views on their understanding of IK and its relevance. This was achieved through distribution of questionnaires to all respondents with the view of allowing them to express what they think about the theme of mutual interest. An open-ended questionnaire was considered to be effective research instrument for gathering more in-depth answers from respondents as they give no pre-set answer options, instead they allow respondents to put exactly what they like in their own words (Patton & Cochran, 2002). Bloom and Crabtree (2006), argues that in an open-ended questionnaire, the

researcher pre-establishes a set of questions to know more information about specific issues. An Open-ended questionnaire was opted because of their flexibility in allowing participants to elaborate in much detailed way. This was helpful in determining issues that best explain why participants hold certain views. Again, this instrument is best suited for those that are knowledgeable and educationally competent (McLeod, 2014), thus looking at the nature of respondents it was worthy to use this instrument.

An organized workshop (see appendix 7) was conducted with all teacher respondents pertaining to ways of integrating IK and approaches to teaching and learning of the curriculum. The respondents were put into three groups based on departments with the view that members in the same family possess familiar information which gave them the opportunity to converse more easily. Each group was given the guide questions for them to discuss and present after the stipulated time. All the information gathered were synthesized and clarified with the teachers in the workshop, which involved respondents' discussion and commenting on the presented concepts. Workshop discussions were vital for the study as they enabled comparison of various opinions and experiences of teachers which gave a greater opportunity to reach a consensus on topical issues presented to them (Kindon, Pain, & Kesby, 2008). Kindon, Pain and Kesby, (2008) adds that it is through workshops that new issues are raised which might be significant to the issue they are discussing.

3.6 DATA ANALYSIS

The process of qualitative data analysis involves disciplined study, creative insight and careful attention to the purposes of evaluation. In this case, analysis is referred to as the process of bringing order to the data, organizing what is there into patterns, categories and forming basic descriptive units (Patton, 2002). This involves engrossing oneself in the data so as to become familiar with it and look for patterns and themes (Kawulich, 2012). This being the case, data from open- ended questionnaire and workshop discussions was analyzed using thematic analysis. Braun and Clarke (2006), defines thematic analysis as "a method for identifying, analyzing and reporting patterns or themes within data and further characterize it as a theoretically flexible research tool which can potentially provide a rich and complex account of data" (p.82). Thus, a

theme captures something important about the data in relation to the research question, and represents some level of patterned response or meaning within the data set.

The entire data were copied and then analyzed through a process of thematic analysis. This process started with identification of themes through careful reading and re-reading of the data to become familiar with the data and know it very well. The generated data was read and interpreted with reflections to the study objectives and any relevant issue that arose from the responses. The data were then coded. Charmaz (2000, p. 254), defines coding as "the process of defining what the data is all about". In the process of coding themes were identified and named during analysis stage. In the process of coding the following processes were done:

a) I focused on sentences and even whole paragraphs in order to identify and label major ideas, since coding process is iterative since one keeps on moving forward and backwards within the data set in order to review the codes (Braun & Clarke, 2006).
b) The codes were then organized into categories through classification of the themes obtained. This involved moving some codes to the next level to become categories, some less important codes were combined to major themes and the redundant codes were discarded (Creswell, 2007).
c) The final key concepts or themes provided the story of what the data means in relation to the phenomenon that was investigated.

3.7 VALIDITY AND RELIABILITY

The criteria for measuring validity and reliability of quantitative research instruments are not appropriate in qualitative approaches (Oluwatayo, 2012). Lincoln and Guba (1985) in (Tuli, 2010) suggest that the fundamental criterion for qualitative reports is trustworthiness. Qualitative research is trustworthy when it accurately represents the experiences of the participants. According to Tuli (2010), for qualitative research to be considered credible and authentic, investigations should be based on a sound rationale that justifies the use of chosen methodology and the processes involved in data collection and analysis. Lincoln and Guba proposes that the trustworthiness of a qualitative methodology be judged according to credibility, dependability, transferability and confirmability (Devers 1999, p. 1165; Shenton, 2004).

To ensure the credibility and dependability of my study, pilot testing of the questionnaire was conducted with the view of gaining insight as to whether the questions really addressed the research objectives; and if there was a need for question rephrasing and whether the instruments provided a good understanding of the respondents culture and context (Denzin & Lincoln, 2005; Onwuegbuzie & Leech, 2007). This was achieved by distributing some of the questionnaires to six teachers at Lilongwe Technical College who were not part and parcel of the respondents in the main data collection exercise but possess similar attributes to the main participatory group. Furthermore, purposive sampling was used and all respondents were approached and briefings of the research concept was held such that the data collection exercise involved only those who were genuinely willing to take part and were prepared to offer data freely. Those that accepted to participate were encouraged to be honest from the outset of the workshop sessions and in filling the questionnaire, whilst indicating to them that there are no right answers to the questions that were asked. Thus, the respondents contributed ideas and talked of their experiences without fear of losing credibility in the eyes of fellow members of staff.

The process of data collection and inscription of research findings were frequently presented to my supervisors, scholars and fellow students who gave advice on the issues of concern. This improved the quality of the inquiry findings which was vital in developing the conclusion of my study (Bitsch, 2005). Member checks were employed as one way of including the voices of the respondents in the analysis and interpretation of data which eliminated biasness of the results. Thus, the data that were gathered, analyzed and interpreted were sent back to the respondents so that they evaluate the interpretation made and suggest changes if they were not happy with it or they were misreported. In addition, notes were taken directly from the workshop session discussions and these were typed immediately after the discussions. Transferability and confirmability were upheld through a dense description of the research methodology where thick descriptions of themes were used to support evidence by relating the findings to the emerging bodies of literature analyzed in the literature section. A reflexive journal (see appendix 8) which includes all events happening during data collection, personal reflections in relation to the study were kept and these were used in reflecting on, tentatively interpret and planning data collection.

3.8 ETHICAL CONSIDERATIONS

Ethical issues in qualitative research is related to how data is collected, analyzed and reported (Wood, 2008). Bogdan and Biklen (2007), recommend a number of ethical guidelines: informed consent, voluntary participation, respect for respondents' privacy and keeping the participants' identity anonymous. Informed consent was regarded as the foundation of ethical practice of my research. It is defined, by Cohen, Manion, and Morrison (2007, p. 53), as "the procedures in which individuals choose whether to participate in an investigation after being informed of facts that would likely influence their decisions". In view of this' respondents were called to a briefing session of the research concept. This enabled them getting a clear understanding of general issues involved in the study and guarantees their protection against any vulnerability. After which a consent form (see appendix 4) was given to each respondent so that they make a decision of whether to be involved in the research or not (Bogdan & Biklen, 2007). The consent form covered the following issues: (a) who is doing the research, for whom, and to what end, (b) risks and vulnerability, (c) right to participate or not, (d) rights of review and withdrawal from the process, (e) anonymity and (f) dissemination. In addition to this, the integrities of the study were also upheld by:

- Obtaining permission from Lilongwe Technical College principal with regards to conduct research in their work place.
- The identities of the respondents were kept absolutely anonymous throughout the data collection exercise and in presenting the research findings such that fictitious names of the respondents and their trend of teaching are used and their responses were kept confidentially.
- The collected data were electronically saved and hard copies carrying same information were kept in a locked drawer.

3.9 CONCLUSION

This chapter has discussed the research methodology with qualitative research paradigm as informing the study. Since the study required significant focus and exploration of IK concept within formal TEVET sector, a qualitative design enabled the exploration, understanding and analyzing the key concepts at Lilongwe Technical College. This being the case, interpretivism

has been explained as the philosophy underpinning the study. Interpretivists study things in their natural setting, attempting to make sense of the situation in terms of the meanings people bring to them. Qualitative research is a situated activity that locates the observer in the world. Owing to this, two data collection instruments of open-ended questionnaires and workshop have been discussed, together with data analysis which occurs simultaneously. Ethical considerations especially taking informed consent, anonymity and confidentiality have also been explained as being relevant to the success of the study. The next chapter four discusses the research findings.

CHAPTER 4

RESULTS AND DISCUSSION

4.1 INTRODUCTION

This chapter presents the analysis of data followed by the discussion of the research findings. Findings are discussed in relation to the study purpose of investigating ways and the need for integrating IK in Malawi's formal TEVET sector towards achieving SD. The process of analyzing data was guided by the research objectives. Thus, the data were analyzed to learn and understand teachers' views on IK; relevance of IK in formal TEVET sector in harnessing SD and strategies that can be used for integrating IK and approaches to teaching and learning of the curriculum that contains IK. The discussion of the research findings are based on respondents' feedback to open-ended questionnaire and workshop discussions conducted with teachers at Lilongwe Technical College. As cited in the methodology chapter, a total of eight respondents with a teaching experience of five years and above participated in the data collection exercise. In this chapter, I present teachers' understanding of IK; relevance of IK in formal TEVET in harnessing SD; and the integration of IK in the formal TEVET curriculum.

4.2 MEANING AND UNDERSTANDING OF INDIGENOUS KNOWLEDGE

Individuals frequently hold distinctive viewpoints and connotations related to indigenous knowledge. The basis of this being the originality of the information, individual thoughts and context (Bear, 2009; Burrows, 2008). The varied ideas and meanings of IK, makes it hard to employ a universal definition of the term, leading to multiple conceptions of IK. The discussions from the findings have shown that IK is interpreted in several ways. It was noteworthy to see that the respondents understood and defined IK based on their originality, trend of teaching and individual perceptions. Three of the respondents viewed IK as the knowledge that comes out of the mind of indigenous people living within a specified location after interacting with the environment and passed on from one generation to the other for survival. This understanding of IK echoes Burrows (2008) and World Bank (2013) who perceive IK as part of the collective

genius of humanity and enables sustainability of the society and its environment. Further the respondents' argued that IK is extracted from the society through political, cultural and religious circumstances (Dei, 2000), and taught to young ones as a way of preparing them for a self-sustainable life. It is commendable to ascertain that the respondents were more aware of the originality of IK and the trend that exist for its survival, for instance, teaching children the knowledge and skills that were viable for society growth. They also interpreted IK as the local knowledge that persist in the society and gives the main features of people living at specified places (Berkes & Folke, 2002; Williams & Muchena, 2005).

In addition, some of the respondents conceive IK as being closely linked to innovations that sustains human life. Articulating their view, they described IK as encompassing the indigenized products and technologies developed by local people and passed on to the future generation. The views of the respondents are derivatives of the work Mapara (2009) and Convention on Biological Diversity (2007) advocated. The two authors interpreted IK as skills, innovations and practices of indigenous and local communities. Literature identifies IK as being dependent upon relationships that exist between people and their social context. On personal level IK is contingent upon subjective interpretations and people's experiences with their local ecosystems; whilst on social, it is highly localized and relies upon the environment and situations encountered by learners (Battiste & Henderson, 2000; Hart, 2007). Some of the respondents focused their meanings based on individual interpretation and their social context. They explained that IK commences from individual minds due to exposure to various situations and originates within ones locality through sharing of ideas and resources. This analysis has got a base to what Hart (2007), and Battiste and Henderson (2000) believes to be the better way of understanding IK. It is noted that the respondents descriptions were mainly inclined to their individual upbringing and the way they conceive what IK ought to be based on the task they perform.

Some of the teacher respondents described IK in terms of activities that specific societies accords. Activities such as growing of crops and trees, controlling pests and diseases, forging, tin smiting, pottery, casting and weaving were mentioned in describing IK. This concurs with World Bank (2013) and Mapara (2009) emphasis that IK reveals itself in various aspects of human life and forms the basis for agriculture, food preparation, linguistics, health care, education, medicine, conservation, craft skills and the wide range of other activities that sustain a society

and its environment in many parts of the world. The respondents underlined that where IK persist people creatively use and control the resources. One of the respondents further this by positing that IK unites people of diverse views and triggers the development of a well secured human life.

4.3 RELEVANCE OF INDIGENOUS KNOWLEDGE IN FORMAL TEVET AND SUSTAINABLE DEVELOPMENT

The explanations from the respondents gave a general view of IK and its relevance in achieving SD. The teacher respondents generally view IK as consisting of distinctive elements which when utilized can help one move towards achieving a self-sustainable life that does not deplete the resources but rather conserve them. As such, the perspectives of the vital part of IK as revealed by the respondents were mostly tied to enriching students understanding, sustaining the environment and heightening entrepreneurial activities. Three themes arose from the objective of relevance of IK in harnessing SD. These themes included: enhancing formal TEVET practices; enhancing socio-economic activities; conserving the environment and managing the resources. The three themes are discussed below.

4.3.1 Enhancing Formal TEVET Practices

The evaluation of teachers' views of IK in terms of enhancing formal TEVET practices reveals teachers' awareness of the potential value of IK in raising learners' understanding. Their views embedded much on furthering theoretical and practical acquisition of knowledge and skills. Some of the respondents acknowledged that with IK, information can move from known to unknown (Dipholo & Biao, 2013) with the view that IK exists in communities that learners lives and are in practice of it. Thus, learners will find it easier to relate the training they receive and activities in their communities. Teachers revealed that at times they utilize IK in their teaching and learning practices as a way of enhancing individual understanding of the concepts and help the achievement of the learning outcomes. One of the respondents added that the use of local language and teaching of concepts that deals with reutilization of products results in individual learners having minimal challenges in getting what is happening. The views of the respondents supports Vygotsky socio-cultural theory which emphasizes cultural responsive curriculum and culturally compatible where language and IKs are respected and utilized. The aim of this is to

make TEVET programs culturally relevant to society needs (Au, 2005; Pawilen, 2013). They alleged that with IK presented in the curriculum, learners thinking would be provoked and (Mogashoa, 2014; Schunk, 2012) defends this by theorizing that IK promotes human developmental processes and foster cognitive growth through learners interaction with their environment, persons, objects and institutions.

The findings also indicated that once IK is integrated individual inner predicaments would be minimized as the knowledge tends to reconcile with scientific knowledge. In this case, learners would better understand the behavior of specific entities. This assertion is upheld by (Nowotny et al., 2001) who claims that IK in education and training minimizes individual inner dilemma's, empowers them and supplement the knowledge currently gained by learners in school. The respondents further their ideas by progressing that local knowledge could trigger learners' creativity and innovations since there would be executing their duties based on challenges that exist within their context. Creativity and innovations were recognized by the respondents to originate from ones understanding of concepts, diagnosing challenges and formulating solutions that are connected to their socio-cultural context. The idea of innovations was closely tied to improvement of goods and services which are foundations for entrepreneurial activities. In this case the responsibility starts shifting from the individual to the world of work.

4.3.2 Enhancing Socio-Economic Activities

The respondents further the idea of relevance of IK by tackling the socio-economic gain that may persist both at school and the community. The coming up and flourishing of enterprises was seen to be a major area that could be activated with the presence of IK. This was revealed from the notion that IK enriches learners, make them proactive, and enhances creativity and innovation which gives confidence in establishment of businesses. This realization corroborates (Bear, 2009; Wangu et al., 2015) arguments on significance of utilizing IK in education and training. They explained that once this natural talent blends with formal training, learners would become more skilled raising local production processes which triggers entrepreneurial activities. The idea behind this was that the natural knowledge sharpens the already existing talents and skills possessed by learners and initiates their aptitudes of making improved products. They, however, acknowledged that the status of most of TEVET learners already exposes them to a lot of

everyday situated activities of human life. And that if training institutions continues to deliver the presently stipulated knowledge and skills depicted in the curriculum; it is likely that the majority of learners would not acquire the necessary knowledge and skills.

Indigenous knowledge also emerged to soundly show the relationship that endures between TEVET and the world of work. Recycling of saw dust into various products and use of local resources in producing various machines such a nail and a string instead of an electric powered router machine were some of the innovations mentioned by the respondents. It was revealed that IKs need to be handled appropriately and when properly exploited they can lead to excellent innovations. Furthermore, it was disclosed that the costs of applying IKs are low and that every individual can manage to find the resources with minimal challenges. It is interesting to see that even with the loss of knowledge and changing lifestyles of the community, teachers spoke of the existing IKs and how they can be developed. IK is indeed a valuable resource which can tighten the relationship amongst, scientific knowledge, the community and the environment. This supports the implementation of Vygotsky theory which advances that, the occurrence of culturally developed knowledge in training institutions enables absorption of scientific concepts introduced in the learning process. In this case, meanings generated become inherently cultural and might be transformed upon reflection by the learner (Schunk, 2008; Yilmaz, 2008).

4.3.3 Management of Resources and Conserving the Environment

It is important to note that TEVET is not only about knowing how to do things but also understanding why things are done in a particular way. This encompasses administration of resources and portraying positive attitudes towards the environment (Pavlova, 2009). The respondents expressed strong desire that proper use of what local people have and imparting it to TEVET learners can help in solving the challenge of scarcity of the resources and deforestation, as they embrace a sound relation to the environment. They explained that the presence of IK in formal TEVET practices could visibly position learners to real reality issues and make them more aware of their surroundings. In support to the theme of managing resources and conserving the environment it was evident when the respondents emphasized that IK instills a sense of self-reliance and self-awareness in handling the resources and the environment. Besides this, recycling of waste products was mentioned to be one way of managing the available resources

and preventing environmental pollution. They identified waste products such as scraps of metal, wood dust and off-cuts from timber to be crucial in demonstrating the link learners hold in conserving the environment. A TEVET expert Afeti (2008) writes that recycling of used products using IK is vital for improving lives of people and sustainability of local resources. Knowing and practicing IK reveals the missing information and allows individuals to work together and develop alternative technologies that are ecologically responsive. They gave an example of planting trees and conserving them so that the future generation might as well use them. Furthermore, IK progresses team work spirit a key to proper resource use and management of the environment.

The teacher respondents were aware of the socio-economic and environmental values that IK can bring to the lives of people, however the reasons and justifications they conversed chiefly centered on enhancing the understanding of concepts, creativity and innovation with no clear link to sustainable development This raises questions about how teachers can be supported in acquiring good understanding of sustainability issues and how best they can be utilized in their everyday duties. This will evidently enhance the development of authentic approaches that add repertoire to their teaching and learning so that the best is achieved.

4.4 INTEGRATING INDIGENOUS KNOWLEDGE INTO FORMAL TEVET CURRICULUM

In respect to the overarching question of how IK can be incorporated into formal TEVET curriculum in order to bring about authentic learning for a viable prospects, the respondents communicated the view that IKs are rich and proper ways of incorporating it can stimulate prominent levels of commitment in any training program and improve the quality and relevance of the training being offered (TEVETA, 2013). Their comments provided some suggestions as to how IK can present itself in the curriculum (see appendix 7). All respondents viewed IK as an effective education and training channel and appreciated the ability of the IKs as a means of maximizing development. From the discussions the respondents indicated that IK are best understood by its holders who are elders in particular tribes, as such their involvement in getting the IKs can save as a basis for gathering a range of thinking dispositions that are fundamental in knowledge integration (Hays, 2009). To them the information gained from the elders can help in

diagnosing the diverse perspectives that people hold which is vital in reasoning, evaluating and reconciling the various knowledge systems. This is in line to what Kaya (2013) posits that, consulting the bearers of IK one acknowledges the existence of multiple forms of knowledge which is important in re-evaluating the hierarchy of knowledge systems present in the curriculum.

The findings of this thesis have shown the idea and clear passion of teachers in reserving the IKs generated from its bearers. It was emphasized that knowing what IKs are there is not enough rather its exploration, validation and preservation is very important for IK to persist for a longer period of time. The preservation of knowledge is vital and critical to learners as teachers are passing on and they take that knowledge with them. Thus, research and documentation of IKs were viewed to be some of the major steps towards knowledge integration. Emphasis was made on having proper documented books that might presents themselves in school libraries. In respect to their everyday teaching practices, the respondents indicated that the complementation of local language with English has helped them in achieving lesson outcomes as learners understand the issues at hand more easily. The issue of language is very well supported by Pawilen (2013) who proposes that, integration of IK in the curriculum needs passion for making cultural knowledge, language and values a prominent part of it. The use of local language was viewed to be an additive for developing and nurturing an effective, creative, innovative and soulful understanding of the natural world present in the curriculum.

Proper selection of IKs that tally with the SK present in the curriculum was identified as one way of making IK existent in the teaching and learning process. It was stressed that IK concepts that are environmentally friendly, acceptable by the society, can provoke intellectual abilities of individuals (Karagiorgi & Symeou, 2005) and advance their socio-economic lives should be given extra attention and set aside for integration. The respondents gave an example of the use of firewood as a prerequisite to an electric powered fire furnace; they explained that the use of an electric fire furnace is a scientific concept that allows the infusion of IK. This means that the identification of content at which IK can be incorporated is significant in managing local practices that provides a link for developing ways of increasing productivity and sustainability of local resources and may reveal missing information which can assist TEVET learners in developing alternative technologies (Afeti, 2008). Likewise to proper selection of IK, literature

underlines the need for careful collection, analysis of IK concepts and finds related SK concepts unto which the two complements each other (Kagoda, 2009). The outcome of analyzing some ways of integrating IK in TEVET curriculum supported the existing literature, however, teachers added that not all relevant IK might be in line with SK present in the curriculum as such separate modules need to be developed so that skills and knowledge of the society are known and valued by individual learners.

Furthermore, they clarified that for IK to exist in formal TEVET there is a need for a strong collaboration amongst the rural community, local artists and TEVET institutions by bringing certain aspects (such as providing tailored made courses on entrepreneurship to the community and local artist so that they understand the value of what they are doing as a basis for generating income) of formal TEVET closer to the community. They explained that this collaboration enhances individual relationships and team work spirit which are vital for developing innovative knowledge and skills for human viability. In addition, they emphasized that by bringing such aspects of formal TEVET practices closer to the community, individuals becomes more conscious and find alternatives of developing the knowledge that exists in their surroundings. Again, those in formal TEVET can benefit much from local artists, as such they too need to be promoted and assisted so that they get a certificate for what they are doing. In so doing, they will be in better position of supporting individual learners and share the knowledge and skills.

4.5 APPROACHES TO TEACHING AND LEARNING

Researchers advocates participation as a central tenet of sustainable development (Shizha, 2009; Smith, 2009). According to Armstrong (2011) and Tilbury (2002) participatory learning is strongly linked to productive skills and its presence in the learning experience builds peoples' abilities and empower learners to take action for change. The respondents demonstrated a clear partiality for pedagogies that are learner centered, specifically for those that feature active participation of learners (Mogashoa, 2014) as a means of tightening the relationship between the learner and his/her ability to add value to the community. In describing the teaching and learning practices that can be employed in delivering content that has IK, various teaching and learning methodologies were cited as being relevant for educating learners and moving them to a more practical world. Most apparent were practices and pedagogies in experiential learning and

modeling of various things. This included designing and realizing products, setting up of tools and creating conducive working environment. Experiential learning and modeling (O'Connor, 2010; Shizha, 2011) is supported in IK and SD literature with UNESCO (2002) highlighting that learning through doing enables people to understand sustainability, human motivations and visions which are key for social change. These respondents explained that the delivery of the TEVET curriculum is based on doing rather than theoretical impartation of knowledge. As such emphasis should be on modeling that encompasses issues from the local environment and its resources rather than explaining the concepts (Nichol, 2005). On the experiential learning, the respondents demonstrated how a wood lathe machine can be taught in local terms and then linked to SK (see appendix 7). It was evident that they have had a very good explanation of it but putting it into practice was a challenge.

The descriptions from the respondents also stipulate the need for field visits to communities, on-job training and engaging special guests as being relevant to the delivery of modules that has IK. Their explanation reveals that the use of these methodologies could enable learners to collaborate with the holders of IK on how certain things give solutions to challenges that surrounds human environment. Additionally, on-job training was viewed by the respondents as being a potential driver in triggering individual curiosity to act in a sensible manner that results in development of problem solving skills, creativity and innovation. Kaiwi and Kahumoku (2006) also espouses the educational training merit of using these active learner centered methodologies as they empower learners to demonstrate a sustained connection of the concepts in relation to their environment. They also found that the use such tactics leads to increased desire to learn and excellent acquisition of hands-on experiences.

A system of teaching and learning content that incorporates IK is one of the things that some teachers are using in delivering their lessons. The teacher respondents embraced learning through observation, discussion and demonstration so that learners recall whatever transpires within the lessons. Teachers spoke much of the present curriculum as it alienates learners from their natural environment and challenges them in using proper methodologies. They suggested the need for change which can materialize if local knowledge can be incorporated to formal TEVET curriculum.

4.5 CONCLUSION

This chapter has presented the results and discussion of the research findings. The analysis is in line to respondents' responses to open ended questionnaire and workshop discussions. The findings are presented based on the respondents' explanations of IK, its relevance and ways of integrating IK in formal TEVET sector. It is clear that the respondents held varied views of understanding and interpreting IK. Despite this diversity, there was a strong emphasis on IK as locally derived by the people who use this knowledge. Respondents' articulation of IK emphasizes that this knowledge is typical and belongs to specific context and passed on to their children. In addition, they explained that IK could be significant if it is taught to formal TEVET learners. The reasons attached to this includes enhancing the teaching and learning process whereby information moves from known to unknown; enhancing the socio-economic status of learners as they struggle to find alternatives in life through entrepreneurial activities; management of resources and conserving the environment. From their responses it is clear that they held similar views of how IK could be integrated and the approaches to teaching and learning process. They explained that research, proper documentation of IK, collaboration of relevant stakeholders, finding SK that allows the integration of IK and use of learner centered methodologies could be vital in channeling this knowledge in formal TEVET curriculum and its delivery. Within the analysis four key findings emerged, these are:

- Teachers understood IK as being rooted within the community after interacting with the environment and passed on from generation to the other.
- Teachers articulated IK as being relevant in enhancing knowledge and skills retention and innovations of individual learners.
- Teachers emphasized the need for conducting research and documenting the available IKs.
- Teachers' embraced IK existence in the curriculum as it supports the use of learner centered methodologies.

CHAPTER 5

CONCLUSIONS AND RECOMMENDATIONS

5.1 INTRODUCTION

The study purported at investigating ways and the need for integrating IK in Malawi's formal TEVET sector for achievement of SD. The research investigation was conducted through the use of open-ended questionnaire and workshop with eight teachers working for Lilongwe Technical College. This chapter presents the summary of findings versus the research objectives, study conclusion and the recommendations. Furthermore, the chapter outlines suggested areas for further research.

5.2 SUMMARY OF FINDINGS VERSUS THE RESEARCH OBJECTIVES

The outline of this section has been presented in relation to the study objectives. The study aimed at:

- Exploring views of teachers on their understanding of IK.
- Exploring views of teachers on the importance of IK in formal TEVET in promoting SD.
- Analyzing ways of integrating IKs and approaches to teaching and learning of formal TEVET curriculum.

The exploration of teachers' understanding and interpretation of IK had shown respondents varied understanding of IK. This variation has come out because of differences in socio-cultural context and daily activities of the respondents. Some of the respondents understood IK as knowledge that comes out of the mind of indigenous people living within a specified location after interacting with the environment, basically meant to solve particular challenges and passed on from one generation to the other for survival. The fact that the respondents tied IK to peoples' perception, insight, their environment and passed on to the future initiation, is a clear indication

that IK is considered as part and parcel of human ingenuity and signals the background from which they are operating. However, a small number of the respondents equated IK to natural or in born knowledge. This means that the potential of IK is somehow appreciated and inherently rooted. It was worthy to note that IK forms the basis of human survival and livelihoods of our communities, for example, forging, making pottery, weaving, casting of metals, use of hoes, managing trees, tin smiting, sharpening of tools, heating of metals, growing of crops and controlling pests and diseases. This shows that whatever we have, its origin is tied to IKs.

Consistent views were expressed by the respondents with regards to significance of IK in formal TEVET sector, in terms of harnessing the potential for achieving sustainable development. The respondents explained that the presence of IK in formal TEVET could be vital in enhancing formal TEVET practices, raising the socio-economic wellbeing of learners as well as their communities and help in conserving and managing the environment. It was explained that if IK is incorporated learners would be repositioned in appreciating the practicality of the information being presented and would apply the local knowledge in their communities. This indicates that the education and training attained by learners could help in uniting people of diverse views, hence developing Malawi at a faster rate. The views of all the respondents clearly show that IK can act as a powerful prerequisite knowledge in the teaching and learning process. This could ease teachers' challenges in delivering lessons and bridging learners to the world of work. This would save as a good base for innovation.

The respondents explained that with the incorporation of IK in formal TEVET curriculum learners could be enriched and become proactive which is vital for establishing enterprises. The findings have shown teachers recognition of IK as being cheap as it draws from local resources as such learners could be less reliant on the outside world which can be expensive and unavailable. Their descriptions tend to emphasize that IK is an effective and efficient way of solving challenges as opposed to scientific know-how. With this excellent innovations could come out leading to independence and self sufficiency of learners. They explained that the use of IK improves team work spirit as individuals tries to work together in various environmental development activities. The participation of teachers in responding to the questionnaire raised the awareness of what they do in relation to the development of the school and the community. However, teachers need more training and support in understanding the significance of IK in

relation to SD as three of the eight respondents were aware of significance of IK and could link it to SD. The other respondents find it hard in terms of connecting IK to SD.

The workshop discussions (see appendix 7) were more effective as teacher respondents explained the integration of IK based on their everyday experiences and their participation was engrossed on socio-cultural bases. All the respondents supported the inclusion of IK into the formal TEVET curriculum. This realization shows that there is a need for Malawi's formal TEVET sector to include culture and its technologies in the curriculum. Several ways were recommended as means of incorporating IK into the curriculum, tactics like research, documentation, consulting holders of IK, coordination between experts and community members, infusing IK into already existing content, stand-alone modules and collaboration amongst the rural community, local artists and TEVET institutions (see appendix 7). This collaboration was emphasized at it enhances individual relationships and team work spirit which are vital for developing innovative knowledge and skills for human viability.

Discussion of the teachers views on teaching and learning methodologies that could be used if IK is incorporated in the curriculum, teachers have valued the use of learner centered methodologies and hands on approaches. Methodologies such as field visits to communities, discussion, problem solving, experimenting, modeling, brain storming, on-job training (internships), demonstration, engaging special guests (see appendix 7) were outline as being significant in delivering knowledge and skills to learners. They had shown knowledge of these methodologies by demonstrating the way they teach some concepts that allow the implementation of IK (see appendix 7). The discussions from the workshops gave a view that teachers at times complement SK and IK in order to bring authentic learning and enhancing learners understanding of the concepts. Despite this trend, teacher still needs communication skills and creativity of how best to use these methodologies so that learners are encouraged and exposed to real life issues.

5.3 STUDY CONCLUSION

This study has explored and presented teachers views on the integration of IK in formal TEVET curriculum as one way of achieving SD. As agents of change TEVET is posed as a significant

contributor to the country's socio-economic development through the provision of skilled man-power which can improve local production processes (Gu et al., 2011). Malawi's TEVET sector recognizes the need for promoting IK (Ministry of Labour and Vocational Education, 2014) in the system as it enhances the country's capability to innovate and create new knowledge. The study has shown that the integration of IK needs education and training that is practically based and in line to the local and national needs of learners. Even though IK has not yet been utilized in Malawi's formal TEVET sector, Barnhardt (2005); Bisong and Andrew-Essien (2012) advocate the need for infusing IK in education and training as this would enable individuals in TEVET in finding substitute ways unto which diverse products can further be developed.

Literature identifies IK as local knowledge, traditional science which refers to accumulative body of knowledge; technologies used by local people for survival in a variety of environments and passed on to young ones (Mosimege & Onwu, 2004, p. 2). As such IK is viewed to contain sets of perception, information and behavior that guide members in society to use land and creatively exploit natural resources (Iyoro & Ogungbo, 2013). Literal documents explains that incorporating IK in TEVET would give learners the opportunity to understand the relevance and meaning of the knowledge presented to them which could make learners hold fast what is valued for them for improved standards of living (Ndlovu, 2008; World Bank, 2005). Battiste (2002) enlightens that involving community IK holders in teaching and learning and research saves as a good base of utilizing IK in the curriculum. The utilization of IK in education and training saves to assists teachers in making extensive use of hands-on activities, investigative and cooperative learning. Lev Vygotsky socio-cultural theory supports the inclusion of IK education and training with the view that learning and development cannot be dissociated from their context. This theory assumes that theory and practice do not develop in a vacuum; they are shaped by dominant cultural assumptions (Au, 2005, p. 28; Pawilen, 2013).

The investigation of the integration of IK in formal TEVET sector was achieved through the adoption of a qualitative research paradigm. The case study design was chosen as foci of the context of the research findings. Thus, the study involved eight teachers at Lilongwe technical college who were purposively selected and were briefed on the research concept. The use of purposive sampling and briefing, ensured credibility and dependability of the study. Data were generated through open-ended questionnaire and workshop discussion. The sampled teachers

took their time in responding to the questionnaire and participating in workshop discussion. A reflexive journal which included all events happening during data collection exercise was kept and enables transferability and confirmability of the findings. Data were analyzed through thematic analysis (Braun & Clarke, 2006) which involved coding, labeling of major ideas, organization of codes into categories and selection of the final key concepts (Creswell, 2007). The themes were explained in relation to the views of the respondents as extracted from the open-ended questionnaire and workshop discussion.

The outcome of this study has shown that IK is a valuable resource that is situated within ones locality and further developed due to individual exposure and interaction with the external environment. The respondents' added that IK is mostly passed from one generation to the other with an aim of creating means of realizing products a sustainable future. Thus, the incorporation of IK in the curriculum was viewed to be vital in enriching formal TEVET activities which could make learners proactive and innovative as the knowledge gained is reconciled with what they do in their communities. Research findings of this study have revealed that IK is a vital resource that can help in managing local resources and creating wealth. The analysis foster the need for incorporating IK to TEVET curriculum as one way of making all training processes contextualized (UNESCO 2006).

The proceedings of the study were relevant to teachers as they appreciated the need for integration of IK which was captured through their participation in group activities and individual responses to the open-ended questionnaire. All the respondents advanced the need for incorporating IK concerns in the curriculum. They advocated research, documentation, consulting bearers of IK as ways that can be used for successful integration of IK. Even though teachers appreciated the need for integrating IK, they too have had challenges in explaining how it can be utilized. It appears that majority of teachers are not sensitized and involved in the development of the curriculum such that their mind is mostly tied to implementation through teaching. Teachers need to know curriculum developmental processes so that they better know how knowledge and skills are validated. Additionally, teaching and learning strategies such as experiential, demonstration, problem solving, field visits and modeling were suggested to have positive impacts in delivering content that has IK. It was observed that the respondents mainly

consider the inclusion of IK due to their everyday work practices. The teacher respondents incorporate IK concepts in some topics which to a greater extent have seen learners understanding better and become innovative. All this shows that, with the presence of IK in the curriculum learners would better understand the information, its function and how it can be applied in their respective communities. Where application of knowledge exists, development also finds it course which in turn triggers economic growth.

5.4 RECOMMENDATIONS

Various authors have presented diverse views of understanding IK and its relevance in realizing viable development (Bear, 2009; Eyong, 2007). The findings of this study have shown teachers varied understandings of IK and its importance in advancing SD, which were chiefly influenced by individual perceptions, trend of teaching and participation in the data collection exercise. Despite this, I found that teachers at times practices IK and their views on enhancing TEVET practices centered much on promoting theoretical and practical attainment of knowledge and skills. Some teachers showed that they know the relevance of IK however no clear connection was made between the IK concept and the viability of the knowledge and skills in advancing SD. This finding suggests the need for capacity building of teachers and the modules to be delivered to them should incorporate developmental modules such as social sciences and learning for a sustainable future. The developmental modules should aim at supporting teachers in understanding social, economic, cultural and ecological sustainability of human life.

IK has been stressed by many scholars as being relevant in situating the education and training programs (Reyhner et al., 2013). The respondents add that with IK learners would better understand the practicality of the information presented to them hence furthering their socio-cultural development life. This suggests the need for infusion of IK in the curriculum. The presence of IK would have an implication on reinforcing and enhancing pedagogies that teachers use in their everyday classroom endeavors. Vygotsky's socio-cultural theory emphasizes the need for incorporating IK as it embraces the utilization of participatory active learner centered methodologies that ingest learners in appreciating and valuing the knowledge presented to them (Schunk, Pintrich, & Meece, 2008).

To improve the competency of teachers to implement the content that has IK in the teaching and learning process, training and support are necessary. There is a need for IK to be utilized even into in-service teacher training programs. This shall evidently call for on-going professional development programs that aim at providing support to the realization of the curriculum innovations.

One of the thematic areas that Malawi's TEVET sector is trying to achieve in its policy is that of quality and relevance of TEVET being offered. The TEVET sector considers that it is through learning about local methods and alternative techniques that triggers the countries capabilities to innovate and create new knowledge. Again, quality of any training program depends largely on the curriculum that teacher uses in delivering the lessons (Ministry of Labour, 2013; TEVETA, 2013). The analysis from respondents view shows that IK are vital in triggering creativity, innovation which leads to production of quality goods and services. This study suggests the need for review of the curriculum so that culture and its technologies are incorporated so that teachers employ them in addressing quality and relevance of the training programs. IK helps in confronting people with reality of their locality, assesses what is truly happening in their home environment and helps them to demand change and take action (Parker & Wade, 2008). It is through the inculcation of IK that learners in TEVET may face and understand sustainable development through the various activities associated with IK. This will call for raising awareness of the significance of IK to all relevant stakeholders.

The findings from this study have shown the need for holistic approaches to proper integration of IK. The respondents conveyed a passion of knowing the IKs present in specific societies through consulting and engaging holders of IK before the knowledge is utilized in the curriculum. In addition they articulated the need for collaboration amongst relevant stakeholders so that relevant IKs are selected. This suggests the need for using resource individuals from various communities so that IKs are generated and validated.

5.5 SUGGESTED AREAS FOR FURTHER RESEARCH

This thesis has discussed teachers understanding of IK, relevance in achieving a defensible development and approaches to successful integration of IK. The findings reflect the need for

analyzing IKs and find the scientific content unto which the two could merge. This presents a vital area for furthering an action-based research where IKs are explored, analyzed and integrated in a specific subject matter, delivered to learners and find its implications in advancing the inculcation of knowledge and skills.

The findings of this study expose the views of teachers at one formal technical institution. Therefore, there is a need to extend the research to other formal technical institutions as a way of getting their views on integrating IK.

5.6 CHAPTER SUMMARY

This chapter has summarized research findings in relation to research objectives. The respondents articulated and viewed IK as a local knowledge that evolves within the community and survives through inculcation to the next generation. The teacher respondents acknowledged the need for utilizing IK in the curriculum as it could enable learners to be innovative, environmental conscience and indulge in enterprises. The integration of IK should be done by consulting holders of IK, research, documentation and validating the current knowledge in the curriculum, developing extra modules for IK that are relevant to the development of the society. However for teachers to embrace this, learner centered methodologies were opted to be effective in delivering the content that has IK. They explained that emphasis on teaching should be on realization rather that theoretical impartation of knowledge and skills. The study recommends the integration of IK in the curriculum, capacity building of teachers, on-going professional development program for teachers and raising awareness of significance of IK to all relevant stakeholders. In addition, the study advocates the need for conducting an action based research where IKs are known and validated and extending the research to other formal technical institutions.

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APPENDICES

APPENDIX 1: REQUEST TO CONDUCT RESEARCH

The Principal
Lilongwe Technical College
P.O Box 190
LILONGWE

25th January 2016

Rose
Permission granted. Proceed collecting data from teachers as requested.
26th January 2016

Dear Sir

RE: REQUEST TO CONDUCT RESEARCH WITHIN YOUR INSTITUTION IN FULFILLMENT OF THE MASTERS IN TVE REQUIREMENTS

I am writing to request your permission to conduct my research within your institution. I am currently conducting a research on *"Integrating Indigenous Knowledge in Malawi's Formal TEVET Sector: Towards Achieving Sustainable Development"*. The research is being conducted as a partial fulfillment of the award of Master's Degree in Technical and Vocational Education at the University of Malawi, the Polytechnic.

The purpose of the study is to investigate ways and the need for integrating indigenous knowledge in Malawi's formal TEVET curriculum for achievement of sustainable development. It is my belief that the study shall expose those in TEVET to appreciate the additive worth of indigenous knowledge as it provides learners with an opportunity to relate their experiences outside the classroom to technical concepts and processes, and relate culturally specific activities encountered in their everyday lives with learning activities. I would like to collect data from teachers who work for the institution.

I would be glad if the permission is granted on time. Should you have any questions, you are welcome to contact me using the details provided below.

Your Sincerely

Rose Mbeye

Cell number: 0999-451-506

APPENDIX 2: AUTHORISATION LETTER

PRINCIPAL

Our Ref.: LTC/SGM/02

Your Ref.:

Date: 25 January 2016

Please address all correspondence to the Principal
Lilongwe Technical College
P.O. Box 190
Lilongwe
Malawi
Tel: (265)1 725 947
Fax: (265)1 725943
E-mail: litecol@ltc edu.mw

Dear Rose Mbeye,

PERMISSION TO CONDUCT RESEARCH

Your letter dated 25 January 2016 on the above subject refers. We note that you would like to collect data from teachers which will be used in your research entitled "Intergrading Indigenous Knowledge in Malawi's Formal Tevet Sector: Towards Achieving Sustainable Development".

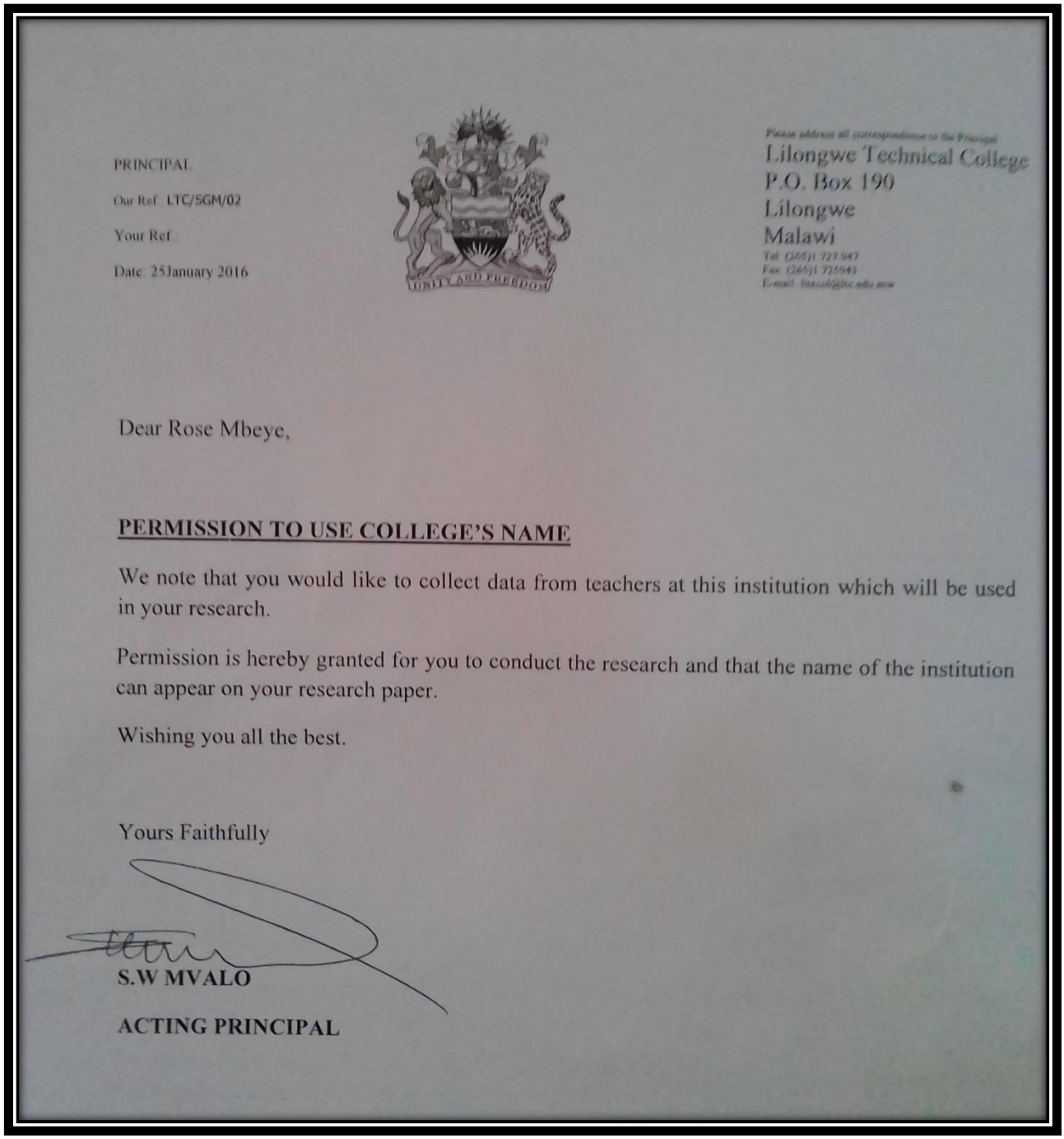
Permission is hereby granted for you to conduct the research.

Wishing you a successful exercise towards attaining your post graduate qualification.

Yours faithfully

S.W. Mvalo
ACTING PRINCIPAL

APPENDIX 3: PERMISSION TO USE COLLEGE'S NAME



PRINCIPAL

Our Ref: LTC/SGM/02

Your Ref:

Date: 25January 2016

UNITY AND FREEDOM

Please address all correspondence to the Principal
Lilongwe Technical College
P.O. Box 190
Lilongwe
Malawi
Tel: (265)1 727 947
Fax: (265)1 725943
E-mail: ltcmal@ltc.edu.mw

Dear Rose Mbeye,

PERMISSION TO USE COLLEGE'S NAME

We note that you would like to collect data from teachers at this institution which will be used in your research.

Permission is hereby granted for you to conduct the research and that the name of the institution can appear on your research paper.

Wishing you all the best.

Yours Faithfully

S.W MVALO

ACTING PRINCIPAL

APPENDIX 4: INTRODUCTORY LETTER

THE POLYTECHNIC

Dear Respondents,

I would like to invite you to participate in a research study that involves integration of Indigenous Knowledge (IK) in Malawi's formal TEVET Sector: Towards Achieving Sustainable Development. The study is being conducted as a partial fulfillment of the award of Masters of Technical and Vocational Education at the University of Malawi, the Polytechnic. You are encouraged to get assistance from any other sources in order to ensure that you are fully satisfied and you clearly understand what this research entails. Your participation is voluntary and you are free to decline to participate. The research will require filling an open-ended questionnaire and participating in workshop discussions.

The study purports at investigating how Indigenous Knowledge can be integrated in the formal TEVET curriculum as one way of developing TEVET training programs and improving its relevance to learners' development needs. I would like to learn more of your understanding of Indigenous Knowledge and its relevance in formal TEVET and in harnessing sustainable development. In addition, your views on means of integrating Indigenous Knowledge in the formal TEVET curriculum, approaches to teaching and learning and opportunities that exist within the system will be of great value to the study. Hence, the repositioning of Indigenous Knowledge will help in balancing off knowledge acquisition in formal TEVET and improves learner's knowledge and skill retention towards enhancement of their socio-economic opportunities.

You have been chosen because you are a key stakeholder regarding the type of knowledge and skills that are inculcated to learners in formal TEVET institutions and you have expert opinion or experience to comment on this matter. Kindly be informed that, all information which will be collected will be kept strictly confidential. You will be identified by a fictitious name; there will be no risks that will persist in the course of participating in this study. You are therefore requested to sign the informed consent given below. If you have anything to comment do not hesitate to contact me using the details below.

Thank you for taking your time to read this letter.

Sincerely

Rose Mbeye

Cell: 0-999-451-506 or 0-884-183-046 Email: rmbeye@yahoo.com

APPENDIX 5: CONSENT FORM

THE POLYTECHNIC

Title of Research: Integrating Indigenous Knowledge in Malawi's Formal TEVET Sector: Towards Achieving Sustainable Development

1. I confirm that I have read and understood the introductory letter for the above study and have the opportunity to ask questions.
2. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason.
3. I have been assured that throughout the research my anonymity will be guaranteed through the use of a fictitious name.
4. I have been made aware that the final report will be submitted for examination for the award, if successful, of a master's degree to the researcher.
5. I have been notified that at a future time the research materials may be used in an academic publication.

I agree to take part in the above study.

Name of Participant: ---------- Date---------- Signature----------

Name of Researcher: ----------Date---------- Signature----------

APPENDIX 6: QUESTIONNAIRE GUIDE

Title of Research: Integrating Indigenous Knowledge in Malawi's Formal TEVET Sector: Towards Achieving Sustainable Development

General Direction

1. The purpose of this study is to investigate the perspectives of Indigenous Knowledge, relevance and means of integrating it in formal TEVET. Literature identifies Indigenous Knowledge as "a cumulative body of knowledge, technologies, innovations, practices and beliefs that have been and are still used by indigenous and local people for existence, survival and adaptation in a variety of environments and are evolving by adaptive processes and handed down through generations by cultural transmission, about the relationship of living beings (including humans) with one another and with their environment (Mosimege & Onwu, 2004, p. 2)".
2. Please answer the questions by putting tick (√) mark against the answer you choose, or write your answers briefly for the open-ended questions.

Thank you in advance for your cooperation.

DATE: …….

Respondents Details:

Name: …….

Age: …….

Sex: …….

Occupation: ……...

Years of work experience: ……

To Understand IK and its Relevance in Formal TEVET in Harnessing Sustainable Development

1. In your view, what does the word "indigenous knowledge" mean?

   _____

   _____

   _____

2. How can you best describe the value that indigenous knowledge can add to formal TEVET practices?

   _____

   _____

3. In view of the socio-economic and ecological crisis affecting Malawi at the moment do you think it is worth to include Indigenous Knowledge in the teaching and learning of formal TEVET subjects? Would you please explain?

   _____

   _____

   _____

4. What is your view about the presence of indigenous knowledge in formal TEVET curriculum? Is it going to have an impact on students' achievements and employment opportunities?

   _____

   _____

5. Considering the global issue of sustainable development and the knowledge gap that exist in formal TEVET, do you think the presence of Indigenous Knowledge in the curriculum can support sustainable development? Would you please explain?

   _____

   _____

   _____

6. What is the significance of Indigenous Knowledge in formal TEVET and in maintaining the sustainability of resources and the entire community?

_____

_____

_____

7. What special contribution can the content that has Indigenous Knowledge make, in terms of knowledge and skills acquisition of learners?

   _____

   _____

8. In general, what can be the significance of indigenous knowledge in formal TEVET in terms of harnessing the potential for achieving sustainable development?

   _____

   _____

9. I am also interested in any other comments you might have concerning the study topic. Please write in the space below

   _____

   _____

   _____

   _____

   _____

   _____

   _____

THANKS FOR YOUR RESPONSES!!!!!!!!!!!!!!!!!!

APPENDIX 7: WORKSHOP GUIDE

Title of Research: Integrating Indigenous Knowledge in Malawi's Formal TEVET Sector: Towards Achieving Sustainable Development

1. Being professionals in TEVET, what type of sustainable technical and scientific knowledge are you promoting?
2. Having explained issues of Indigenous Knowledge, SD and the formal TEVET curriculum, what do you think could be the best way(s) of integrating Indigenous Knowledge in the formal TEVET curriculum?
3. In your experience, what methodologies/ approaches would be most effective in teaching and learning content that has Indigenous Knowledge and Scientific Knowledge?
4. In terms of practical aspects of the subject, what approaches can be more effective in teaching content that has Indigenous Knowledge?

APPENDIX 8: WORKSHOP ORGANISATION AND PROCEEDINGS

Facilitated by: Rose Jane Mbeye

Workshop Program

DATE/ TIME	DESCRIPTION	MATERIALS
16th February 2016 08:30-08:30	Opening session • Ethics, honest and respect in the discussion • Briefing of the research study • Questions and comments from participants	• LCD projector • Lap-top computer • Flip charts • Flip chart stand
08:30-10:00	Discussion on ways of integrating IK in the formal TEVET curriculum	• Flip charts • Permanent marker • White board • White board markers • Flip chart stand
10:00-10:30	**TEA BREAK**	
10:30-12:00	Discussion on teaching and learning methodologies of content that has IK	• Flip charts • Permanent marker • White board • White board markers • Flip chart stand
12:00-12:15	Closing session	

Participants

The workshop was attended by eight teachers from Lilongwe Technical College: Zwao, Rwawele, Xheme, Lwendi, Mwandi, Psaska, Twangu and Swawu. The participants took their time discussing how IK can be integrated in formal TEVET curriculum and they had a chance to present what has transpired within the group.

Discussion 1: Introduction

The workshop was opened by welcoming the participants, asking them to introduce themselves and establishing the rules and ethics for the discussions. I then took my time to briefly explain to them what the study is all about, including participants' expectations and outcomes for the discussions. The participants were given the opportunity to make comments and ask questions for what was explained.

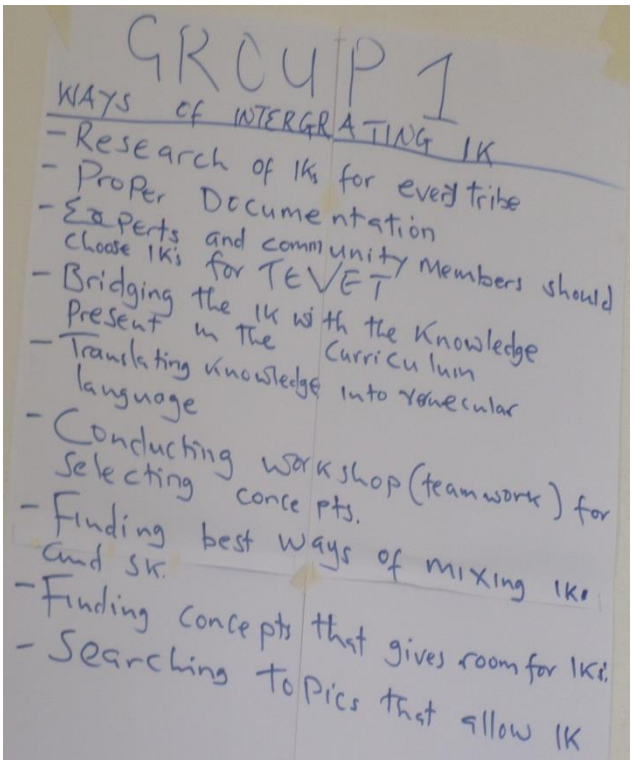
After this the participants were asked to divide themselves into three groups based on departments. The groups were as follows:

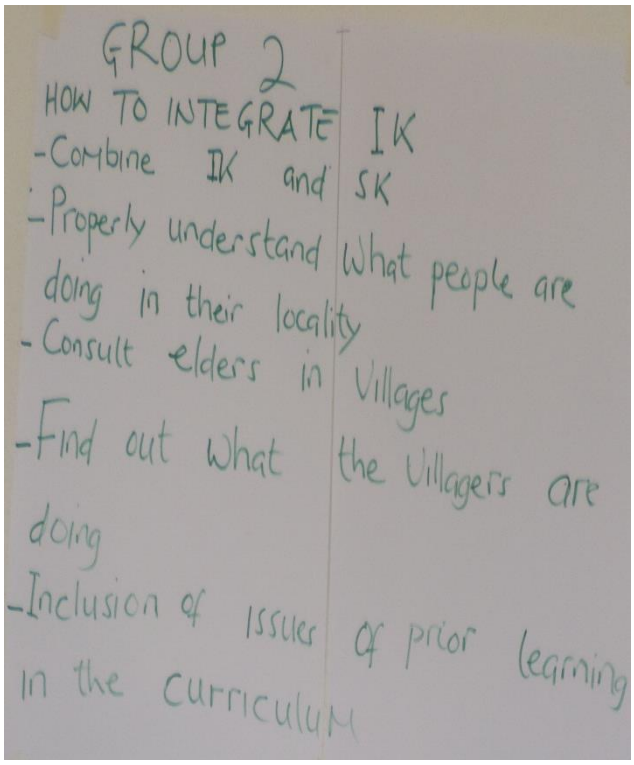
Group 1: Lwendi, Mwandi and Psaska
Group 2: Swawu, Zwawo and Xheme
Group 3: Twangu and Rwawele

Discussion 2: how can IK be integrated in the formal TEVET curriculum

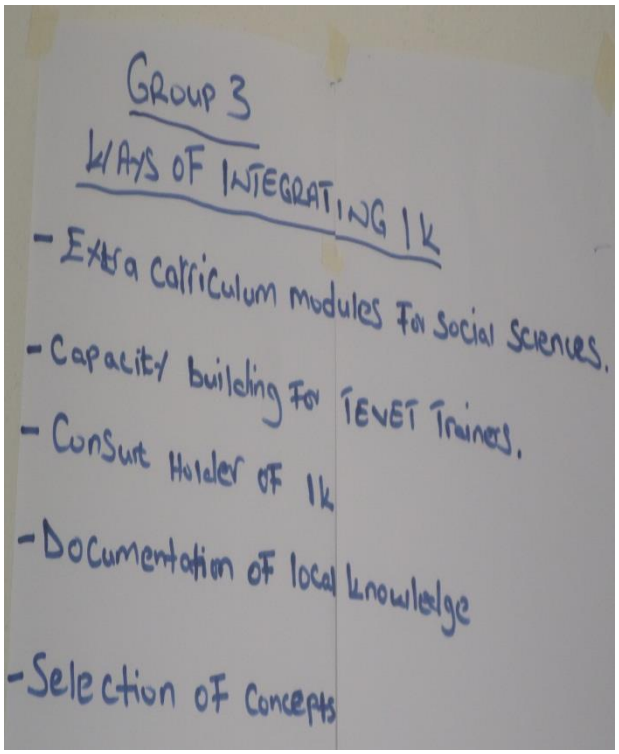
Teachers will discuss IK and various ways of integrating IK in the formal TEVET curriculum. The teacher participants will be grouped into three, each group will be given flip charts and permanent markers to write whatever they are discussing. Each group will have an opportunity to present what they have discussed, and fellow participants will comment and make further suggestions on what has been presented.

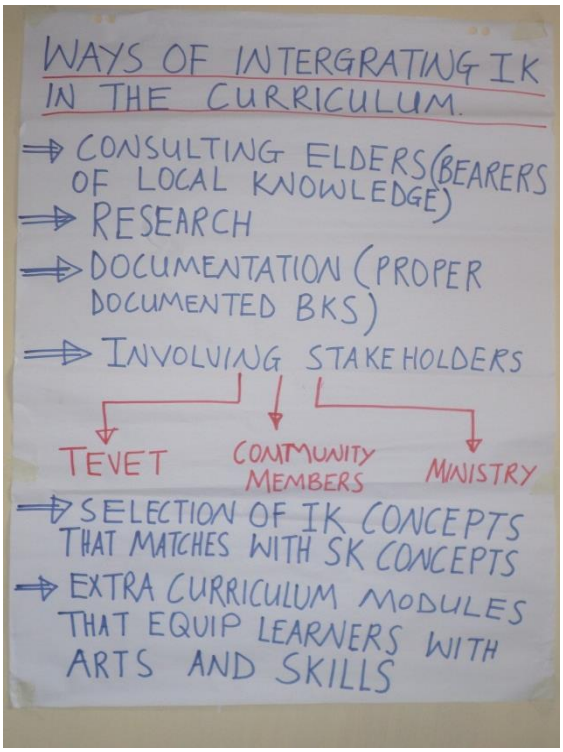
- ***Conversation results from each group***





Synthesis Results from the Groups





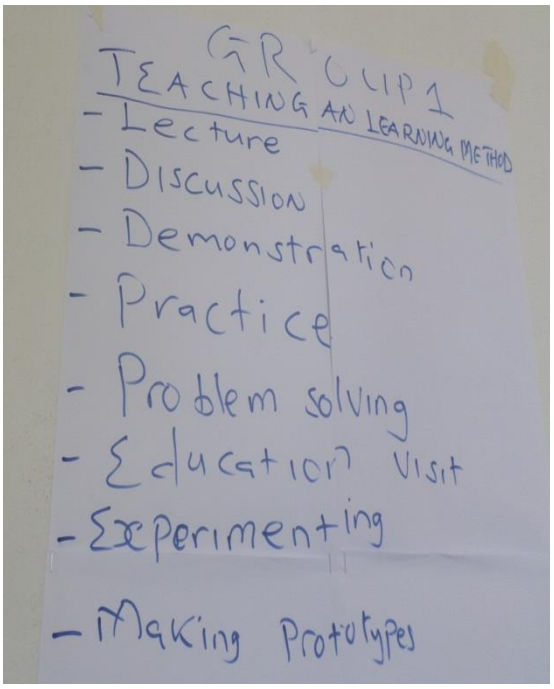
- ***Comments and suggestions from fellow participants***

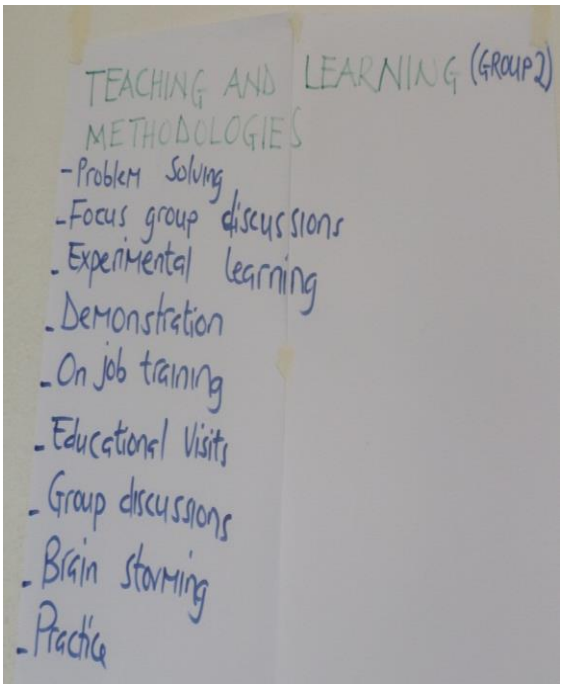
  - On the issue of conducting research, they suggested that "the process should aim at obtaining various forms of local knowledge's that exists in particular tribes by understanding what the indigenous people does and how best they can be synthesized with others that hold similar attributes". The participants advocated proper planning and coordination of the programs with support from relevant stakeholder such as the ministry, community chiefs and elders, TEVET.
  - The participants commented on the selection of IK concepts by positing that "the selection process should be based on concepts that are environmentally friendly, acceptable by the society and can advance the socio-economic lives of individuals".
  - They indicated that, every tribe has got its own local practices based on cultural beliefs, attitudes and values; as such its holders need to be consulted by critically explaining the concept of IK and find out what they have. They articulated that, for any concepts that need to be integrated, its success relies on clear understanding of it, including its impact to human life.
  - They added that the incorporation of IK needs capacity building of TEVET trainers

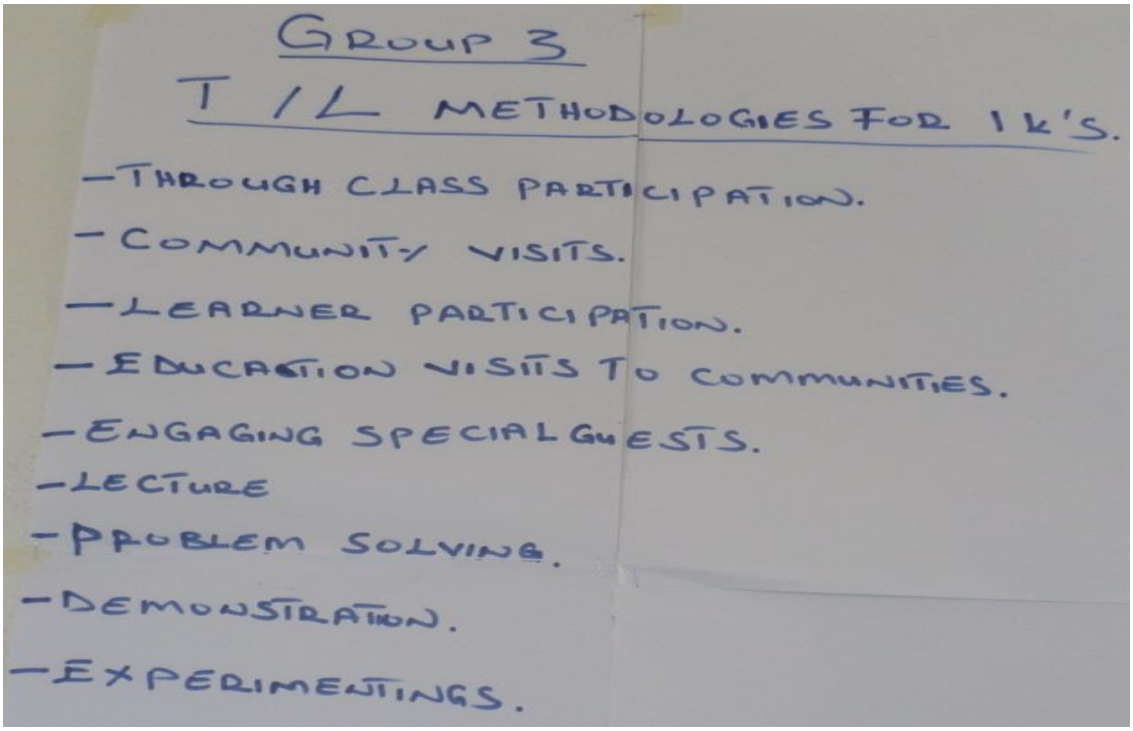
Discussion 3: What methodologies/ approaches would be most effective in teaching and learning content that has IK?

After tea break the participants were briefed on the next task of discussing teaching and learning methodologies that can be used in teaching content that has IK. The participants went back to their respective groups, discussed the issue and presented the results of their discussions. The rest of the participants made their comments on each of the presentations.

- ***Conversation results from the groups***







- ***Comments and suggestions from fellow participants***
  - Participants agreed that, the demonstration methodology should aim at practically demonstrating the theory at hand, with practical examples and hands on exercises
  - They also suggested that when using the selected methodology emphasis should be on realization of the products rather that theoretically feeding the students with knowledge and skills. They advocated learner centered methodologies as being best in teaching concepts that have IK's.
- ***Demonstration of a wood lathe machine***
  - On demonstration, the participants explained that its aim should be practically demonstrating the theory at hand, with practical examples and hands on exercises.
  - They added that, experimenting and modeling procedures need to be encouraged as learners get exposed to real life issues. In clarifying how these methodologies can be used in order to bring authentic learning, the respondents demonstrated the way they teach some concepts that allows the implementation of IK. In this scenario they demonstrated the teaching of the wood lathe machine using the generated local knowledge and how that can proceed to harmonize the knowledge and skills of working on the lathe machine as in the curriculum.

Figure 1: demonstration of a wood lathe machine (chain method)

Figure 2: demonstration of a wood lathe machine (sewing machine method)

The demonstration proceeded with the description that two ways can be used in the teaching and learning of the machine; with the chain method (Figure 1) that tallies much with the electric powered lathe machine whilst the other (Figure 2) uses the mechanism of a sewing machine. From the demonstrations, explanations were given on how the two machines work and a link to the electric lathe machine were made. Using the chain method (Figure 1), they explained that the machine consists of two bearings which are fitted onto a wood stand. The bearings works in the same way to those of electric lathe machine where by one end holds the piece firmly and the other part rotates it. They further that, an individual or two individuals hold the chain at the middle and they continuously pull it to rotate the mounted piece at a specified speed. As they are doing this, another one works on the piece and produces the required shape. They enlightened that the finishing is of good quality as the piece is worked on at good speed which is similar to that of an electric lathe.

Using the demonstration in figure 2, the respondents articulated that the machine works likes a sewing machine where by one person hold the handle and rotate it. A pulley which is attached to the piece is allowed to rotate and turn the piece. They added that the piece is mounted in the same way as it can be held on an electric powered lathe machine. Even though the descriptions were made clear, the materials and the set-up were not in line, making it difficult for somebody to grasp what was really happening. Furthermore, the participants could not come out clear as to what is the relationship between the local knowledge they conversed and sustainable development. The respondents conversed and concluded that with the use of the locally available resources learners would appreciate the need to use what they have at their disposal.

APPENDIX 9: REFLEXIVE JOURNAL

DATE	DESCRIPTION	RESPONSIBLE PERSON
26th Jan 2016	- Briefed the study and obtained permission from the college principal to conduct research.	Rose Mbeye
27th Jan 2016	- Sampled teachers based on trend. - Briefed the research concept to a sample of teachers teaching social sciences and arts, and signing of informed consent form.	Rose Mbeye
28th Jan 2016	- Briefed the research concept to a sample of teachers, teaching technical side and signing of informed consent form.	Rose Mbeye
29th Jan 2016	- Distributed two questionnaires, one to a Conventional Science teacher and the other to a Manufacturing Engineering teacher.	Rose Mbeye
01st Feb 2016	- Gave a Tubing Construction teacher one questionnaire and one to Technology Study teacher.	Rose Mbeye
02nd Feb 2016	- Gave a Designing teacher a questionnaire. Collected three questionnaires.	Rose Mbeye
16th Feb 2016	- Distributed three questionnaires; one to Material Construction teacher, one to Human Economics teacher and one to Ecological Study teacher.	Rose Mbeye
16th Feb 2016	- Conducted workshop discussions with all respondents.	Rose Mbeye
26th Feb 2016	- Collected five questionnaires.	