UNIVERSITY OF THE WESTERN CAPE

E-LITERACY AND EMPLOYABILITY: A TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING (TVET) CURRICULUM PERSPECTIVE

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E-LITERACY AND EMPLOYABILITY: A TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING (TVET) CURRICULUM PERSPECTIVE

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KEYWORDS

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ABSTRACT

E-literacy and employability: a technical and vocational education and training (TVET) curriculum perspective

S. Mata

The high rate of youth unemployment is a global phenomenon and a worrying factor. This contradicted the opportunity presented by the ICT sector, which requires e-skills, particularly e-literacy/or digital literacy skills in the entire sectors of the economy, not only ICT. Ala-Mutka (2011) defines e-literacy skills as the "basic technical use of computers and the internet". ICT skills are viewed as essential in the modern day world in order to improve individual's chances of securing and keeping employment. Various initiatives to improve youth employability in South Africa, particularly those that are studying TVET colleges or those have already graduated. Various approaches have been adopted such envisaged by the White Paper for Post-School Education and Training of 2013 i.e. preparation for workplace, self-employment through close cooperation of TVET colleges and industry (DHET, 2013). Employers assume that graduates are familiar with computer and Internet usage. Thus, the study set the following objectives:

- To understand the theoretical and contextual background of promoting employability;
- To explore existing employability frameworks that might be relevant for promoting employability;
- To identify and categorize the factors that are relevant for promoting employability obtained from pertinent literature;
- To validate these factors by interviewing key TVET stakeholders and ICT experts;
- To propose an employability framework customized for the South African context; and
- To explain the use of these factors within the proposed employability framework.

The objectives were realised by reviewing pertinent literature, which led to the development of an employability conceptual research framework for South Africa. A conceptual research framework that consists of five factors from the e-skills national curriculum competency framework: (i) e-skills for service delivery; (ii) e-skills for new jobs; (iii) e-skills for existing

jobs; (iv) self-employment; and (v) ICT practitioner skills. In-terms of e-skills levels i.e. ICT user skills, e-business skills and ICT practitioner skills. The first three sets of e-skills are associated with ICT user skill, e-skills for self-employment are associated with e-business skills and then ICT practitioner skills. This conceptual research framework was subsequently empirically verified using an interpretive approach by interviewing key TVET stakeholders and an ICT expert. The empirical findings affirmed the validity of the above-mentioned employability factors but also uncovered two additional factors: (iv) practical experience and infrastructure. These factors were subsequently incorporated into the final employability framework for South Africa.

The main contribution of this study is the fact that it brings a new employability framework for TVET colleges for the South African context, with the hope that it can be applicable in similar environments in the developing context.

There are some limitations in the present study due to a small research sample that was caused by the unavailability of employed graduates. However, it is believed that this limitation did not deem the results and the academic and practical contribution of the study invalid.
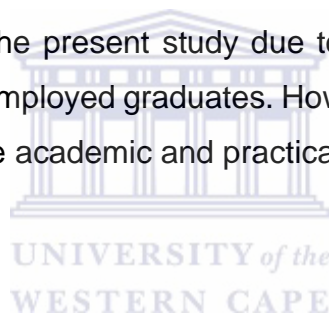
Declaration

I declare that **"E-skills and Employability: A Technical and Vocational Education and Training (TVET) Curriculum Perspective"** is my own research work and that it has never been submitted previously for any degree or examination in any other university. All the sources that I have mentioned or cited have been completely referenced.

Songezo Mata   **Date:**

Signed: _____   October 2015

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This thesis is dedicated to my late grandmother, Nongamile Josephina Mata who raised my siblings and I as her own.

Acronyms

Acronyms	Explanation
DHET	Department of Higher Education and Training
TVET	Technical and Vocational Education and Training
DoC	Department of Communications
DTPS	Department of Telecommunications and Postal Services
ITU	International Telecommunications Union
NDP	National Development Plan
MTSF	Medium Term Strategic Framework
Wi-Fi	Wireless Fidelity
LTE	Long-Term Evolution
IMT	International Mobile Telecommunications
Modem	Modulation - demodulator
NeSPA	National e-Skills Plan of Action
iNeSI	Ikamva National e-Skills Institute
OECD	Organisation for Economic Co-operation and Development
EU	European Union
EC	European Commission
eSNCCF	e-Skills National Curriculum and Competency Framework
ReSNeS	national Research Network for e-Skills
ICT	Information and Communication Technology
ICDL	International Computer Drivers Licence
IT	Information Technology
FOSS	Free Open-Source Software
IC3	Internet and Computing Core Certification
CTT+	Certified Technical Trainer
N6	National Certificate Level 6
NQF	National Qualification Framework
STATSSA	Statistics South Africa
ILO	International Labour Organisation
GSMA	Groupe Special Mobile Association
InfoDev	Information for Development Program

Definition of terms

Research studies use particular terminologies to express meaning. It is fundamental that researchers provide the connotation of these terms within the context of the study. The following definitions apply to terms that will be used in this study.

Electronic skills (e-Skills)

According to (iNeSI, 2014b), e-Skills for for South Africa are reffered to as *"the ability to use and develop ICTs within the context of an emerging South African information society and global knowledge economy, and associated competencies that enable individuals to actively participate in the world in which ICT is a requirement for advancement in government, business, education and society in general"*. Further, e-Skills are said to encompass the following (iNeSI, 2014b): "e-literacy skills; e-participation and e-democracy skills; e-government/governance skills; e-business skills; e-user skills; e-practitioner skills; and e-community skills".

E-literacy Skills

According to National e-skills Plan of Action (NeSPA), e-Literacy is defined as the "capabilities for the socio-economic appropriation of modern information and communication technologies" (NeSPA, 2012). A more broader definition of e-literacy is offered by iNeSI: *"the ability of individuals to use digital tools and facilities to perform tasks, to solve problems, to communicate, to manage information, to collaborate, to create and share content and build knowledge, in all areas of everyday life and work"* (iNeSI, 2014a). Further, e-literacy skills are *"aimed at employment readiness, particularly targeting unemployed and unskilled youth and rural society (including starting own small business)."*

Digital Literacy

Ala-Mutka (2011) states, "digital literacy is underpinned by the basic technical use of computers and the internet". Ala-Mutka (2011) adds that, "Digital literacy encompasses computer hardware, software (particularly those used most frequently by businesses), the

Internet, cellphones, PDAs, and other digital devices. A person using these skills to interact with society may be called a digital citizen"[1].

Employability

Employability mean a range of *"factors and processes that enable a people to progress toward or find employment, to remain employed, and/or to advance in the workplace"* (Garrido, Sullivan, & Gordon, 2012). Employability is also referred to as *"a set of achievements – skills, understandings and personal attributes – that make graduates more likely to gain employment and be successful in their chosen occupations, which benefits themselves, the workforce, the community and the economy"* (Knight & Yorke, 2003).

Curriculum

There are a number of ways of defining curriculum. According to (Glatthorn, Boschee, & Whitehead, 2009) curriculum can be defined as "*prescriptive, descriptive or the combination"*. The prescriptive definition outlines *"what ought to happen, and they more often than not take the form of a plan, and intended program, or some kind of expert opinion of what needs to take place in the course of study"* (Glatthorn et al., 2009). On the other hand, the descriptive curriculum does *"not merely in terms of how things ought to be… but how things are in real classrooms"* Ellis in (Glatthorn et al., 2009).

According to (Glatthorn et al., 2009) the curriculum is a documented plan designed to be applied in a classroom situation. Furthermore, the curriculum is prepared in order to be received by the students and is geared towards guiding the school *and is available in documents.*

Internet

According to (Machet, 2012, p. 68) the Internet *"is a worldwide network of networks, a networking infrastructure. It connects millions of computers together globally, forming a*

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[1] https://cleach.wordpress.com/what-is-digital-literacy/

network whereby a computer can communicate with any other computer as long as they are both connected to the Internet".
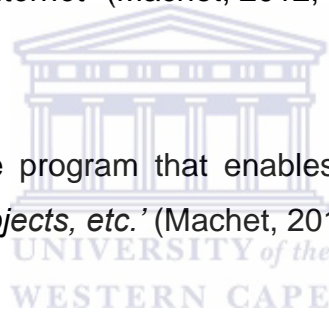
Broadband

Broadband is *"a high speed Internet access using a modem[2]"* (Machet, 2012, p. 66). In South Africa, broadband is referred to as *"high capacity, high speed and high quality electronic communication networks, services, applications and content that enhances a diversity, uses and value of information communications for a variety of users"* (DTPS, 2013).

Wi-Fi

Wi-Fi is a *"wireless networking technology that uses radio waves to provide high-speed Internet and network connections. It is a means by which portable devices such as notebook computers can connect to the Internet"* (Machet, 2012, p. 68).

Search engine

A search engine is a software program that enables the searching of information from databases using *'keywords, subjects, etc.'* (Machet, 2012, p. 67).

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[2] https://en.wikipedia.org/wiki/Modem

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CHAPTER 1. INTRODUCTION

1.1 Background to the research problem

Information and Communication Technologies (ICT) have become part of our daily lives. According to Loveless (2003), the technology change is taking place at a fast rate with huge impact that synonymous with agricultural and industrial developments. Furthermore, Loveless (2003) points out that ICT features in almost all spheres of our daily lives (i.e. work-life, pastime, education and home-life). In addition, technology have rapidly influenced people's daily lives as well their way of life in a form of culture and personal relationships. ICT skills are seen as key to in improving a person's chance of getting employment and can enhance a person's employability chances, especially when combined with additional skills (de Hoyos et al., 2013).

Global youth unemployment rate is at a staggering rate of 12.6 percent, translating to about 73 million young people that are out of work worldwide according to the International Labour Organisation 2013 (ILO, 2013). Furthermore, the ILO (2013) notes that skills mismatch is a major concern particularly in Sub-Saharan Africa, with the highly educated having low rate of unemployment than the less skilled.

The developing world once faced an uphill battle in exploiting the ICTs, especially personal computers (PCs) and the internet, which are viewed as key for growth and development (Araba & Fellows, 2009). Recently, the developing countries are experiencing an explosive growth in mobile phones, with Sub-Saharan Africa connecting 253 million unique subscribers (GSMA, 2013). While mobile is replacing computers, few of the poor in South Africa use the internet, with internet illiteracy rate at 86 percent, and few amongst these being aware of internet function (InfoDev, 2012). This might be one of the contributing factors to South Africa's unemployment rate which has risen from 32.7 percent in 2008 to 36.1 percent in 2014 amongst the youth aged 15-34 years (Statssa, 2014). In the midst of all this rising unemployment in South Africa, there is a demand for information communication technologies (ICT) skills, with the supply of skills in the ICT sector low. Recently, South Africa was estimated in 2010 to be in need of between 12 000 to 25 000 information technology (IT) professionals, a lower figure than previously estimated i.e. 70 000 in 2009 (Schoefield, 2010).

The recently published White Paper for Post-School Education and Training of 2013 mention that the purpose of TVET colleges is to: *"prepare students for the workplace and/or self-employment, it is essential that they develop and maintain close working relationships with employers in their areas of study"* in order for the colleges to benefit from possible work-integrated learning opportunities to enable students get placements after graduation *(DHET, 2013, p. 16)*. However, the high unemployment rate amongst the South African youth, the bulk of which are dropouts or have graduated at TVET colleges, as stated above, is a major concern for government. While young people constitute between 52 to 64 percent of the working people, they constituted only 42 to 49 percent of those employed, and approximately 33.5 percent of those are not in employment, education or training (NEET) (Statssa, 2013). The rising unemployment in South Africa amongst the youth may be further worsened by lack of e-skills if the corrective action does not take place timely.

1.2   Rationale

There are four reasons for undertaking the study that is focusing on public TVET colleges. Firstly, the high rate of youth unemployment, especially amongst the post-school youth, is at 36.1 percent as indicated above, the bulk of which are TVET college dropouts or have graduated from these institutions. Second, the TVET colleges have been prioritised by government for skilling the post-school youth and to increase enrolments, and hence, are receiving substantial funding (DHET, 2013). Third, the National Development Plan (NDP) projects the enrolment at TVET institutions to be one million by 2030 (NDP, 2011). Lastly, the author is concerned about the current state of unemployment amongst the youth in South Africa and would like to contribute in tackling the unemployment problem by improving employability of TVET college graduates.

1.3   Problem statement

The South African government acknowledges that e-skilling of the South African youth could possible address the one of the challenges that they are facing, unemployment to enable to

be part of information society[3] (NeSPA, 2012). Key to the use of ICT in South Africa and elsewhere, is having competent and e-skilled employees Mitrovic, (2010). This will require an appropriate solid base to promote youth employability. That solid base is seen as development of an e-skills framework geared towards promotion of employability (NeSPA, 2012).

1.4   Research Question and Sub-questions

The recognized research problem of the study implied that answering of the main research question would lead to the development of a framework for promoting employability in South Africa:

What are the factors on the e-skills landscape that are connected to the development of employability framework and how can this framework be successfully applied?

The following are the research sub-questions from the main research questions:

- What is the theoretical and contextual background of promoting employability?
- Are there any existing employability frameworks that might be relevant for promoting employability?
- What are the factors that are relevant for promoting employability in the South African context?
- How should these factors be used in the development of the e-skills employability framework?

1.5   Research Objectives

The main research objectives for this study are as follows:

- To understand the theoretical and contextual background of promoting employability;
- To explore existing employability frameworks that might be relevant for promoting employability;

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[3] https://en.wikipedia.org/wiki/Information_society

- To identify and categorize the factors that are relevant for promoting employability obtained from pertinent literature;
- To validate these factors by interviewing key TVET stakeholders and ICT experts;
- To propose an employability framework customized for the South African context; and
- To explain the use of these factors within the proposed employability framework.

1.6   Research methodology

The philosophical stance that the researcher adopted is qualitative in nature. This is due the way the data for this study will be acquired by interviewing mainly key college stakeholders and ICT experts, and data analysis is carried using the hermeneutics method of analysis. The research sample composed of 14 interviews. The sample was composed of key stakeholders from the TVET sector and ICT experts from industry: students enrolled for the National Certificate level 6 (N6) Electrical Engineering class, pursuing heavy current core subjects (i.e. Electro-technics, industrial electronics, logic systems and mathematics). Ind addition, face-to-face interviews were conducted with the head of department (HOD) from electrical engineering, campus manager, lecturer from electrical engineering and an ICT expert from industry. The interpretevist approach suggests that the evidence was produced through interaction between the researcher and the research participants.

The nature of this study called for the adoption of a research techniques considered the following aspects:

- Literature review was conducted of the pertinent literature;
- Semi-structured interviews were recorded audio data from participants;
- Interpretive approach was adopted during data collection and data analysis.

1.7   Ethical considerations

Ethical considerations were be taken care of by making sure that all respondents were aware of the aim of the study before consent was sought (Saunders, Lewis, & Thornhill, 2003) as well in accordance with the University ethics rules. Furthermore, (Saunders et al., 2003) points out that regardless of the research method, ethical issues such as privacy, confidentiality and anonymity, amongst others, should be upheld. This study involved people and hence, privacy and confidentiality of their information was guaranteed. Respondents did not provide their names to ensure anonymity.

The researcher hereby confirmed and agreed to adhere to the above ethical issues. In addition the data and information that was gathered for this research project will not be used outside of the University of the Western Cape nor will it be used for anything other than research purposes.

1.8   Short summary of the findings

The literature that was reviewed revealed that there is a relatively new framework i.e. the e-skills national curriculum competency framework (eSNCCF) that was developed for the South African context, which provided the five factors. Further, literature assisted in clarifying the factors as these were drawn from this new framework. The five factors are: (i) e-skills for service delivery, (ii) e-skills for new jobs, (iii) e-skills for existing jobs, (iv) e-skills for self-employment, and (v) ICT practitioner skills. The empirical results confirmed the validity of the above mentioned employability factors but uncovered two new factors: (vi) practical experience, and infrastructure, here referred to as enabling factors. These employability factor were grouped were mapped to the e-skills levels i.e. (i) ICT users skills – e-skills for service delivery, e-skills for new jobs, and e-skills for existing jobs; (ii) E-business skills – e-skills for self-employment; and (iii) ICT practitioner skills – ICT practitioner skills.

1.9   Contribution of the study

The main contribution of the study is that it casts more light on how the various factors can play a role in the promotion of employability at TVET colleges in the South African context.

The study could be applicable in other programmes in similar TVET contexts. Theoretically, the study has made a contribution by to the academic understanding of the importance of certain key concepts that play a role   in in the promotion of employability derived from the pertinent literature as well as from empirical findings from this research.

1.10   Limitations

The limitations are as follows:

- The study was carried at a particular technical and vocational education and training (TVET) college in South Africa, which surely limited the generalisation of the research findings. However, it is hoped that the findings of this research could be more or less, applicable to other similar settings.

- The study focused on students from the electrical engineering (i.e. N6 exit point), and did not interview students from general courses such as hospitality, tourism, and education, even though it could be interesting to find out, in order to allow more in-depth understanding regarding the group, which the study focused on.

- Due to the fact that study employed convenience sampling, the findings of study cannot be generalised and largely reflects the views of respondents in that institution.

1.11   Thesis outline

The research report is comprised of five chapters. The research is structured as follows:

Chapter 1: Introduction, covers the background to the research problem, the rationale for the study and provide the definition of key terms relevant to the study. Then this is followed by formulation of the problem statement, research questions, research sub-questions and research objectives. Further, the research methodology, ethical considerations, summary of and research findings of the study were outlined. Lastly, contributions of the study are and the research limitations were also highlighted.

Chapter 2: **Literature review,** cover four main sections: understanding the concept of e-literacy, the state of e-literacy in South Africa, understanding the employability conceptual landscape and the designing of an employability framework: a conceptual research proposal.

Chapter 3: Research design and methodology, covers the research methodology, philosophical perspective, rationale for choosing a case study research, sample population, sampling techniques and sample, methods of data collection and data analysis.

Chapter 4: Results and interpretation of results, cove three main sections: core themes of the study, general findings and the relevance of the conceptual framework from literature.

Chapter 5: Conclusion and recommendations comprise of the following main sections: recalling the e-literacy related employability factors, recommendations, contribution of the study, and the limitation of the study, and future research suggestions.

CHAPTER 2. LITERATURE REVIEW

2.1 Introduction

Most employers in South Africa and elsewhere today require potential employees to possess some form of Information and Communication Technology (ICT) skills as most companies communicate via e-mail, make PowerPoint presentations, prepare and submit reports.

According to the National Development Plan (NDP, 2011), *"e-literacy programmes, skills development and institutional capacity-building strategies, and other generic demand-side interventions"* promote ICT diffusion and require collaboration between departments, public and private sector coordination. Further, the importance of e-skilling the three million youth that are not in education, employment or training (NEET) ages between 18 and 24 have been highlighted by (NeSPA, 2012).

This study should contribute to this gap in literature, by providing appropriate material on the key concepts of e-literacy and employability. The literature material that was used for this study was sourced from online journals, books, online databases, interviews, and newspapers and from the research community.

This chapter is structured as follows: the first section discusses the concept of e-literacy. The second section discusses the state of e-literacy in South Africa. The third section discusses the employability conceptual landscape. The last section discusses the designing of an employability framework for TVET colleges in South Africa. The chapter concludes by summarizing the main points that emerge from the literature.

2.2   Understanding the concept of e-literacy

In order to understand the effects of e-literacy on employability, it is vital that the concept be explored. This will enable the location of e-literacy within the e-skills ecosystem so as to address the study's research objectives. This section discusses various e-skills frameworks, models and taxonomies. The section concludes by providing suggestions on how to embed the employability factors into the curriculum and propose an employability framework for TVET colleges in South Africa.

2.2.1   The digital divide

The characteristics of Information Society are better explained by the digital divide concept that explain 'access and exclusion issues' that are referred to as 'the gap between those who can effectively use new ICT tools, such as the Internet, and those who cannot' (Mancinelli, 2007). Further (Mancinelli, 2007) point out that there are three aspects of the digital divide:

- **Access divide, or *"early digital divide"*:** it considers the gap between those with and those without access;

- **Usage divide or *"primary digital divide"*:** it concentrates on those who have access but are non-users;

- **'Quality of use' divide or *"secondary digital divide"*:** it focuses on the differentials in participation rates of those people who have access and are users.

Mobile phones have pushed many developing countries, including South Africa beyond 'access divide' to usage and 'quality of use divide' (Mancinelli, 2007). This is confirmed by (Gillward, Moyo, & Stork, 2012) that mobile ownership is South Africa is at 84.2 percent and prepaid subscription being the most preferred (87 percent) while about 51 percent of the

mobile phones having Internet browsing capability. Further, (Gillward et al., 2012) note that internet browsing is at 27 percent, supporting the notion that the digital divide is beyond 'access divide'. In addition (World Wide Worx, 2012) point out that 7.9 million South Africans access Internet on their mobile phones, 2.48 million access the Internet on their mobile phones only, and the rest (6.02 million) access the Internet on personal computers, laptops, and tablets. Hence, the digital divide is no longer about access but about usage and quality of use (Mancinelli, 2007). This has a bearing on e-literacy as Internet access; particularly mobile broadband access via mobile phones contributes immensely to the promotion of e-literacy.

2.2.2 Benefits of e-Skills in Society

According to (Mitrovic et al., 2013) citing (Van Deursen, 2010)[4], digital competences and e-skills offer the following benefits to the general population: social, health, economic, civic, cultural and societal benefits. The benefits of e-skills, according to (Ala-Mutka, 2011), are briefly explained next.

- **Social benefits:** Internet enables people to connect with each other, with other communities, start new connections based on common interest;

- **Health benefits:** Internet improves the quality of life by enabling those who have similar illnesses to form communities of support;

- **Economic benefits:** Digital literacy contributes to employability due to the demand of ICT professional in all economic sectors;

- **Civic benefits:** The Internet tools and media enable people to access current information from different sources in their country and around the world in order to be better-informed citizens;

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[4] Van Deursen, A. J. A. M. 2010, "Internet Skills, Vital assets in an information society". *University of Twente.* Available at: http://doc.utwente.nl/75133.

- **Cultural benefits:** The Internet and other social platforms enables people to share *"their personal expressions and interact with the audience if they so wish"*;

- **Societal benefits:** "ICT usage has penetrated all areas of work, business and services".

The economic benefits that are derived from digital literacy are the focus of the current study as the effects of e-literacy on employability from a TVET curriculum perspective is being investigated. As in (Ala-Mutka, 2011) digital literacy and e-literacy will be used interchangeable in this study.

2.2.3 Various types of ICT Literacies

According to the (European e-Skills Forum, 2004), e-skills include a variety of *"capabilities (knowledge, skills, and competences) and issues with an e-skills dimensions span over a number of economic and social dimensions"*. The term e-literacy is just one type of e-skills, and although all types of e-skills are important for the information society, this study will focus on *"e-literacy (also known as digital literacy)"* (Mitrovic, 2010).

 NeSPA (2013) defines e-literacy as follows:

"These are capabilities for the socio-economic appropriation of modern information and communication technologies".

According to (Ala-Mutka, 2011) *"digital literacy is underpinned by the basic technical use of computers and the internet"*. Further, (Ala-Mutka, 2011) points out that digital literacy is connected to e-Inclusion, with e-inclusion meaning *"inclusive ICT and the use of ICT to achieve also more general inclusion objectives, such as inclusion of specific groups at risk of exclusion (elderly, immigrants, low-skilled, unemployed, special needs population)"*. Thus, the aim of e-Inclusion is that of ensuring 'no one is left behind' in 'ICT and use of ICT to achieve also more general inclusion objectives, such as' amongst others, unskilled and the unemployed. The argument by Ala-Mutka on e-literacy above is similar to the argument by (NeSPA, 2010) that e-literacy skills *"encompasses those capabilities needed by civil society (including associations, students, youth, women, disadvantaged and rural communities)"*. Further, (NeSPA, 2010) point out that *"a key goal of e-literacy is to impact on employment*

readiness, particularly in relation to school leavers, university graduates, the unemployed, unskilled youth and those living in rural society".

European e-Skills Forum (2011) argue that *"Being digitally literate implies being able to search and retrieve information to navigate and communicate on-line, to participate in digital and virtual communities. It is perceived as a key element in the battle to overcome social exclusion and division in the information society"*.

The European Commission working paper (European Commission, 2008) defines digital literacy as follows:

"Digital literacy is the skills required to achieve digital competence…Digital literacy is underpinned by basic technical use of computers and Internet".

In this study, *'digital literacy'*, have the same meaning with '*electronic literacy (e-literacy)'*, which is considered to be an inclusive term for knowledge, skills and attitudes (Ala-Mutka, 2011).

The European Commission cited in (ITU, 2014) define computer literacy as *"the ability to use computers and related technologies, from end-users to ICT professionals. It is generally understood as the knowledge and skills needed to effectively use hardware and software components"*. The computer literacy skills are:

- **Basic computer skills:** turning a computer on and off; using a mouse and keyboard; understanding basic computer terminology and concepts; understanding operating system, programmes, and data; and managing files.

- **Intermediate computer skills:** performing basic functions of common productivity programmes (word processing, spreadsheet, presentation); using email and web browser; and installing software and hardware.

- **Advanced computer skills:** programming; using advanced features of productivity programmes; and fixing simple computer problems.

In addition, it is argued that computer literacy at the intermediate level is becoming requirement for virtually every job (ITU, 2014). Further, it is worth noting that the definition of computer literacy at intermediate level is similar to e-literacy or digital literacy.

According to (NeSPA, 2010) e-literacy Skills includes all those competences needed by the society (including associations, students, youth, women, disadvantaged and rural communities), building on the digital literacy concept from the European e-Skills Forum definition that being digitally literate suggests being able to look and extract information to navigate and communicate in the digital world, to participate in digital and online communities. It is perceived as a key element in the battle to overcome social exclusion and division in the information society". Further, (NeSPA, 2010) point out that *"a key goal of e-literacy is to impact on employment readiness, particularly in relation to school leavers, university graduates, the unemployed, unskilled youth and those living in rural society"*.

Even though there are numerous definitions of digital literacy, *"digital literacy may have merit as an integrating (but not overarching) concept that focuses upon the digital without limiting itself to computer skills, and which comes with little historical baggage"* (Ala-Mutka, 2011). There are various organisations that have attempted to define, describe and categorise e-skills, with variation from country to country. The examples include European e-Skills Forum, the European Commission, INSEAD eLab and NeSPA for South Africa, amongst others.

2.2.4 International ICT Literacy Panel

The International ICT Literacy Panel (2007) define ICT literacy as follows: "*ICT literacy is using digital technology, communications tools, and/or networks to access, manage, integrate, evaluate and create information in order to function in a knowledge society*".

Further, International ICT Literacy Panel (2007) argues that the definition mention skills and knowledge in a particular order that indicate *'increasing cognitive complexity'*. In addition, the (California Emerging Technology Fund (CETF) 2008) definition outline digital literacy elements, building on the International ICT Literacy Panel (see Table 1 below).

Table 1: Basic elements of digital literacy (Source: International ICT Literacy Panel, 2007)

Element	Definition	Competencies
Access	Applying an existing organisational or classification scheme	Search, find, and retrieve information in digital environments.
Manage	Applying an existing organisational or classification scheme	Conduct a rudimentary and preliminary organisation of accessed information for retrieval and future application.

Integrate	Interpreting and representing information. It involves summarising, comparing and contrasting	Interpret and represent information by using ICT tools to synthesis, summarise, compare, and contrast information from multiple sources.
Evaluate	Making judgements about the quality, relevance, usefulness, or efficiency of information	Judge currency, appropriateness, and adequacy of information and information sources for a specific purpose (including determining authority, bias, and timelines of materials).
Create	Making judgements about the quality, relevance, usefulness, or efficiency of information	Adapt, apply, design, or invest information in ICT environments (to describe an event, express an opinion, or support a basic argument, viewpoint or position).
Communicate	Communicating information pervasively to meet needs of various audiences through use of an appropriate medium.	Communicate, adapt, and present information properly in its context (audience, media) in ICT environments and for peer audience.

Further (Ala-Mutka, 2011) add that ICT literacy is *"the narrowest digital concept, and mainly concentrated on the technical knowledge and usage of computers and software applications"*.

2.2.5 The OECD ICT competencies

The Organisation for Economic Co-operation and Development (OECD) distinguishes three categories of ICT competencies: the basic users, advanced users and ICT specialists (OECD, 2005). The three categories of ICT competencies are briefly explained below.

*'**Basic Users:** competent users of generic tools (e.g. Word, Excel, Outlook, and PowerPoint) needed for the information society, e-government and working life. Here too, ICTs are tools, not the main job'.*

*'**Advanced Users:** these are competent users of advanced and often sector-specific, software tools. ICTs are not the main job but a tool'*;

*'**ICT Specialists**, who have the ability to develop, operate and maintain ICT systems. ICTs constitute the main part of their job – they develop and put in place the ICT tools for others'*;

2.2.6 The European e-skills Forum

The (European e-Skills Forum, 2004) classifies e-skills into three main categories: ICT-user skills, e-business skills and ICT practitioner skills. The e-skills three categories are briefly explained next.

'ICT-user skills: these are capabilities required for effective application of ICT systems and devices by the individual. ICT users apply systems as tools in support of their own work, which is, in most cases, not ICT. User skills cover utilisation of common generic software tools and the use of specialised tools supporting business functions within industries other than the ICT industry', with these skills also broadly include "digital literacy" (European Commission, 2013, p. 19):

'E-business skills: these are capabilities needed to exploit opportunities provided by ICT, especially the Internet, to ensure more efficient and effective performance of different types of organisations, to explore possibilities for new ways of conducting business and organisational processes, and to establish new business';

'ICT practitioner skills: these are capabilities required for researching, developing and designing, managing, the producing, consulting, consulting, marketing and selling, the integrating, installing and administrating, the maintaining, supporting and service of ICT systems'.

The *'shortage, gaps and mismatches'* of e-skills have a direct impact on productivity, both in the ICT sector as well as in the general user sector which affects competitiveness (European e-Skills Forum, 2010).

2.2.7 EU Commission Digital Competence Definition

The European Commission has provided a comprehensive definition of digital competence by drawing from various frameworks (European Commission, 2013). Further, EU Commission represented the definition into constituent parts: learning domains, tools, competence areas, modes, and purpose (see Table 2 below).

> *Digital Competence is a set of knowledge, skills, attitudes, abilities, strategies, and awareness that are required when using ICT and digital media to perform tasks; solve problems; communicate; manage information; collaborate; create and share; content; and build knowledge effectively, efficiently, appropriately, critically, creatively, autonomously, flexibly, ethically, reflectively, for work, leisure, participation, learning, and socialising.*

Table 2: Digital competence parts (Source: European Commission, 2013)

Digital competence is the set of knowledge, skills, attitudes, strategies, values and awareness.	Learning domains
That are required when using ICT and digital media	Tools
To perform tasks; solve problems; communicate; manage information; collaborate; create and share; content; and build knowledge	Competence areas
Effectively, efficiently, appropriately, critically, creatively, autonomously, flexibly, ethically, reflectively	Modes
Work, leisure, participation, learning, and socialising, consuming and empowerment.	Purpose

According to Newman cited in (European Commission, 2012), digital literacy requires both technical skills and critical thinking skills, with technical skills related to ICT skills and critical skills related to information literacy. The EU Commission further point out that the term ICT skills (technical skills) are used interchangeable with digital literacy.

2.2.8 Electronic Competences (e-Competences)

Romani (2009) identified five key e-competences: e-Awareness, technological literacy, informational literacy, digital literacy, and media literacy. These five competences are described below. Additionally, the competences are also presented in Figure 1, which illustrates their associated concepts.
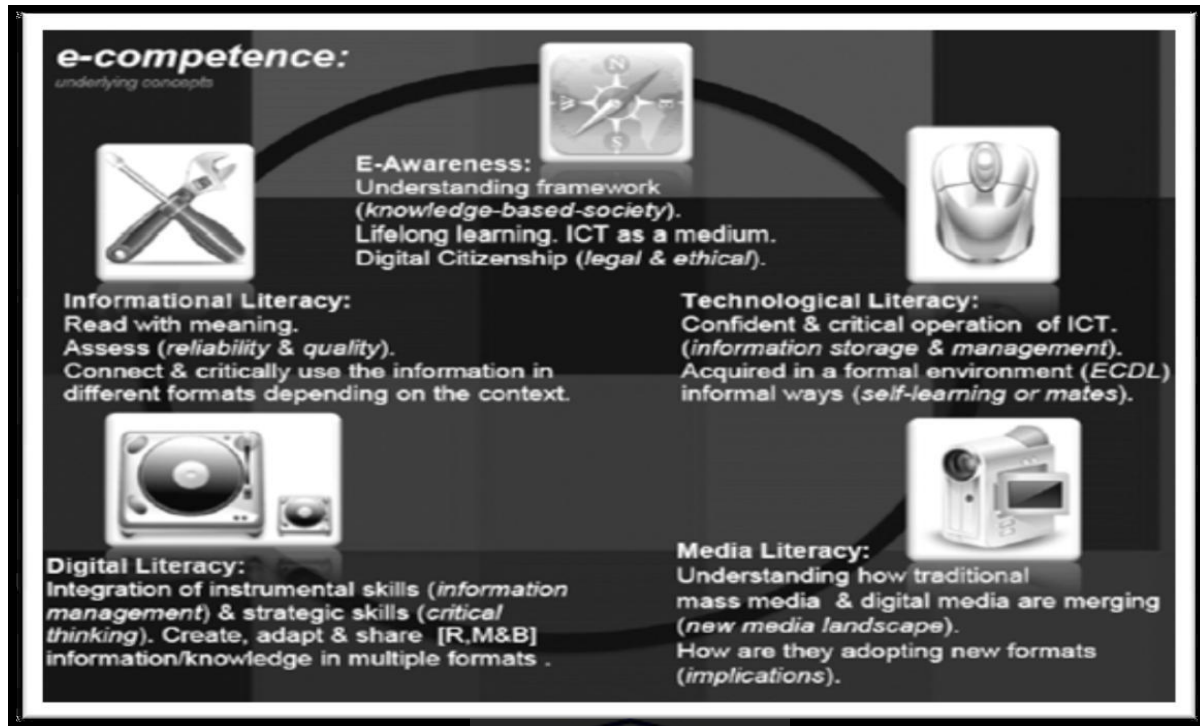
Figure 1: e-Competences and underlying concepts (Source: Romani, 2009)

- *'**E-awareness:** these are cognitive (thinking) skills is characterised by a user's awareness of ICTs and appreciation of the relevance of these ICTs in the information based society. It embraces familiarity with the technologies and understanding of how these actually are, or can be potentially, beneficial or prejudicial for society';*

- *'**Technological literacy:** the confident and critical use of electronic media for study, work, leisure and communication is represented by the ability to interact with hardware and software, as well as productivity applications. This literacy includes the use of main computer resources such as word processing, spreadsheets, databases, and tools for the storage and of information';*

- *'**Information literacy:** is the ability to understand, assess and interpret information from all kinds of sources. The concept goes beyond simply being able to read; it means the ability to read with meaning, to understand critically and – importantly – to evaluate, connect and integrate different information, data, knowledge and other sources';*

- *'**Digital literacy:** the proficiency to build new knowledge, based on the strategic employment of ICTs is termed digital literacy. The main aspects of digital literacy are how*

to get relevant information (strategic dimension). Being digital literate also means using technology for information and knowledge in order to access, retrieve, store, organise, manage, synthesise, integrate, present, share, exchange and communicate in multiple formats, either textual or multimedia';

- '**Media literacy:** *has to do with understanding how the traditional media and digital media are merging, combining and evolving towards a new landscape'*.

2.2.9 The e-skills Integration for Impact Framework

The latest National e-Skills Plan of Action (NeSPA) document proposes an e-Skills Integration for Impact Framework, which is a framework that addresses various, amongst others, ICT skills for services delivery areas of government. The areas include: e-literacy, e-inclusion, e-business, e-media, e-health, e-learning & e-education, e-enablement, and e-astuteness (NeSPA, 2012). The framework identified skills needed to move South Africa to the Knowledge Society (NeSPA, 2012). The e-Skills Integration Framework is depicted in Figure 2 below.
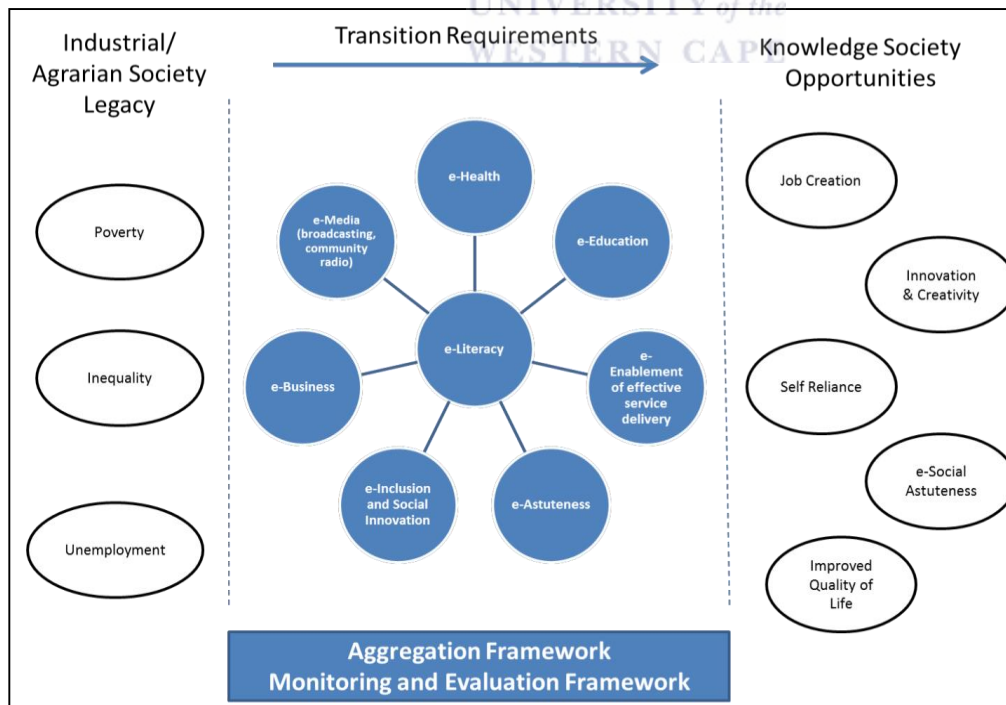
Figure 2: The e-skills integration for impact framework (Source: NeSPA, 2012)

According to ((NeSPA, 2012, p. 25) e-skills integration for impact framework locate e-skills for inclusion and e-literacy as the at the foundation level before proceed to gain advanced skills. Further, (NeSPA, 2012, p. 25) argues that *"capacity development in e-literacy is becoming essential to access government and health services and this in turn then provides capacity for citizens to harness opportunities in the socio-economic environment which are essential to delivering on the NDP"*. Table 3 below describes the e-skills necessary to move South Africa to the information society.

Table 3: Skills for information society (Source: NeSPA, 2012)

E-SKILLS	DESCRIPTION
• **E-Literacy**	These are capabilities for the socio-economic appropriation of modern information and communication technologies
• **E-Inclusion**	These are capabilities for digital inclusion and social innovation
• **E-Business**	These are capabilities for conducting business electronically
• **E-Media**	These are capabilities for effectively using electronic media
• **E-Health**	These are capabilities for using ICT-supported systems and applications
• **E-Learning & e-Education**	These are capabilities for learning and education
• **E-Enablement**	These are capabilities for e-government/governance and e-participation for effective service delivery
• **E-Astuteness**	These are capabilities for personal growth and self-reliance

2.2.10 The e-skills National Curriculum Competency Framework (eSNCCF)

According to (NeSPA, 2012) the eSNCCF *"places the e-skills for inclusion and e-literacy skill as essential for access to any further skills development"*. The eSNCCF factors are: e-skills for existing jobs; e-skills for new jobs; e-skills for self-employment; e-skills for service delivery; and e-skills for ICT practitioners (see Figure 3 below).
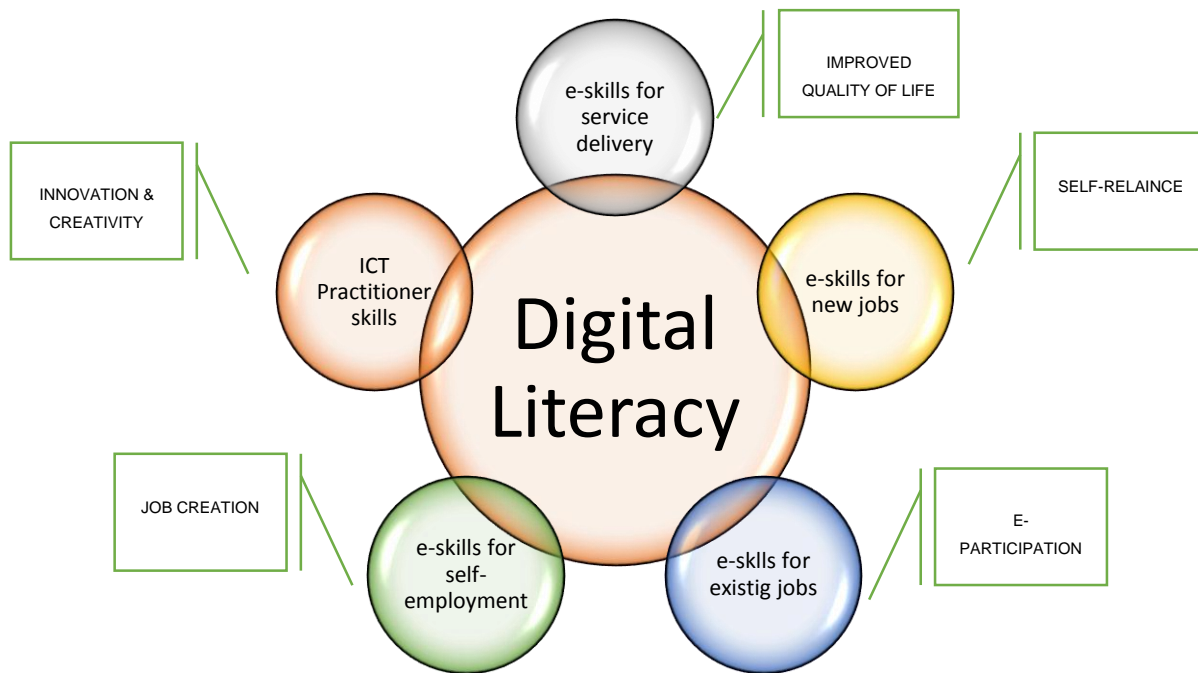
Figure 3: The eSNCCF for South Africa (Source: NeSPA, 2012)

Hence, the eSNCCF factors and their associated impact areas (see Table 4 below) can be summarized as follows:

Table 4: The eSNCCF factors and associated Impact Areas (Source: NeSPA, 2012)

eSNCCF factors	Impact areas
Service delivery	Improved quality of life
New jobs	Self-reliance
Existing jobs	E-participation
Self-employment	Job creation
ICT practitioner skills	Innovation and creativity

Figure 3 provides an overview of the eSNCCF for for South Africa. According (NeSPA, 2012) the framework is geared towards moving South Africa to the Knowledge Society or Information Society goals. In addition, NeSPA advocates that e-literacy (i.e. the eSNCCF was created to address e-literacy) are needed by all citizens to develop their skills whether it be for existing jobs, in preparation for new jobs that may not yet exist; to become an ICT practitioner, to develop services for citizens and increase transparency, or to use ICTs for greater efficiency in the workplace. The overall impact of these new skills will be to improve

e-participation, support innovation and creativity, empower citizens, lead to job creation and ultimately improve the quality of life overall in South Africa.

2.2.11 The e-Skills Framework and Taxonomy

The e-Skills Framework and Taxonomy cover four sets of e-skills that contribute to e-literacy (iNeSI, 2014). The four e-skills set are:

(1) **Sector user skills:** (i) "the skills for work in a specific sector or type of organisation"; (ii) the skills of "general nature (e.g. a general e-skills set for business), or a specific skills set applicable to that sector (e.g. the graphics industry, or health), or a combination of both"; and specific skills for each sector.

(2) **ICT practitioner skills:** "the skills or capabilities required for: (i) researching, developing and designing, managing; (ii) the producing, consulting, marketing and selling; (iii) the integrating, installing and administrating; and (iv) maintaining, supporting and service of ICT systems."

(3) **E-Leadership skills:** "a portfolio of skills, representing expertise in both using ICT systems and leading organisations (or divisions/functions in an organisation), as appropriate to the specific context."

(4) **E-Literacy:** "the ability of individuals to use digital tools and facilities to perform tasks, to solve problems, to communicate, to manage information, to collaborate, to create and share content and to build knowledge, in all areas of everyday life and work."

This study was mainly focused on e-literacy, which used synonymously with digital literacy, which are skills necessary for "*Being digital literate also means using technology for information and knowledge in order to access, retrieve, store, organise, manage, synthesise, integrate, present, share, exchange and communicate in multiple formats, either textual or multimedia*" (Romani, 2009). Moreover, *"digital literacy is underpinned by the basic technical use of computers and the internet" (Ala-Mutka, 2011, p. 31).*

"Digital literacy encompasses computer hardware, software (particularly those used most frequently by businesses), the Internet, cell phones, PDAs, and other digital devices. A person using these skills to interact with society may be called a digital citizen" [5]

2.2.12 Providing e-literacy

The summary of the three key initiatives for addressing e-literacy is provided in Table 11 below in order to provide an understanding of the typology of frameworks. The main objective, purpose and the target group are briefly highlighted and provided in Table 11 below.

Table 5: Digital literacy frameworks (Source: Ferrari, 2012)

Name	Provider	Type of program	Target group	Focus
1. **DigiEuLit**	EC eLearning Initiative	Certification	European citizens	Digital literacy
2. **IC3 Internet and Computer Core Certification**	Certiport Inc., US Private Company	Certification	Students and job seekers	Digital literacy, practical digital skills for employment
3. **ECDL**	ECDL Foundation	Certification	All citizens	Digital literacy, computer skills

According to (Ferrrari, 2012, p. 39), the DigLit framework provide a *"hierarchical three step approach (know>use>create) builds on the hypothesis that knowledge is a pre-requisite for use and that transformation is the highest achievable cognitive output"*. Further, (Ferrari, 2012) point out that the framework has not been implemented as yet.

The European Computer Drivers Licence (ECDL) also known as International Computer Drivers Licence (ICDL) outside of Europe is international recognised standard that offer end-user computer skills certification (Itech-Research, 2003). ICDL offer various certification such as ICDL Core; equiskills; e-Citizen; ICDL for Computer Aided Design (CAD); IT Security; e-Learner; Image Editing; Web Editing; and Project Planning (Itech-Research, 2003; ICDL, 2013). The ICDL products and modules are provided in Table 12 below.

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[5] https://cleach.wordpress.com/what-is-digital-literacy/

Table 6: The ICDL course and modules (Source: ICDL, 2012)

ICDL Product	Modules
Equiskills	Introduction to computers, e-mails and Internet
E-Citizen	Focused on the Internet skills for effectively communicate, information retrieval and access to product and services
ICDL Core	(1) Basic Concepts of IT; (2) Using a Computer and Managing Files; (3) Word Processing; (4) Spreadsheets; (5) Database; (6) Presentation; and (7) Information and Communication
E-Learner	IT Basics, Files & Folders, Drawing, Word Processing, Spreadsheets, Presentations, and Web Browsing & Email; Online Essentials; Online collaboration
ICDL for CAD	CAD, Web Editing, Image Editing, IT Security, Project Planning

ESI (2013), also suggest various vendor or Free Open-Source Software (FOSS) courses such as CTT+, I-Cando, and e-literacy Coursed (NC/S. Gauteng) amongst others in order to address e-literacy. In addition, ESI (2013) argue that both ICT and non-ICT students from TVET College require technology literacy (see Figure 4 below). The current study is focusing on non-ICT students from electrical students at N6 level. Non-ICT students are typical of *'basic users'* or *'ICT user skills'* as mentioned by the OECD and e-Skills Forum respectively.
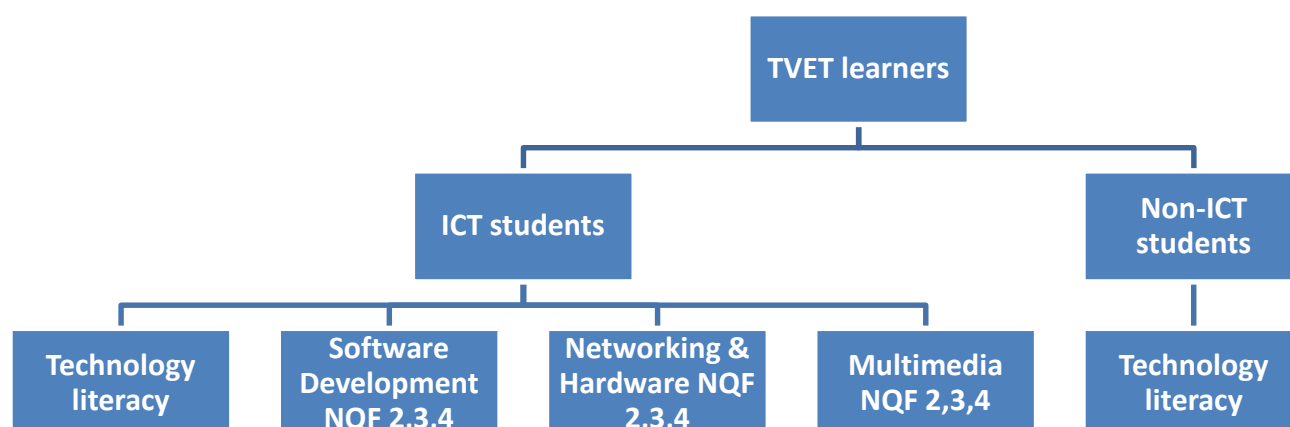
Figure 4: Differentiated e-skills needed for TVET College Students (Source: Adapted from ESI, 2013)

This study will mainly use ICDL as an example as this is an international recognised certification program that is aimed at all citizens and cater for different from lower to high level (see Table 6 above). In addition, to some extent, electrical students, who are the subject of this study, may be viewed as non-ICT students (see Figure 4 above). Similarly, (Garrido et al., 2012) refer to two training strategies, vertical and horizontal training. Vertical training that is aimed at IT workers and horizontal training that is aimed at general workers (i.e. non-ICT workers) such as electricians, plumbers, etc. Horizontal training is the focus of the current study as e-literacy skills of electrical students (i.e. electrical N6) is being investigated.

The main modules are ICDL core, which are courses geared towards addressing e-literacy (also known as "digital literacy") and advanced skills such as ICT practitioner skills. Digital literacy is viewed a "being able to search and retrieve information to navigate and communicate on-line, to participate in digital and virtual communities" (Mitrovic, 2010:2).

2.3   State of e-literacy in South Africa

There are various initiatives that are geared towards addressing e-literacy skills in South Africa. Some of these initiatives include the National Development Plan (NDP), the National e-Skills Plan of Action (NeSPA), and SA Connect, amongst others. These initiatives provide a framework for promoting employability by taking advantage of the opportunities that are offered by Information and Communication Technologies (ICTs).

2.3.1 ICT skills shortage in South Africa

The debate around unemployment is about skills shortage, skills gap and skills mismatch. Causes of graduate unemployment according to (SAGDA/BASE, 2012) include, amongst others: (i) skills mismatch; (ii) lack of career planning, guidance and management from high school; (iii) poor mathematics and science education from high school; lack of employability skills, i.e. interview and job search skills; and minimum work experience.

According to (Daniels, 2007) there is a difference between skills, scarce skills and critical skills as follows:

- **Skills:** refer to both qualifications and experience;

- **Scarce skills:** refers to occupations which there is *"a scarcity of qualified and experienced people, currently or anticipate in the future, either (a) because such skilled people are not available, or (b) because they are available but do not meet employment criteria"* (Daniels, 2007) citing Foodbev SETA;

- **Critical skills:** refers to specific skills within an occupation. In the South African environment, there are two groups of critical skills: (1) generic skills, associated with problem solving and learning to learn; language; literacy and numeracy; skills; and working in teams; (2) particular occupational skills necessary for performance within that occupation. The particular occupational skills are the one impacted by technological evolution.

There are various challenges that have been highlighted in measuring the ICT skills shortage in South Africa. Lotriet, Mathee, & Alexander (2010) examined the existing ICT skills shortage reports in South Africa. The study collected documents such as news reports, official reports and international reports (i.e. making reference to South Africa). The study discovered that many South African departments are interested in ICT skills development, hence, several reports. However, the reports have a lot of methodological challenges such as:

- **Absence of critical research elements:** absence of focus; limited to surveys; exclusion of actual practitioners; ICT dropouts and small companies and informal sector; vague data sources; and the use of secondary data.

- **Political structure of the ICT landscape:** ISETT SETA does not comprise all organisations in the ICT sector; [6]

- **Skills classification difficulties:** the (International Standard Industrial Classification) ISIC and (North American Industry Classification System) NAICS classification systems are not keeping up with the pace of the ICT industry;

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[6] ISETT (Information Systems, Electronics and Telecommunications Technologies) SETA (Sector Education and Training Authority)

- **Higher Education MIS data:** enrolments and qualified cannot be directly compared *"as enrolled includes students over a number of years, while qualified relates to only to students in a finally year"*.

The information on the demand of ICT skills is partly provided by ISETT (Information Systems, Electronics and Telecommunications Technologies) SETA (Sector Education and Training Authority) and the banking industry. According (Merkofer & Murphy, 2014) there is a demand of people with general skills and those with advanced ICT practitioner skills. ICT practitioner skills are the capabilities required to conduct research, system development and designing, working with ICT systems, amongst others (European e-Skills Forum, 2004).

The top twelve scarce skills (see Table 2 below) in the ICT sector range from ICT project manager to software developers (MICTSETA, 2012).

Table 7: Demand of top twelve skills in the ICT sector (MICT-SETA, 2012)

OFO Code	Occupation Description	Total Scarce Skills, 2012 - 2015
251201	Software Developer	493
251203	Developer Programmer	451
252301	Computer Network and Systems Engineer	402
251101	ICT Systems Analyst	351
351301	Computer Network Technician	220
422206	Call or Contact Centre Agent	220
351201	ICT Communications Assistant	186
251901	Quality Assurance Analyst (Computers)	152
252101	Database Designer and Administrator	76
251202	Programmer Analyst	72
242101	Management Consultant	67
133102	ICT Project Manager	63

In addition, ICT practitioner skills were discovered to be scarce with most companies finding it difficulty recruit candidates with these skills. As stated earlier in chapter one, the (ILO, 2013) is worried about the skills mismatch in Sub-Saharan Africa, where there is high rate of unemployment amongst the low skilled . While the (ILO, 2013) reported the youth unemployment rate to be 12.6 percent around the world, South Africa's unemployment amongst the youth aged between 15-34 has increased from 32.7 percent to 36.1 percent between 2008 and 2014 respectively (Statssa, 2014).

According to (SAGDA/BASE, 2012), the following happens to students after graduation: (i) some students gain formal employment (7.9 percent), (ii) others endeavor on entrepreneurship (14.9 percent) and the majority become unemployed (30 percent) (SAGDA/BASE, 2012).   There are those who join internship programs (26.7 percent), volunteer (12.5 percent); stay home/family (3.6 percent); travel abroad (2 percent); further study - post graduate (5.9 percent) and further study – new qualification (9 percent). Judging from the above, the statistics is worrying as the objective of education is to increase the prospects of formal employment, and lately, self-employment and job mobility.

Regarding supply, education is viewed as crucial to the supply of ICT skills. Various studies point mismatch between the requirements of business and the skills of graduates from tertiary education (Merkofer & Murphy, 2014). In addition, (Kraak, 2004) cited in (Daniels, 2007) argue that while high skills associated with advanced qualifications are important, low skilled strategies should be promoted as they are key in addressing unemployment. This study is focused on ICT User skills of TVET students precisely to investigate the role of these skills in promoting employability. ICT user skills (also see section 2.5.7 below) *are those capabilities that enable an individual to use ICT systems and devices effectively (European e-Skills Forum, 2004)*
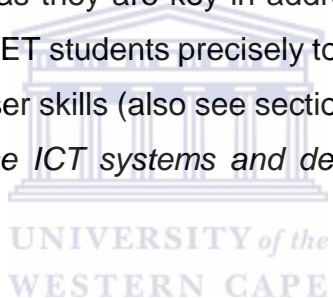
2.3.2   The State of TVET College sector in South Africa

The education system in South Africa is broadly categorised into three bands through the National Qualification Framework (NQF): (i) the General and Further Education and Training Qualification Sub-framework; (ii) the Higher Education Qualifications Sub-framework; and (iii) the Trades and Occupations Qualification Sub-framework. This study focuses on the public TVET colleges that fall under the general and further education and training qualification sub-framework. The snapshot of the public TVET sector in South Africa is provided in Table 8 below.

Table 8: Public TVET sector in South Africa (Source: DHET, 2013)

Indicator	Description
Number	50 public TVET colleges; 12 public TVET colleges in 2015 (envisaged)

Enrolments	345 566 in 2010 to estimated 650 000 in 2013; Expected to increase from 1 million by 2015 to 2.5 million by 2030
Bursary allocation	R300 million in 2010 to R1.988 billion in 2013

There are currently 50 public TVET colleges with enrolments increasing from 345 566 in 2010 to about 650 000 in 2013 (DHET, 2013). An additional 12 colleges are envisaged in 2015, with enrolments projected to increase from 1 million in 2015 to 2.5 million in 2030 (NDP, 2012). While the TVET sector is projected to grow in the nearby future, recent studies reveal that the bulk of graduates that are unemployed are from both public and private TVET institutions (60.3 percent), followed by those from universities of technologies (16.2 percent), then by those who attended learnerships (13.8 percent) and lastly, the graduates from universities (9.7 percent) (SAGDA/BASE, 2012).

Unemployment in South Africa is caused by a plethora of problems. According the (DoC, 2015)[7] some of the possible causes of unemployment in South Africa include: (i) the legacy of apartheid; (ii) labour demad – supply mismatch; (iii) the effects of the 2008/2009 global recession; (iv) the role of trade union federations in government; and (v) the general lack of interest for entrepreneurship. Further, SAGDA/Base (2012) add the following causes of graduate unemployment (i) skills mismatch; (ii) lack of career planning, guidance and management from high school; (iii) poor math and science education from high school; (iv) lack of employment attraction skills (i.e. interview and job search skills); and (v) minimum exposure to work experience. Moreover, the South Africa Report (2014) provides six reasons of that may possible contribute to the high unemployment amongst the youth in South Africa: (i) the socio-economic condition of the youth from underprivileged areas with poor schools; (ii) high expectations in terms in a form of high salaries and job security; (iii) low economic growth in the formal sector; (iv) the weak education system; (v) weak youth policies; and (vi) long unemployment period that discourages employment search.

In addition, studies reveal that the bulk of graduates that are unemployed are from both and private TVET institutions (60.3 percent), followed by those from universities of

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[7] http://www.doc.gov.za/content/resourcecentre/newsle7tters/insight/issue13

technologies (16.2 percent), then by those who attended learnerships (13.8 percent) and lastly, the graduates from universities (9.7 percent) (SAGDA/BASE, 2012).

South Africa's weak education system seems to be the main contributor to the high unemployment rate. Spaull (2013) argue that regardless of subject or grade, the vast majority of South African pupils perform considerably below the curriculum, unable to even acquire functional numeracy and literacy skills. Spaull further point out that approximately 25 percent of schools in South Africa are mostly functional and are not in a position to impart the fundamental knowledge and skills they are supposed to be acquiring from school. In addition, some of the contributors to the weak education include "least-knowledgeable primary school mathematics teachers in sub-Saharan Africa" (Spaull, 2013).

Sunday Independent writes the following on the state TVET sector:

> *Only three out of ten (10) students who sit for the Further Education and Training College exams pass, with more than half dropping out of the system along the way. Incompetent and unqualified lecturers and late delivery of text books are some of the reasons cited for the poor results, which are worrying politicians. MPs have called on all involved to try and save the poorly performing colleges, which are mostly seen as the poor cousins of universities, or a dumping ground for students who couldn't make it to varsity. But the Department of Higher Education and Training has a policy of not releasing FET results, which means that the success rate of students remains a matter of speculation. In February, the Federation of Unions of SA (Fedusa) called for the public release of FET results, but it never got a response to its call, purportedly because the authorities are "too embarrassed to release the results because the pass rate is very low." The Department maintains that because exams are conducted seven times a year, it's not possible to publicly release results in the same way as for matriculation. In terms of the National Development Plan (NDP), it is hoped to attract 4m students to FETs by 2030. About 500,000 were enrolled this year[8].*

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8   http://www.salabournews.co.za/index.php/owner/15156-only-three-out-of-10-students-at-fet-colleges-pass-exams-and-over-half-drop-out.html [23 March 2014]

This article points to some of challenges that TVET colleges are facing – low pass rates, and dropout rates.

McGrath et al. (2010) carried a comparative study on the state of employability in the TVET college sector in England and South Africa. Literature review was carried out in three TVET colleges, two from South Africa and one from the United Kingdom (UK). The review was carried out internally and externally, and the lessons learned were categorised under five heading: (i) students, (ii) staff (iii) institutional culture, (iv) employers, and (v) policy. The study revealed the following:

(i) Students

In all three colleges from South Africa and England, the study discovered that student's age ranges from 14 year olds to those that are employed. The study focused on those that are not yet employed. The following are some of the learner's perspectives on employability that are summarised in the Table 9 below, which were categorised according to character; general skills, job seeking skills; qualification; occupation and; social skills.

Table 9: Learners perspective on employability (Source: Adapted from McGrath et al., 2010)

Character	General Skills	Job Seeking Skills	Qualification	Occupation	Social Skills
Positive attitude	Teamwork	Internet	Matric/A-level	Specialising in an area	Fitting in
Respect	Communication	Newspaper	College qualification	Ability to adapt	Willing to Travel
Self-discipline	Literacy	Word of Mouth	Good pass	Electrical, motor and diesel	Connections
Communication skills	Physical strength	Knowing where to look	Further studies	CNC	Accepting authority
Honesty	Writing skills	CV skills	Practical experience		Willing to relocate

It is important to note that under job seeking skills, Internet skills are rated high (see Table 9 above).

(ii) Staff

The staff was gauged on the extent of facilitating access and model behavior through levels (i.e. epistemological and rational). Epistemological access refers those teachers who facilitated students employability prospects were recognised as good teachers with the recognition that teacher should be qualified. Rational access refers to social capital or network, which is viewed to be a major barrier. Modeling the employer or modeling the employee through dress code, occupational health observation and safety issues, amongst others.

(ii) Institutional culture

The institutional cultural issues are summarised in Table 5 below.

Table 10: Institutional cultural issues (Source: McGrath et al., 2010)

Issue	Explanation
College spaces	Messages that the college buildings send about the value and college values
Distance between colleges	The blurring of college boundaries
Working within the TVET Band	Academic-vocational boundary
Employer engagement	Breaking the boundaries between the world of learning and work, which is so far, less successful
Simulating work experience	Training with production, short-term placements and volunteering (including workplace visits) as well as mimicking the industry (i.e. job cards)
Entrepreneurial college	Equating employability with entrepreneurship, with employable institutions showing a tendency of being entrepreneurial or acting business-like
Specialist vs. generalist colleges	Public TVET colleges are viewed and there is a question on how generalist the colleges should be, and specialisation being viewed as employability enhancer
The data problem	Lack of decent data on student destinations (only further courses and not on gaining or maintaining employment
Going beyond the ordinary	Employability colleges were viewed as the result of leaders and staff that go beyond the required level expectation to engage with industry and with learners

(iii) Employers

Employers are more concerned with specific work skills with construction national curriculum and vocation (NCV) programmes being supported by some employers to promote long-term employability of college students while complaining the fact that NCV students will require two years of work experience after graduation (i.e. before construction industry trade test).

- **College engagement with employers:** is viewed as a major challenge for TVET colleges with strategies such as appointment of placement officers to secure employment being adopted.

- **Employer engagement with colleges:** is viewed as sporadic in-terms of industry participation as the practical component of the training proved to be difficult, particularly for the NCV students in Civil Engineering and Building Construction as "health insurance cover cannot be extended to student placements in the workplace as this applies to full-time employees".

- **The colleges as an employer:** is viewed as less likely to employ college graduates. Instead, full-time professionals who are not necessarily college graduates ran the businesses. Colleges were more likely to employ their former graduates as lecturers or as support staff.

- **State as an employer:** is viewed as more prevalent in South Africa with contracts to train existing defence force staff.

(iv) Policy

Policy is geared towards transformation of the college sector, with mergers mandated in South Africa, new funding models, governance structures and curricular offerings emanate from national policy decisions.

2.3.3 E-literacy in TVET Colleges

According to (Haywood, Haywood, & Macleod, 2006) *"e-literacies for employability will be particularly focused on: ICT basics (productivity tools), information management (search, retrieval, storage), problem-solving using these e-literacies, digital communications, digital presentations, data handling and assessment of quality of information".*

It is evident from Table 10 in section 2.3.2 above that job seeking skills include Internet, which tops as one of the aspects that are perceived to promote employability by most learners. Other aspects that key in job seeking include newspaper; word of mouth; knowing where to look; and curriculum vitae preparation skills. According to Poole & Zahn (1993) highlighted some of the job-seeking aspects in section include, amongst others: (i) job applications and resumes preparation; (ii) conducting career/job search; (iii) developing job application letters; and (iv) demonstration of effective interviewing skills.

According to the (Krull & Bialobrzeska, 2012) ICTs in the TVET sector are affect mainly three areas: (i) administration – records, finance and management; (ii) teaching – Virtual Learning Environments (VLEs), eContent, eAssessment and support; and (iii) communication – Communication tools, social networking.

Various challenges faced by TVET colleges are presented in Table 11 below.

Table 11: Challenges faced by TVET colleges (Source: Adapted from Krull & Bialobrzeska, 2012)

Issue	Explanation
Environment	Infrastructure (i.e. electricity and access to resources); sustainability (i.e. lack of framework for harnessing the potential of ICTs to address the countries developmental challenges; implementation policy (i.e. lack of overarching policy on ICTs in education)
Institutions	ICT integration; major financial investment needed; high cost of acquiring and maintaining ICTs; high cost of content; consistency across campuses and colleges
People	ICT literacy of lecturers and readiness; extra effort and time involved in using technologies; lack of readiness of students to use technologies; shortage of people with technical skills to maintain ICT systems
Technology	Reliability and Security; system/Data Integration; inexperience in procuring appropriate ICT; limited bandwidth
Teaching, learning and student support	Student Readiness; constrained Staff Capacity; quality resources; programme Delivery

There are various challenges that are faced by TVET colleges in South Africa. According to the (Krull & Bialobrzeska, 2012) the challenges that are faced by TVET colleges can be categorized as follows: (i) environment, (ii) institution, (iii) people, (iv) technology, and (v) teaching, learning and student support.

2.3.4 Policy and Legal Framework for Addressing e-Literacy in South Africa

The e-education policy for South Africa seeks to address e-literacy in the education sector. The goal of the e-Education White Paper of 2004 is that to ensure that:

"Every South African manager, teacher and learner in the general and further education and training bands will be ICT capable (that is, use ICTs confidently and creatively to help develop the skills and knowledge they need as lifelong learners to achieve personal goals and be full participants in the global community) by 2013" (DoE, 2004).

It is apparent this has not been achieved. This is confirmed by Statistics South Africa's (Stassa)[9] general household survey for 2012 that was published on 22 August 2013 that indicated the places where the largest percentages of South Africans tend to use the Internet include: (i) at work (8.9 percent); (ii) within the household/at home (9.8 percent); and (iii) at school/university/college (5.4 percent).
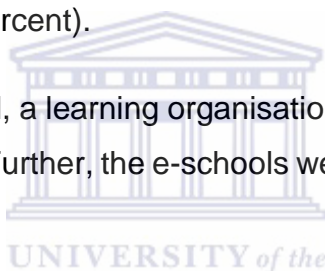
To achieve the e-Education goal, a learning organisation termed e-school was envisaged for both GET and FET institutions. Further, the e-schools were supposed to function across three dimensions:

- **Operational dimension:** skills that are necessary for the use of new ICTs;

- **Cultural dimension:** culture or mindset that supports the practice of using ICTs for educational purposes, regardless of one's level of expertise;

- **Critical dimension:** teachers and learners to step outside the cultural and challenge assumptions that are embedded in the success stories about ICTs inside and outside of GET and FET institutions.

The computer penetration and use in each province is provided in Table 12 below.

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[9] http://mybroadband.co.za/news/internet/85165-south-africas-internet-access-stats-revealed.html

Table 12: Computer penetration in South Africa (Source: Isaacs, 2007)

Province	Total number of schools	Schools with Computers (%)	Schools with Computers for Teaching and Learning (%)
Eastern Cape	6,239	23.0	7.8
Free State	1,842	77.0	25.9
Gauteng	1,897	94.5	78.8
Kwa-Zulu Natal	5,653	43.6	12.0
Mpumalanga	1,863	52.9	16.3
Northern Cape	422	91.0	60.4
Limpopo	4,187	41.8	8.7
North West	2,025	67.6	29.7
Western Cape	1,454	97.0	76.6
National	25,582	50.9	22.6

The Eastern Cape had fewer schools with computers (23 percent) and lowest computers for teaching and learning (7.8 percent). On the other hand, Gauteng had the highest schools with computers (94.5 percent) and highest computers for teaching and learning (78.8 percent).

Recently, Statistics South Africa published the General Household Survey Report[10] about South Africa in 2013 about South African households, including a section about Internet and telecommunications. The key findings of the survey indicate the following:

- That **40.9%** of South African households have at least one member who either used the Internet at home or had access to it elsewhere – which on the surface sounds like a promising number – until you find out that only **10%** of households had Internet access at home.

- That means that **30%** of the people who go online do it either at work (16%), school/university (5.1%) or at an Internet cafe (9.6%).

- Access to the Internet at home was highest among households in the Western Cape (21.1%) and Gauteng (15.7%) and the lowest in the North West (4.5%) and Limpopo (3%).

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[10] https://www.webafrica.co.za/blog/general/latest-statistics-south-african-internet-penetration/
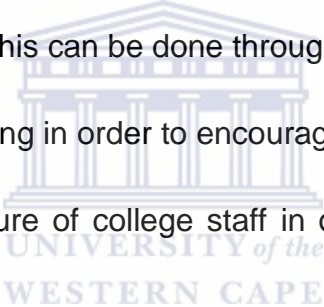
- Predictable, there are far more households in metropolitan areas that have Internet access at home (16,4%), It is evident that **mobile phones offer more access** for rural households – 17.9% of rural households go online using mobile devices, with a 30.8% total of South African households using mobile devices to access the Internet.

- *White Paper for Post-School Education and Training 2014*

The White Paper highlights various initiatives in order to improve employability in TVET colleges. The initiatives, amongst others, are college relationships with employers and students support.

- **College relationship with employers:** can be established through linkages with 'employers in small businesses' as well as with public sector institutions such as municipalities, clinics, schools and police.

According to the (DHET, 2013) this can be done through:

- o Work integrated learning in order to encourage work placement after studies;

- o Frequent work exposure of college staff in order to be up to date with industry developments;

- o Solicit advise from employers on college curriculum;

- o Provision of a platform whereby experts from industry could teach at colleges on part-time or occasional basis;

- o Encourage employers to donate equipment to colleges.

Student support: through integration of career counselling into post-school education as well provision of career guidance in order for the college students to make informed decision on correct learning pathways and career decisions.

2.4   Understanding employability conceptual landscape

2.4.1 Defining employability

In order to understand the role of e-literacy in promoting employability, the concept of employability should be unpacked. Employability is more than just getting a job. According to (Dacre Pool & Sewell, 2007) *"Employability is having a set of skills, knowledge, understanding and personal attributes that make a person more likely to choose and secure occupations in which they can be satisfied and successful"*. More recently, (Garrido et al., 2012) add that employability refers to a variety of *"factors that enable people to progress toward or find employment, to remain employed, and/or to advance in the workplace"*.

2.4.2 Employability models

The *'Key to Employability'* (CareerEDGE) Model outlines five aspects that need to be dealt with in order to improve graduate employability (Dacre Pool & Sewell, 2007). The CareerEDGE acronym stands for the following: Career Development; E-Experience (Work & Life); D-Degree Subject Knowledge, Understanding & Skills; G-Generic Skills; and E-Emotional Intelligence. The five aspects are briefly explained below.

- **Career Development:** Help and guidance offered to graduates on how best to explain to potential employers about their achievements and how they will be of benefit to them, in application forms, CVs and interview activities;

- **Experience (Work and Life):** This is the experience in the world of work to develop key competences and skills and enhance chances of employability;

- **Degree Subject Knowledge:** Subject understanding which is referred as a key outcome of education;

- **Generic Skills:** The study of a specific discipline in depth, to gain a degree, gets a higher qualification and thus gets a good or better job. High level and transferable key skills such as the ability to work with others in a team, communication skills, listening & questioning skills, written communication …

- **Emotional Intelligence:** Is the ability to understand to control ones feelings and be able to react in an appropriate way under any provocative situation without getting angry.

The model view career guidance as essential for students in order them "to identify a market in which to advertise their newly developed skills" Foster cited in (Dacre Pool & Sewell, 2007).

The study by (McQuaid & Lindsay, 2005) explored the concept of employability by analysing the present and past use of the term. This was done by tracing the evolution of the concept, discussed its role in the present labour environment and training approaches and seeks to identify a way defining employability for labour market policy formulation. The study proposed *"a broad employability framework"* employability framework (see Table 1 below) that covers three main interrelated employability components: individual factors, personal circumstances and external factors.

It is important to note that "job seeking skills" is listed under individual factors, also *"Basic ICT Skills"* are listed under individual factors; sub category termed *"key transferable skills" (see Table 1 below)*
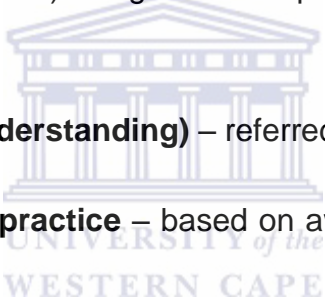
Table 13: An employability framework (Source: Adapted from McQuaid & Lindsay, 2005)

Individual Factors	Personal Circumstances	External Factors
1. Employability skills and attributes • Key transferable skills – Basic ICT skills, reasoning, problem solving, etc.	1. Household circumstances • Direct caring • Other family and caring responsibilities • Other household circumstances	1. Demand factors • Labour market factors • Macroeconomic factors • Vacancy characteristics • Recruitment factors
2 Demographic characteristics • Age, gender, etc.	2. Work culture	2. Enabling support factors • Employment policy and other enabling policy factors
3. Health and wellbeing • Health and disability	3. Access to resources • Access to transport, financial capital, social capital	
4. Job seeking [i.e. ability to search for information (including ICT); awareness and effective use of informal social networks; ability to complete CVs/application forms]		
5. Adaptability and mobility		

The Council for Industry and Higher Education (CIHE) in the UK (Haywood et al., 2006) mention the following skills, amongst others, that graduates should possess:

- **Cognitive skills** – *'the ability to identify, analyse and solve problems, work with information and handle a mass diverse data …'*

- **Generic competences** – *'high level and transferable key skills such as the ability to work with others in a team, communication skills, listening & questioning skills, written communication … '*

- **Technical ability** – *'having the knowledge and experience of working with relevant modern technology. The ability to apply and exploit information technology.'*

According to (Yorke & Knight, 2006) citing the Skills plus project, four broad themes play a role on employability:

- **Understanding (subject understanding)** – referred as a key outcome of education;

- **Skills, particularly, skillful practice** – based on awareness of, and responsiveness to context;

- **Efficacy beliefs, student's self-theories and personal qualities** – student's malleable beliefs about self. Malleable self – self-theories advocate the ability to see tasks as opportunities for learning rather than performance-oriented to demonstrate competence.

- **Metacognition, encompassing self-awareness regarding the student's learning, and the capacity to reflect on, in and for action** – learning how to learn; reflection in, on and for practice; and a capacity for self-regulation.

Further, Yorke & Knight, (2006) argue that *"good curriculum design will continue to help learners to construct understandings of the subject matter and maintain the more recent interest in developing a number of skillful practices or skills. However, they will also show care for the development of positive efficacy beliefs, metacognition and other complex achievements that employer's value"*. In addition (Yorke & Knight, 2006) provide a list of 39 (i.e. computer literacy is listed item 23 under process skills) aspects of employability from

the Skills plus, arguing that the USEM model (see appendix H), although it is useful, it is too *"course-grained for analytic work on curricula"*.

According to (Poole & Zahn, 1993) the following are nine employability skills: responsibility; job-seeking and job-getting skills; reasoning and problem solving; health and safety habits; and personal attributes. The competencies associated with job search and acquisition skills (see appendix G for other employability skills and associated competencies) will be provided and are as follows: (i) being conscious of one's creative potential; (ii) utilization of ingenious ability in job-related situations; (iii) ability to organize resumes and job applications ; (iv) conduct career/job search; (v) develop job application letters; (vi) exhibit efficient interviewing skills; and (vii) demonstrate an understanding of benefits and payroll processes.

2.4.3 Types of curricula

There are a number of ways of defining curriculum. According to Ellis in (Glatthorn et al., 2009) curriculum can be defined as prescriptive, descriptive or the combination. The prescriptive definition outlines what is supposed to happen*, and more likely than "take the form of a plan, and intended program, or some kind of expert opinion of what needs to take place in the course of study"* (Glatthorn et al., 2009). On the other hand, the descriptive curriculum does *"not merely in terms of how things ought to be… but how things are in real classrooms"* (Glatthorn et al., 2009).

According to (Glatthorn et al., 2009) the curriculum is a document that is used to for planning what must be thought in a school. Furthermore, it can be referred to be a blueprint designed to guide schools

Glatthorn (2000) identify seven types of curricula: recommended; written, taught; supported; assessed; learned; and hidden. Further, (Glatthorn, 2000) argues that the hidden curriculum has a huge impact on students learning. The four elements of the hidden curriculum include:

- **Time allocation –** this is related to the time allocated to health and physical in order to allow enough time to influence the behavior of students;

- **Space allocation –** this is related to the room the teacher have for teaching and planning;

- **Use of discretional funds –** this is in connection with the decision making on the usage

of funds;

- **Student discipline –** this related to maintaining discipline and adherence to ethics;

- **Physical appearance –** this is related to the appearance of the institution's building and to reflect that the institution is taken care of and is decorated with student artwork;

- **Student activities program –** this has to do with the institutions' program if it reflects and responds to student diversity.

    .

- **Communication –** This is related to the messages being communicated over the public address system and if they are positive, and the frequency of student voices being heard;

- **Power –** This is in connection with power teachers in the decision-making process and the power of students over the things that matter.

It appears that even though different goals and ambitions are set by different schools the results on innovation are the same for learning environment of students and outcomes for teachers and students. Voogt & Pelgrum (2005) examined curriculum changes in ICT-supported educational practices from 28 countries. The selection of cases was conducted by an International Coordination Committee and reviewed by the National Research Coordinators. The initial coding resulted in two categories with two large indicators of ICT use within a curriculum. The first indicator assessed the nature of change within the curriculum whilst the second indicator appraised the quality of the value added due to the implementation of ICT within the curriculum. The study analysed in-depth 32 cases selected from 15 countries via an analytic framework (intended, implemented and attained curricula) with dimensions as follows:

- Intended curriculum – changes in the content and goals;

- Implemented curriculum – teacher and student activities, changes in curriculum organisation, and changes in assessment practices;

- Attained curriculum – teacher and student outcomes.

The study revealed that ICT skills were not taught in isolation, which complicates things (i.e. this supports the debate of offering "computer literacy" as a separate subject in the school curriculum).

"Despite the differences in the goals and ambitions that were pursued (intended curriculum) in the various schools, we also found out in general that the innovative practices were rather similar in the learning environment they provided to the students (implemented curriculum) and the outcomes realised for teachers and students (the attained curriculum)".

There is strong indication that the curriculum is strongly influenced by influential individuals and academic fashion. Gruba, Moffat, Søndergaard, & Zobel (2004) examined factors that influence curriculum change in computer science departments and schools. A survey was administered to a wide range of people in computing departments and schools in Australia. About 100 senior staff members in 31 institutions were e-mailed for the survey. About 31 individuals completed the survey from 19 institutions, spanning 75 aspects of curriculum change. The study revealed that the two most popular factors – academic merit and professional curricula were least important, as hypothised in the study. Other insignificant factors include university or government requirements and financial pressure (which was unexpected, although income from extra year and new markets was detected). The following were dominant factors: influential or outspoken individuals and academic fashion.

It seems that traditional face-to-face and practical training are most preferred forms of learning. Koivunen et al. (2008) examined an evidence-based approach to develop a curriculum to support the computer literacy skills of nurses. The study was carried out in four phases: first, exploration of different ways to learn how to use computers as well as possible barriers; second, a survey on computer skills of nurses ways conducted; third, literature review was conducted to discover the most suitable approach of teaching and learning computer skills; and lastly, the knowledge was incorporated to develop a curriculum on the use computer and internet. The study revealed three ways by which nurses use computers: (i) self-education; (ii) face-to-face; and (iii) learning in groups.

On self-education, the study revealed that respondents exposed to this mode of learning were often unsatisfied with the learning experience. Face-to-face (computer expert, tutor, colleague, friend, etc.) was positive, with most females indicating a gain from skilled colleague. Practical training under the guidance of a computer expert is reported to be most

effective. Barriers to computer use include learning abilities (course difficulty due to high learning goals and inexperience with computer use), circumstances (practicing without a computer, computer or application were out of order and no computer expert to fix the problem), emotions (negative feelings such as fear, horror and anxiety, particularly from females, with males – emotion of surprise and lack of skill), and attitudes (student-tutor relationship, self-education learning by trial and error is disappointing and frustrating, and older nurses have negative attitude towards information technology). The literature findings from ten studies revealed the following:

- Two studies described computer skills;

- One study measured the attitude of nurses towards IT system rollout process;

- One study assessed the effects of health professional's skills and lastly;

- One study examined the interventions included the use of computers.

Barnett et al. (2001) present three curricula models:

- The knowledge domain;

- The action domain and;

- The self-domain.

While the factors offered by (Gruba et al., 2004) are more concerned with the recommended and written curricula. The hidden curriculum factors, student factors and the three domains of the curriculum models focus on the student learning (Barnett et al., 2001; Gruba et al., 2004). Further, (Barnett et al., 2001) view science and technology as more inclined towards the Knowledge Domain; the arts and humanities more inclined towards the Self Domain; and the professional subjects have more integration of the three domains (i.e. knowledge, action and self domains).

2.4.4 Linking Employability to ICT and e-Literacy

Employability concepts such as career development; experience; degree of subject knowledge, understanding and skills; generic skills; and emotional intelligence are deemed

crucial and are captured well by the key to employability model (Dacre Pool & Sewell, 2007). Moreover, ICT skills include 'the ability to apply and exploit modern technology' (Haywood et al., 2006).

It is thus crucial to understand the link between employability, ICT, e-literacy and curriculum. This will assist in understanding the how the ICT skills, particularly e-literacy related capabilities can be incorporated into the curriculum in order to promote employability. There are a number of studies currently around the world that paying a particular attention promoting employability as the shortage of ICT skills across sectors present opportunities. This review considers the significance of e-literacy in promoting employability from a technical and vocational education and training (TVET) sector.

2.4.4.1 *Employability and ICT*

There is a link between ICT skills and employability. From an employability point of view, ICT skills are seen as essential for one to be marketable in the competitive labour market (de Hoyos et al., 2013). Further, ICT skills are *"seen as gateway skills without which a person's likelihood of finding employment would significantly be reduced"* (de Hoyos et al., 2013).

The study by (Garrido et al., 2012) proposed an analytic framework for studying the relationship between ICT skills and employability. The framework was developed from empirical data gathered through interviews with non-governmental organisations (NGOs) conducting ICT and employment programmes across twenty-three countries. The framework incorporates *"three levels of analysis to identify elements that can potentially link ICT skills and employability"* (Garrido et al., 2012). Level 1 deal with the characteristics of both ICT training and employment programmes by looking at the participants (target group), the content and the approach used in conducting training. Level 2 deal with the labour market stakeholder relationships (i.e. training providers, employers, government agencies and social organisations that participate in assisting individuals in becoming employable). Level 3 deal with individual factors (i.e. motivation and to follow employability pathways) and macro contextual factors (i.e. labour market and enabling factors that play a role in an individual's employability) that affect a person's employability.

Table 14 show various work scenarios work and ICTs.

Table 14: Scenarios of work, flexibility and ICTs (Source: Adapted from Rubery & Grimshaw, 2001)

Dimension of job quality	Optimistic
Employment opportunities	ICTs create work (develop new market and human capital
Employment relations	High-trust employment relations in new knowledge-based, learning society
Career opportunities	ICTs create opportunities for new flexible or boundary less careers
Job protection and collective bargaining	ICTs blur the boundary between employee and employer and thereby reduce the need for traditional employment protection/regulation
Pay	ICTs increase pay (augment skills)
Work intensity	ICTs reduce time taken to perform tasks and thereby provide opportunities to reduce work effort
Power and autonomy	ICTs lead to more individual flexibility and freedom of choice
Work/life balance	Work is integrated with and subordinated to daily life (work adjusted to needs of family and life)
Work relations	ICTs interconnect and stimulate individuals
Skills	ICTs upgrade skills and competence, multi-tasking, creativity
Job prospects	ICTs expand career opportunities (strengthen connectedness among organisations)

According the Word Bank Group, the technology advancement in the past two decades will have a major socioeconomic impact in the next decade. Employment trends indicate that the ICT sector has created millions of employment opportunities or "digital jobs" directly, for those employees involved in ICT production and for advanced users, who use specialized software and tools as a main element of their job, regardless of the sector (WorldBank, 2015).

Figure 5 below show the scale of possible impact of technology on work.
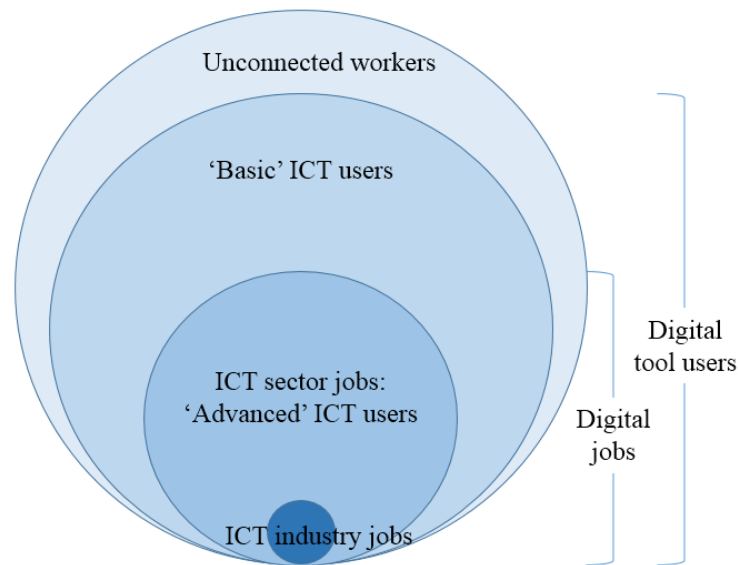
Figure 5: Relative scale of possible impact of technology on work (Source: Worldbank, 2015)

Figure 5 above indicate that there is a relative small share of ICT industry jobs, followed by the ICT sector job and the larger share of jobs require 'Basic ICT uses'. The unconnected workers have the largest share. Further, the Worldbank notes that digital jobs generate around two and four times the employment in other sectors of the economy and offering a relative higher than average wages.

2.4.4.2 Employability and e-literacy

There is gap between what universities performance in developing student's e-literacies, skills and attitudes and the perceptions of employers on student's skills. Haywood et al., (2006) examined what universities are doing in developing undergraduate e-literacies, skills and attitudes of their undergraduate students, employer's perspectives on graduate skills, and future directions for graduate e-literacy development. The study analysed data gathered from seven universities across Europe. The study revealed the following on e-literacy, skills and attitudes:

- Universities have pursued better ways to develop e-literacy skills for both the short-term and long-term.
- Some universities have adopted the accreditation approach with particular courses while other have adopted an embedded approach where e-skills development is integrated into

the curriculum and accredited as part of the degree award, with e-literacy skills development programmes seen as part of an employability agenda within the university together with academic skills agenda.

- Some universities keep track of student e-literacy and attitudes, as part of university research that drive strategy.

On the employer's perspectives, the study revealed that:

- Employers felt that graduates have reasonable ICT skills, although students lacked skills on presentation software, databases and information management, and with some gap between what graduates thought they could do and the reality once employed;

- Many employers assumed that graduates are competent on normal software such as Microsoft Office, e-mail, and the Internet, with variation amongst European countries, which point to the extent of ICT skills development embedment in education;

- Few employers' seek fluency beyond MS Office;

- Larger companies have intensive training programmes while small to medium enterprises (SMEs) have self-training (even big companies expected graduates to work out what they needed);

- Only a few employers required ICDL certification beyond the degree;

- Short-term (web publishing, mobile working, knowledge/information management, and security);

- Long-term (HTML or PDF, firewalls, virtual private networks, intranet/extranet/internet distinction, password renewal, digital signatures, etc.);

- Employment (short contract, freelance and self-employment options);

- Training (self-development, assessment of own needs and acquiring new skills or updating old ones).

There are various literacy terms associated with technology. Some of the literacies associated with technology provided by (Ala-Mutka, 2011) are:

- **Computer literacy/ICT literacy** – is about knowing and being able to use a compuetre and related software programmes;

- **Internet literacy/network literacy** – is the ability to use the networked resources, media and communications;

- **Information literacy** – relates to the identification, location, evaluation, and use of media materials.

- **Media literacy** – implies an ability to deal with information formats presented to the user;

- **Digital literacy** – is an inclusive term for all the concepts (see Figure 6 below) and connected to the ability to understand and use information in a variety of formats from a range of sources when made available via computers.

Figure 6 below provide the mapping of digital literacy with other related concepts.
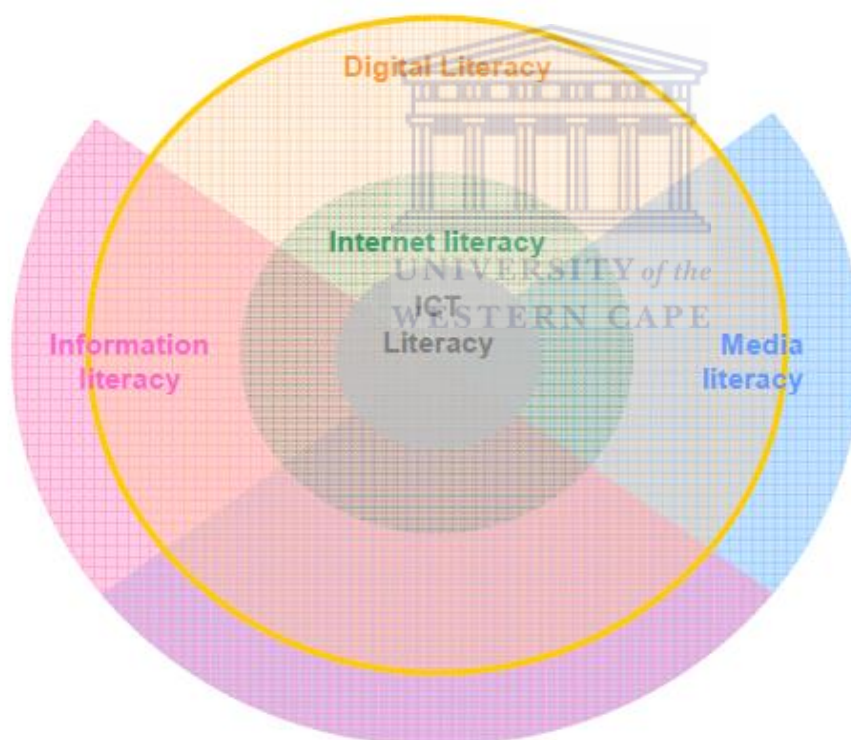

Figure 6: Mapping digital literacy together with the related main concepts (Source: Ala-Mutka, 2011)

The digital literacy is viewed to be the encompassing concept that entail making use of digital tools in a responsible and effecting manner for carrying out personal tasks and development while benefiting people associations Gilster (1997) cited in Ala-Mutka (2011). Information

literacy and media literacy span both digital and non-digital areas i.e. they cover aspects that are not in digital literacy. Further, information understanding and communication supports all the other literacies.

2.4.4.3   Employability and curriculum

There appears to be a strong link between curriculum and employability. Yorke (2004) discussed three research surveys conducted in the UK on student perceptions on their programmes in relation to the labour market. The study discussed the surveys with reference to the USEM account of employability. USEM is an acronym for Understanding (the subject and other aspects relevant to employability); Skill practices (display of theoretical and practical aptitude); Efficacy beliefs and Metacognition. In the first study, (Mason et al., 2003) examined the perceptions of 247 newly employed graduates and 201 of their line managers regarding the match between graduates achievements and line manager's expectations of them in the workplace. The second study by Skills plus project, which is reported in Yorke (2004) examined 97 recently employed graduates and 117 more senior colleagues. The third study, explored opinions of students regarding the first set of foundation degrees. The discussion started off by looking at the development of human capital, followed by employability, then student perception of the employability aspect of the curricula. The study by (Mason et al., 2003) demonstrated that the weight given to subject disciplines and traditional academic values and is probable typical of higher education, with line manager being satisfied with new recruits on information searching, problem solving and working independently. However, non-traditional academic expectations were less highly regarded with line managers pointing out to a number of aspects of employability that could be more developed than had been the case.

The curriculum guidelines developed by INSEAD for the European Commission to deal with e-Competence (Fonstad & Lanvin, 2010), which reflects in the following:

- Create an appetite for potential students by making curricula career-related (rather than job-specific), and future-oriented (i.e. linked to competitiveness and innovation)';

- Create relevance for industry and potential employers generally by engaging industry and practitioners in the design and delivery of curricula';

- Design curricula as a set of modules, making them easy to update and combine with other curricula, fostering multi-disciplinary approaches to e-competences;

- Design curricula in a way that allow graduates to maximize their ability to keep their knowledge up-to-date throughout their professional lives, combining them with relevant life-long learning opportunities in particular;

- Monitor the curricula design/delivery process with a view to constantly improve on them, while maintaining their consistency across European universities and education institutions (e.g. vis-à- vis the Bologna process);

- Ensure that curriculum delivery makes optimal use of the most advanced and relevant IT-based delivery tools, including those labelled 'web 2.0' for example.

2.5   Designing an employability framework: A conceptual proposal

There is recognition that e-skills are necessary for the information society, which is the "present time in history, where society regards information as a key product or resource, and where political decisions, economic development, the quality of life and social change are dependent on the use of information" (Machet, 2012, p. 4). According to (Mancinelli, 2007) mobile phones have moved many developing countries beyond access divide, to usage divide (i.e. access but non users) and quality of use divide (i.e. participation rates of those with access and are users).

In order to address e-skills shortage in South Africa, e-skilling the South African youth have been proposed by NeSPA. The technology ladder provides a stepwise progression in acquiring e-skills from basic to advanced skills.

As indicated section 2.2.1 above, the digital divide has changed in many countries from access divide to usage and quality of use divide (Mancinelli, 2007). The technology ladder (see Figure 7 below) provides a clear path in addressing the digital divide beyond access (Beyers & Koorbanally, 2010).
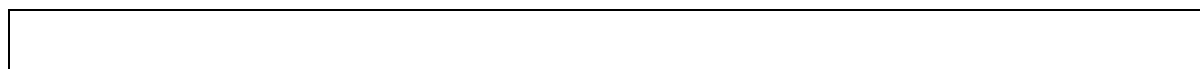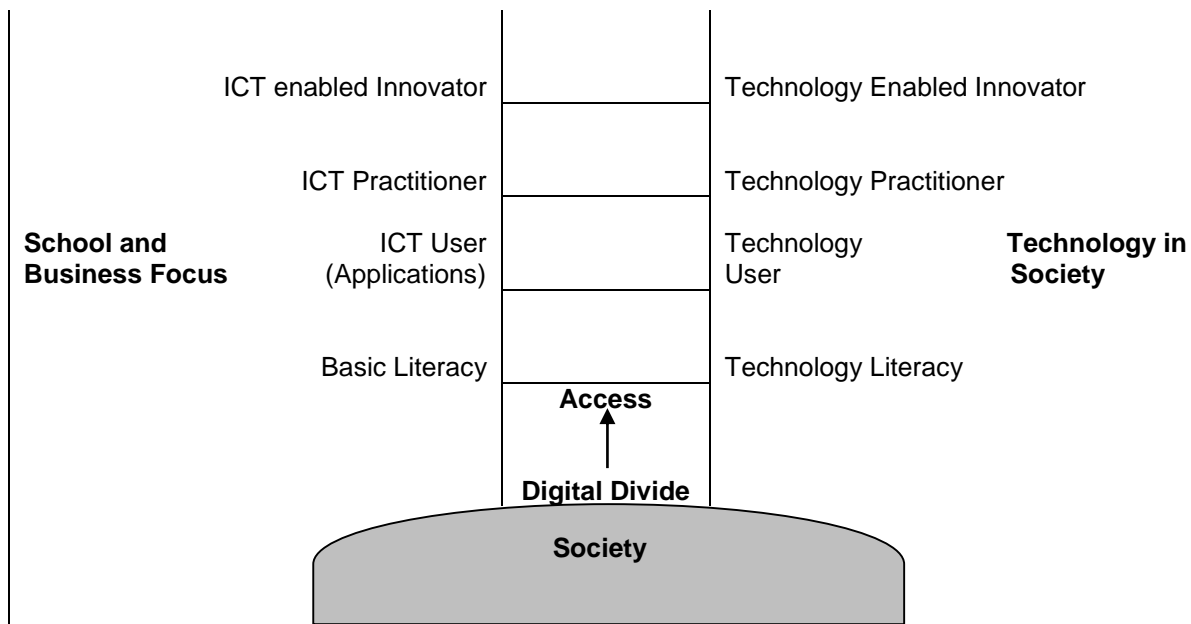
Figure 7: Schematic representation of the Technology Ladder (Source: Beyers & Koorbanally, 2010)

Further, (Beyers & Koorbanally, 2010) argue that *'many learners in the current education system will remain on the first rung or even slip off '* due to lack of *'additional support or access time to develop their newly acquired skills'*. In addition when technology literacy has been achieved, an attempt should be made to expose users to a number of packages to develop them into competent users (Beyers & Koorbanally, 2010).

In addition, the DigEULit framework provides stages of digital literacy development:

- **Level I:** Digital competence (skills, concepts, approaches, attitudes, etc.);

- **Level II:** Digital usage (Professional/discipline application);

- **Level III:** Digital transformation (innovation/creativity).

The literature has highlighted factors from various employability frameworks. The summary of some of the employability frameworks and related factors are provided in Table 15 below.

Table 15: Summary of various employability frameworks, factors and references (Source: Author)

Employability framework	Factors	Source

eSNCCF	New jobs; existing jobs; self-employment; service delivery; ICT practitioner skills	NeSPA (2012)
Key to Employability Framework	Career development learning; experience; degree of subject knowledge; generic skills; emotional intelligence	Dacre Pool & Sewel (2007
The USEM Account of Employability	Understanding; skills; efficacy; metacognition	Knight and Yorke, 2004
Employability Framework	Individual factors; personal factors; external factors	McQuaid & Lindsay (2005)
Aspects of Employability	Personal skills; core skills and; process skills	Yorke and Knight (2004)
Nine Keys to Employability	Responsibility; job-seeking and job-getting skills; reasoning and problem solving; health and safety habits; personal attributes	Poole & Zahn (1993)
ICT Skills Training and Employability Framework	Mission, vision & scope; values; partnerships; client selection; client employability expectations; ICT training strategies; complimentary services; sense of self; workplace readiness; extended networks; job supply and demand; job quality; required job skills; subsidies, public support and; legal protection	Garrido, Sullivan, Gordon (2012)
The Council for Industry and Higher Education (CIHE)	Cognitive skills; generic competences and technical ability	Haywood, Haywood, & Macleod (2006)
Internet usage	Information search; news; personal development; commercial transaction; leisure; social interaction	Van Dorsen & van Dijk (2013)

The eSNCCF provided the formed the basis for the development of the employment framework for this study. This due to fact that the factors from this framework are related to e-literacy and cover most aspects from the various frameworks considered. The eSNCCF factors will be discussed next.

2.5.1 Steps followed during the design of the employability framework

The employability framework was designed taking into consideration the South African developmental context and customized to technical and vocational education and training (TVET) college sector. The reviewed literature indicates the concept of employability has various components and can be approached in many angles as shown in various reviewed models and frameworks. This study proposes the following factors for the development of the employability framework: (i) e-skills for service deliver; (ii) e-skills for new jobs; (iii) e-skills for existing jobs; (iv) e-skills for new jobs; and (v) ICT practitioner skills.

Table 15 below shows the factors mapped to the e-skills levels and references:

Table 16: Employability factors mapped to e-skills levels (Source: European e-skills Forum, 2010; iNeSI, 2013)

Factors	E-skills levels
1. E-skills for service delivery	ICT user skills
2. E-skills for new jobs	
3. E-skills for existing jobs	
4. E-skills for new jobs	E-business skills
5. ICT practitioner skills	ICT practitioner skills

Although the study focus is on the first three factors (i.e. E-skills for service delivery, new and existing jobs), which are assumed to be at ICT user skills level, all the factors were considered (see Table 16) above. Further, ICT user level skills can be addressed the ICDL core module (see Table 6 above for ICDL modules). The core curriculum modules for the national certificate at level 6 (N6) electrical engineering are: electro-technics, industrial electronics, logic systems and mathematics (Northlink, 2014).

Figure 8 below is the graphic representation of the proposed employability framework.
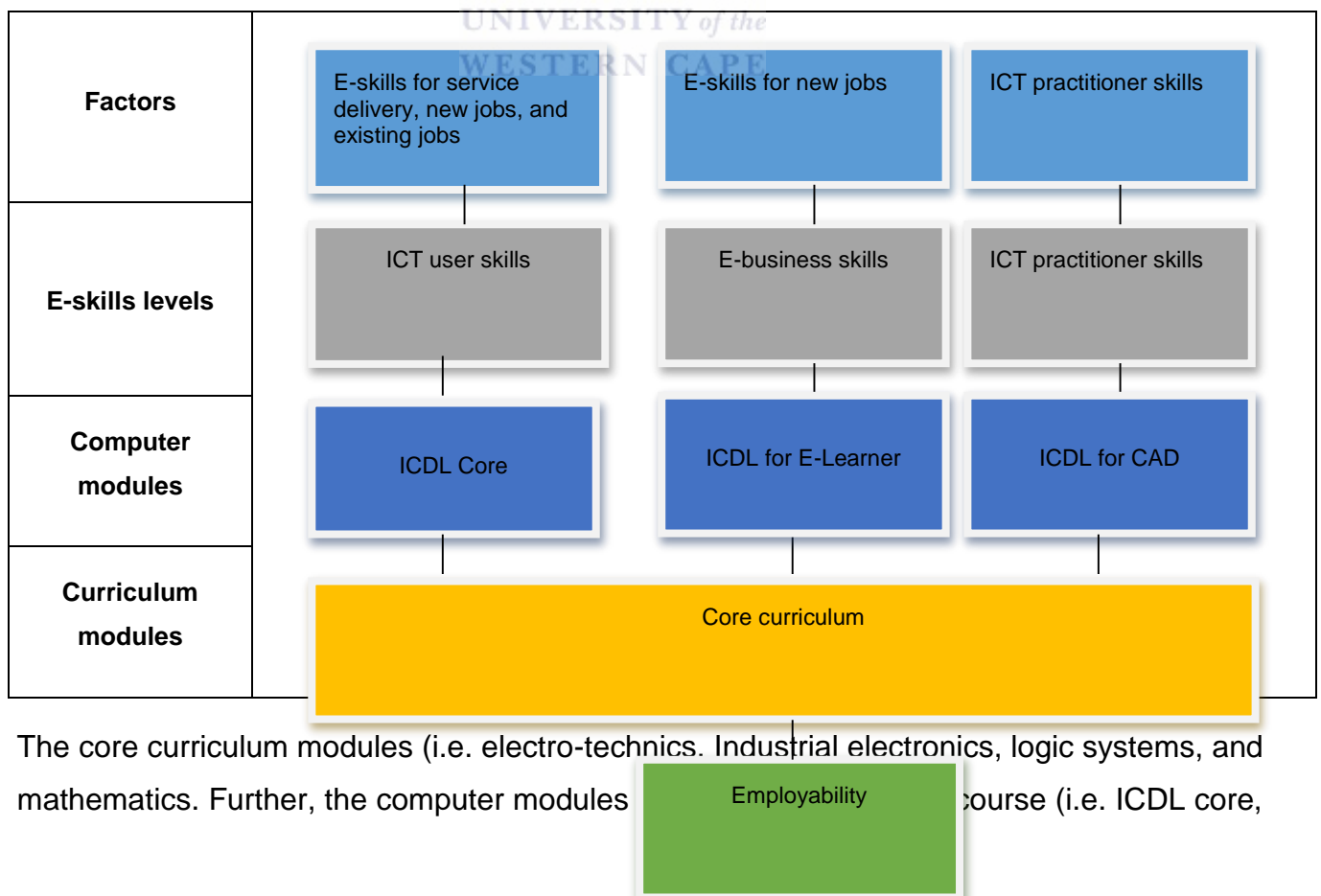
The core curriculum modules (i.e. electro-technics, Industrial electronics, logic systems, and mathematics. Further, the computer modules   course (i.e. ICDL core,

Figure 8: Employability conceptual research framework (Source: Author)

Information society	

ICDL for E-learner and ICDL for CAD) and are connected to the e-skills levels, which are directly linked to the factors being considered by this study.

2.5.2 Summary of the factors proposed employability conceptual framework

This section provide a summary of the literature derived employability conceptual research framework.

2.5.2.1   E-skills for service delivery

The concept of e-Enablement, which is related to service delivery is defined as the *"capabilities for e-government/governance and e-participation for effective service delivery"* (NeSPA, 2012); According to (iNeSI, 2013) e-enablement entails the delivering of the current or new government services in all three spheres of government (i.e. national, provincial and local) via online platform. Further, this new way of delivering government services will require the reconfiguration of the type of services, training of workers involved and measures should be put into place to ensure that all citizens have access to the e-services and are able to use them.

In addition e-government/e-governance entail the use of information and communication technologies (ICTs) to deliver government services, government administration, facilitation of democratic process, and relationships with citizens, civil society, private sector (iNeSI, 2013) citing Dawes. Further, Dawes in (iNeSI, 2013) point out that *"the evolution of e-governance is examined in terms of five interrelated objectives: a policy framework, enhanced public services, high quality and cost effective government operations, citizen engagement in democratic processes, and administrative and institutional reform."*

E-government is linked to the concept of e-participation, which is the area of impact in the eSNCCF factor (see Figure 3 above), e-skills for existing jobs (iNeSI, 2013). E-participation is viewed as a prerequisite for e-democracy and is referred to as the technology supported participation in administration processes, policy- making, service delivery, information dissemination, consultation and deliberations, amongst others (iNeSI, 2013). According to (iNeSI, 2013), there are three levels off e-participation: (i) informative public participation; (ii) consultative public participation; and (iii) cooperative public participation.

2.5.2.2   E-skills for new and existing jobs

These are competences required for effective usage of ICT systems and devices an individual. ICT users make use of ICT tools in support of their own work, which is, in most cases, not ICT related. User skills cover the utilisation of common generic software tools and the use of specialised tools supporting business functions within industries other than ICT industry" (European e-Skills Forum, 2010: 5). ICTs facilitates job search, recruitment and selection processes in a form of e-recruitment and e-selection with job search conducted in all geographical areas (de Hoyos et al., 2013). Further, (de Hoyos et al., 2013) point out that ICTs enables access to career information and guidance, and can connect employers and potential employees. ICT user skills are addressed through MS Office, Outlook and Internet (Sharif, 2013, p. 51) citing Naidoo.

E-skills for service delivery and e-skills for new and existing jobs are related to ICT user skills and can be developed through the provisioning of International Computer Drivers Licence (ICDL) in parallel with the curriculum, ensuring that the acquired ICT skills are demanded during the core curriculum offering (i.e. Assignments written of using Microsoft Office and submitted via e-mail, conduction online research, etc.).

2.5.2.3   E-skills for self-employment

E-business are competencies required to exploit opportunities provided by ICT, particularly the Internet, to ensure more efficient and effective performance of different types of institutions, to explore possibilities to new ways of conducting business and organisational processes, and to establish new businesses (European e-Skills Forum, 2010: 5). According to (iNeSI, 2013), e-entrepreneurship, which is another concept related to e-skills for self-employment, is the ability to start "a new company with an innovative business idea within

the Net Economy" Kollmann in (iNeSI, 2013, p. 4). Further, this is a type of business that makes use ICT platforms to offer products and services purely online (iNeSI, 2013. In addition, ICT enabling new ways of working such as flexible working arrangements such as annualised hours, compressed hours, flexi-time and home-working, job sharing, part-time working, and staggered hours (de Hoyos et al., 2013). According to (ITU, 2014) new employment and entrepreneurial opportunities include: (i) online job services and job matching; (ii) micro-work and crowdsourcing; (iii) application development; (iv) accessibility; and (v) gaming.

2.5.2.4   ICT practitioner skills

These are the competencies that are necessary for *"researching, developing, designing, strategic planning, managing, producing, consulting, marketing, selling, integrating, installing, administering, maintaining, supporting and servicing ICT systems." (iNeSI, 2013, p. 6)* citing EU Commission.

The ICT practitioner skills are related to programming and the use of specialized software (i.e. ICDL Computer Aided Design or CAD module).
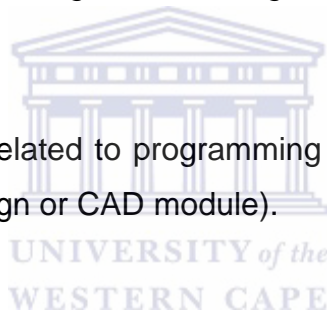
2.5.3 Testing the factors of the employability conceptual research framework

This employability conceptual research framework was subsequently verified in the empirical setting that comprises key TVET stakeholders: students, ICT experts, lecturers and management personnel. The conceptual framework and its factors that have been described through this chapter formed a basis for the development of the interview questions that was administered to the selected sample for this study. The next section, thus, discusses the research design for this current study, the methodologies and method that was chosen, which guided the how data collection was carried out and subsequent analysis.

2.6   Chapter conclusion

This chapter discussed commenced by discussing the e-literacy concept. This was followed by the discussion of the state of e-literacy in South Africa. Lastly, the chapter proposed an employability framework identified e-literacy related employability factors that are necessary

for promoting employability at the TVET college sector. These factors are: (i) e-skills for service delivery, (ii) e-skills for new jobs, (iii) e-skills for existing jobs, (iv) e-skills for self-employment, and (v) ICT practitioner skills.

The next step was to select an appropriate research methodology that gave guidance on how the data should be collected and analysed. Testing the conceptual research model followed this. Hence, Chapter 3, the research design, methodology and the rationale for the study are discussed.

CHAPTER 3. RESEARCH DESIGN AND METHODOLOGY

This chapter begins by discussing the research methodology for the study. This followed by a brief description of the philosophical perspective of the research. In addition, the chapter outline the research paradigm and research design. Further, explanation of the case design, sampling strategy and data collection is offered. The chapter also provides a detailed account of the process of data analysis as well as reliability and validity issues.

3.1   Research methodology

Research is carried out using different methodologies. According to (Levy, 2006) the research methodology is a plan of action.   The two most popular research methodologies are quantitative and qualitative research methodologies (Myers, 1997; Saunders et al., 2003). These research methodologies are briefly explained below.

3.1.1   Quantitative research methodology

This research methodology was developed for natural science in order to study the natural occurrences (Myers, 1997). This is the type of research methods that require *"objective observation, precise measurement, statistical analysis, and verifiable truths"* (Cavana, Delahaye, & Sekeran, 2001). Some examples of quantitative methods include survey methods, laboratory experiments, econometrics and mathematical modelling (Myers, 1997). In addition, numerical methods, such as mathematical modelling are also considered quantitative methods (Myers and Avison, 2002). Furthermore, in quantitative studies research questions are generally formulated on the basis that answers will be numerically or statistically analysed.

3.1.2   Qualitative research methodology

The qualitative research methodology was developed for social science in order to enable researchers to investigate social and cultural phenomena (Myers, 1997). Qualitative research methods was involve attempting to understand human behavior in their natural environment (Cavana et al., 2001). This is the type of research methodology that employs data gathering techniques such as interviewing people, reviewing documents, questionnaires, observing

research participants, and *'the researcher's impressions and reactions'* to get a clear picture of the social phenomena (Myers, 1997). Thus, collecting behavior and observation is difficult to measure. This data collection method reveal interesting patterns that are unique to this type of research methodology. Further, primary data collection was carried out on the participant's environment in order to understand their experiences and views. The views were concerning employability skills they had and those that they felt were important.

3.2   Philosophical Perspective

Regardless of the type of research methodology (i.e. quantitative or qualitative) chosen, research needs to be *"…based assumptions about what constitute 'valid' research and which research methods are appropriate"* (Myers, 1997, p3). According to (Terre Blanche et al., 2006) there are three main cornerstones of research philosophies are ontology, epistemology, and axiology (Leedy and Ormrod, 2010). Ontology is associated how people view reality whilst epistemology is the theory of knowledge and techniques of acquiring knowledge of social reality. Axiology deals with value systems such as ethics and aesthetics – how our values impact our way of thinking the social environment. There are few research paradigms that can be used as a guidance to conduct a study. The three research paradigms are prevalent in the study of science, namely positivist, critical and interpretivist (Myers, 1997). These research perspectives guide the research.

- **Positivist approach:** Positivist researcher adopts an *"objective and detached epistemological stance towards reality, and can employ a methodology that relies on control and manipulation of reality"* (Terre Blanche, Durrheim, & Painter, 2006, p. 7). A positivistic inquiry enables an explanation that would subsequently lead to a prediction and the control of a particular phenomenon (Ponterotto, 2005). This research approach relies on occurrences of the phenomena indicating that the phenomena are non-random. Positivists rely on coding data; compute frequencies to check occurrences for validating a hypothesis regarding the relationship between

variables. Further, Flowers (2009)[11] also highlighted the connection between positivism and deductive reasoning. According to Flowers (2009) the positivist approach is based on the values of reason, truth and validity. Moreover, the focus is purely on facts that are gathered through direct observation and experience. These facts are thus computed empirically using quantitative research methods (Flowers, 2009).

- **Critical approach:** Make an assumption about social, that it is historically constructed and created by people (Myers, 1997). This research paradigm is focused on emancipation and transformation. The researcher's proactive values are considered central to the main task, purpose, and methods of the proposed research (Ponterotto, 2005). Although the researcher's values are central to the task, their assumption is that the social reality is historically constituted, produced and reproduced by people (Myers and Avison, 2002). In the same vein critical research also focuses on the oppositions, conflicts and contradictions that affect modern-day society. Additionally, this approach seeks to help to eliminate the causes of alienation and domination in the society (Myers and Avison, 2002).

- **Interpretivist approach:** The interpretivist approach opposes the positivist notion that human beings are completely influenced by environmental factors. The interpretivist approach believes that reality is a result of peoples subjective experiences, and may "*adopt an interactional epistemological stance towards that reality and use methodologies, such as interviewing or participant observation, that rely on a subjective relationship between researcher and subject*" (Terre Blanche et al., 2006, p. 7). An interpretive researcher commences by making assumptions about reality through constructs such as language, consciousness and common understanding (Myers and Avison, 2002). Additionally, interpretive researchers endeavor to advance a general understanding of the phenomena through the understandings or meanings that people have assigned to them (Myers and Avison, 2002).

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1. [11] Flowers (2009) -
    https://www.google.co.za/#q=Flowers%2C+P.+%282009%29.+Research+Philosophies+%E2%80%93+Importance+and+Relevance
    [10 May 2016]

The research paradigm that was deemed appropriate for this study was the interpretive research paradigm. The adoption of this research paradigm because it enabled to uncover and make-sense of social reality. This research used mainly qualitative method is and methods of data collection include participant observation, in-depth interviews and focus groups. Qualitative data was collected via a focus group (i.e. in order to solicit the views of students) and one-on-one interviews (i.e. views of teachers and ICT experts).

3.3   Rationale for choosing Case Study Research

This study adopted a philosophical perspective that embraces the qualitative research methodology as the data is collected by interviewing students and key college stakeholders. This study employed an interpretive approach as the core epistemology due to the role of the researcher that act as the interpreter and analyst (Klein & Myers, 1999).

3.4   Sample population

The sample population of this research is made up a group of people that the researcher would like to investigate (Hussey and Hussey, 1997). According to (Saunders, Lewis, & Thornhill, 2003) a sample population is defined as the members you want to study. The sample population consists of TVET students studying electrical engineering in the Gauteng Province. Further (Saunders et al., 2003) cites that the whole population of significance is generally too large or geographically dispersed to study directly. In such cases drawing a sample from a particular population enables the researcher to analyse the smaller sample and make inferences about the population features.

3.5   Sampling techniques and sample

According to (Saunders et al., 2003) sampling is the process of selecting a proper research sample for the purpose of determining parameters or characteristics of the whole population. In addition (Saunders et al., 2003) suggest that the purpose of sampling is to deal with a lesser sample of for gathering information. This is also because of the previously stated reason above that population may be scattered geographically. In this research, 10 students studying N6 electrical engineering in one of the TVET colleges on Gauteng as a sample from which the researcher drew his inferences.

The research sample for the study was selected via a purposeful convenience sampling due to the nature of the study, which is a method that is non-probabilistic or non-random sampling technique (Saunders et al., 2003). Purposive sampling allows the researcher to select the most relevant data sources.

This study sample (see Table 17 below) included ten students from N6 electrical engineering (Heavy Current), the campus manager, head of division (HOD) of electrical engineering, a lecturer from electrical engineering and an information technology (IT) expert from industry. We could not secure a representative from the Department of High Education (DHET).

Table 17: Research sample

Category	Coding	Number
Student focus group	Participant 1-10	10
Campus manager	Participant 11	1
HOD from electrical engineering	Participant 12	1
Lecturer	Participant 13	1
ICT expert from industry	Participant 14	1
Total		**14**

The case study method was adopted for this study, and case studies are qualitative in nature (Saunders et al., 2003). According to (Yin, 1994, p. 8) a case study is *"preferred in examining contemporary events, but when the relevant behaviors cannot be manipulated"*. Further, (Yin, 1994, p. 8) point out that in addition to history, two other sources of evidence are: *"direct observation and systematic interviewing"*. The study used mainly interviews to gather evidence, hence the case study method. For this case study the key sources of data were TVET college students, staff and industry experts. The students were selected based on level of study, key staff members of the college and an industry expert familiar with digital literacy. A limited sample was sufficient as the focus is not on frequency but on meaning (Yin, 1994).

3.6   Data Collection

Interviewing technical and vocational education and training (TVET) college students doing national certificate at level 7 (N6) electrical engineering, a campus manager, head of division (HOD) of electrical engineering, lecturer from electrical engineering, and an expert from industry was the main data collection strategy for this study. There are various ways in which

data collection can be undertaken. Exploratory studies employ observation, unstructured interviews and unstructured focus groups; and descriptive studies employ structured interviews, structured focus groups and questionnaire (Cavana et al., 2001). On the other hand, causal studies employ structured questionnaires, field experiment and laboratory experiments (Cavana et al., 2001). In order to attain the objectives of the study, semi-structured interviews were conducted in-line with the case study methodology.

Student interviews were in a form a focus group due to the limited time granted by the TVET College. This was for minimal interruption of teaching and learning. The nature of the study called upon face-to-face interviews of participants in their natural environment (Yin, 1994). Further, Yin (1994) point out that there are three principles of data collection i.e. use of multiple sources of evidence, create a case study database, and maintaining a chain of evidence.

Interviews focus on the topic and provide insight into the issue at hand Yin (1994). Further Yin identifies bias and reflexivity as the drawback of interviews. In this study, semi-structured interviews will be conducted to minimise bias, and corroboration with other sources to overcome reflexivity Yin (1994).

This study reviewed pertinent literature, conducted a student focus group and face-to-face interviews. These are be briefly discussed next.

3.7.1 Literature Review

According to (Saunders et al., 2003) literature review gives is an account of the previous published work on the topic by leading scholars and researchers in the field. In addition (Cavana et al., 2001) state that the literature review give an assessment of the literature in a particular filed, discovering where the weaknesses and gaps are, contrasting the views of authors, or raising questions. In this study, the researcher used literature material such as books, journal articles, published reports, case studies, annual reports, government policies, regulations, and any other relevant published material.

3.7.2 *Interviews*

There are three types of interviews: structured, semi-structured and in-depth interviews. The researcher will conducted a focus group interview with 10 students and had face-to face interviews with one lecturer, head of division from electrical engineering, the college principal, Department of Higher Education (DHET) representative, and an education expert in South Africa. The nature of the study calls upon face-to-face interviews of participants in their natural environment Yin (1994). Interviews focused on the topic and provide insight into the issue at hand Yin (1994). In order to attain the objectives of the study, interviews were conducted in line with the case study methodology. Semi-structured interviews were used to strike the balance between the unstructured and structured interviews (Cavana et al., 2001).

To gain access for interviews at a particular TVET college, an introductory letter was sent to campus manager and other potential participants outlining the purpose of the research and the length of the interviews. An appointment was arranged with the campus manager, who delegated a deputy campus manager to meet with me to discuss logistics, particularly for student interviews as ten students were going to participate. Due to time constraints, it was decided that a focus group will be feasible and free period was identified. The research sample comprised of 14 (i.e. 10 students for the focus group, a campus manager, a head of division of electrical engineering, a lecturer and an ICT expert).

There were few limitation associated with this data collection technique. Time was the most limiting factor, which resulted in opting for a student focus group interview instead of one on one.

3.8 Data Analysis

Data analysis is described by (Saunders et al., 2003) a being a process that entail the following strategies:

- Categorisation of data;

- Unitising data;

- Recognising relationships and developing the categories to facilitate this;

- Developing and testing hypothesis to reach conclusions.

All these listed strategies are, to some extent, applied in this study, as explained in this section.

The author followed the steps suggested by (Saunders et al., 2003), with the first step being data categorization. This step was facilitated the semi-structured interview questions that were categorized into the factors. The author read the transcripts and placed the answer into the relevant category. The next step was achieved identifying key units of the responses in their relevant categories. This entailed confirmation by checking the notes that were taken during the interviews. The third step was to recognize relationships between factors in order to detect further patterns.

The last stage of the analysis in this study make a comparison between the empirical findings and the reviewed literature in order to propose an ultimate form of the employability framework. The outcome was the framework depicted in Figure 9, which reflects some gaps between this framework and the proposed framework constructed from literature review.

3.9 Chapter conclusion

This chapter discussed the path that was followed during the research design and methodology. The discussion outlined how the data collection was carried out and data analysis techniques that was used. In the main, the research design was based on a qualitative method to data collection and analysis. The qualitative approach was deemed appropriate due to the fact that the researcher was collecting data from individuals whose way of life is affected their environment, in their location at the college. The data were collected from the population sample via a semi-structure focus group on ten students and semi-structure interviews on key stakeholders. The data collected was analysed using content analysis.

The research process was inductive, which entail the development of a framework based on the primary and secondary data collected. The next chapter will provide a detailed description and discussion of the findings that were discovered during the data analysis stage.

CHAPTER 4. RESULTS AND INTERPRETATION OF RESULTS

4.1 Introduction

This chapter gives the main results of the study and provides an interpretation. The results demonstrate the role e-literacy related factors in promoting employability. The chapter is structured as follows: It starts by providing an overview of how the content flows. This is followed by presentation of the results. The core themes are discussed separately. These core themes represent the e-literacy related employability factors that key in the e-literacy for employability framework. The results were categorised in order to deal with each research question. The chapter concludes by revising the conceptual framework in light of the findings.

4.2 Core themes of the study

The main research question of the study was: *'what are the factors on the e-skills landscape that are connected to the development of employability framework and how can this framework be successfully applied?'* The results of the study are the employability framework (Diagram 2) with the e-literacy related employability factors.

The factors of the e-skills national curriculum competency framework (eSNCCF) were used as they cover issues aimed at addressing e-skills. The framework is relatively new and its factors have not yet been tested. The following are the factors:

  (i)   E-skills for service delivery;

  (ii)   E-skills for new jobs;

  (iii) E-skills for existing jobs;

  (iv)   E-skills for self-employment; and

  (v)   ICT practitioner skills.

Interview questions were categorised according to factors. The results were also presented according to these factors.

4.3 General findings

The general findings of the study indicate that there is a need to address digital literacy skills, hence, an "*e-literacy for employability framework*" *for TVET colleges in necessary*:

> *I have never attended any short course in computer skill but have learned to use a computer by myself (Participant 1).*

> *Computer skills are important for employment especially the Microsoft packages background (Participant 3).*

All the students interviewed stated that there is no requirement whatsoever in their curriculum that they should use a computer and most of their assignment are handwritten and submitted manually/physically. The above statements indicate that there is no requirement for using computer at the college as tests and assignments are paper based.

All respondents indicated that they did not attend any computer course at the college. Some of the respondents acquired computer skills prior college enrolment such as the ITC course prior to enrolling at the college, which includes Microsoft package (Participant 4) and some acquired computer skills in high school (Participant 7).

The importance of computer skills was reflected

Computer skills are important when applying for employment online and for investigative techniques and research purposes (Participant 8 and10).

In addition "Government must initiate more programs to support e-skills and e-literacy. More laboratories must be established at colleges to enhance more practical especially in the engineering faculty" (Participant 8).

4.4 Relevance of the conceptual framework derived from literature

The interviews analysis revealed that there is a general agreement from most respondents of the factors of the framework in Chapter 2 (Table 14 and Figure 6) that were derived from literature are important and should feature in the final framework for this study.

4.4.1 Digital literacy

The students were asked the question: "*describe various uses of a computer and the kinds of activities for which you use the computer for here?*"

Students stated that there is no requirement whatsoever in their curriculum that they should use a computer and most of their assignment are handwritten and submitted manually/physically.

"Sometimes if like you have to get more work to understand…. that's when you get assignments and faultfinding, you have to use a computer" (Participant 1).

The above response from one participant indicates that researching further requires computer skills. However, the participants pointed out that they acquired computer skills on their own: "*I have never attended any short course in computer skill but he learned to use a computer by himself" (Participant 1). "I know the computer on my own" (Participant 3). "I attended ITC course prior to enrolling at the college, the course includes Microsoft package-word, excel" (Participant 4). "*I acquired his computer skills from high school" (Participant 7).

Some respondents (Participants 1, 3, 8 and10) believe that computer skills are important for employment, when applying for employment online, for investigative techniques and for research purposes. For example, you can search for company information before an interview (Participant 1), data capturing in using excel in some workplaces (Participant 5) or program robots for municipality using programming logic circuit (PLC) by programming, sketching and running (Participant 2). E-mail is faster and can be used anywhere unlike the post office (Participant 4).

Here in Pretoria, there are some many schools and some of them they are not registered … to find out if they are registered, I have to go to the Internet and search the school (Participant 6).

To investigate information on the Internet (Participant 7)

If a company invites you for an interview, you can Google to get more information about the company (Participant 9), for directions (Participant 2) and apply online (Participant 6).

Some companies carry out assessment test using a computer (Participant 10).

More information about our studies …faultfinding does not have a book, we are using study guides. If you want more information, you must go to the Internet (Participant 8).

All students have cellular phones and are on Facebook (Confirmation of popularity of social media and cellular phones).

The responses by experts when asked to "*explain the digital literacy/e-literacy skills that are important for promoting employability at TVET colleges?"*

Typing skills are important (Participant 11). Basic computer literacy, how to type/create a CV in order to apply for a job, surf the Internet to search jobs, and use the Internet to e-mail (Participant 12). Knowing basic computer skills, subject on computers that is compulsory for all college students, and mathematics software (Participant 13). Infrastructure required for digital literacy …the skills for using digital equipment; digital literacy skills have become a competitive advantage (Participant 14).

4.4.2 Employability Skills

Experts were asked the question: "*explain the factors that you think can contribute to the promotion of employability of TVET students?"*

There should be a lot of partnerships between the TVET colleges and employers…should be easy for students to be employed; as in the past, there should be arrangements between industry and colleges, where students reported to employers; and the TVET curriculum should speak to the needs of the industries (Participant 11).

Practical experience/practical skills not theory only as currently the college have models, components, detesters, just the basics on electrical engineering for practical at the workshop (Participant 12).

Lecturer involvement in creation simulation to submit work via e-mail, in pdf format, making a document and attaching it; a functional library as there is no functional library with internet access, no internet skills, and no guidance on CV making (Participant 13). Further, hardcopy submission of assignments and no course for computer skills that is available for everyone (Participant 13).

Infrastructure is required for this particular subject matter (Digital literacy), which are the skills for using digital equipment/devices, as digital literacy skills have become a competitive advantage (Participant 14). In addition, some work environments require typed reports.

Next, both students and experts were asked to give their opinion on the digital literacy/e-literacy related employability skills or any other skills that could contribute in the promotion of employability in TVET colleges and how the skills could be embedded into the TVET curriculum. The responses on each factor are captured in the below.

4.4.3 Factor one: e-Skills for Service Delivery

"Buying pre-paid electricity via cellular phone banking, accessing government jobs online (Participant 8) and look for post/jobs on social media (Participant 1).

There is few were aware about online services and knowledge about some government services such as the Department of Public Service (DPSA) on line job advertisements and Z83 forms and National Youth Development Agency (NYDA for accessing youth services (Participant 1).

Skills related to service delivery were viewed to span from typing skills (Participant 11), basic computer literacy how to type a CV in order to apply for a job, surf the Internet to search for a job, use the Internet to e-mail (Participant 12). Knowing basic computer skills, subject on computers that is compulsory for all college students and Mathematics software (Participant 13). Infrastructure is required for this particular subject matter (Digital literacy), which is the skills for using digital equipment/devices and digital literacy skills have become a competitive advantage (Participant 14). Digital literacy is required in the environment where reports are to be written (Participant 14).

4.4.4 Factor two: e-Skills for New Jobs

Microsoft word is important as you can type your CV and be able to both physical and online job search (Participant 8). Computer skills will enable you to do an online job search and upload your CV online for recruiters to peruse them so that when a job opportunity arises they are able to contact you (Participant 8).

The initiative is available (Participant 11). Gauteng-online like initiative can assist (not available currently) for students to access information, computer literacy can be included in the curriculum as most students at N6 that have never work on a computer before (Participant 12). In addition, there should be a computer course for engineering students in the curriculum (Participant 12). Create simulation (i.e. CD) on a real situation for applying for a job (Participant 13). The trend is online job search, report writing and the curriculum requires every student should have a digital gadget (Participant 14).

4.4.5 Factor three: e-Skills for Existing Jobs

All the students were not familiar with e-learning.

There is no e-learning initiative, not sure from the DHET (Participant 11), only encouragement to do research on a topic (Participant 12). No e-learning initiative, consultations through Skype could be beneficial (Participant 13). E-learning is for the future, can promote research and provides a single entry to a variety of sources instead of consulting different libraries i.e. see many from one point (Participant 14).

4.4.6 Factor four: e-Skills for Self-employment

The business plan is important for starting your own business therefor computer skills will assist you to source information from the internet regarding the drafting of the business plan (Participant 9). Computer skills are necessary as you can request information from the internet on how to start your company (participant 7).The use of internet is also important as you can market your business on social media … by put it out there on social media, banners, all those things are done by a computer…SMS, e-mail (Participant 8). Computer skills will assist you to profile your business on the Internet in order to attract more clients (Participant 8) and to be able to search for NGOs that can help you to start your own business (Participant 3).

P10: You can use the social media to get views on the kind of business you want to start (Participant 10) as most companies have Facebook pages (participant 1).

The entrepreneurship subject talk to that… new venture creation, entrepreneurship and is available only to business students, not available for engineering students (Participant 11). No initiative to support this (Participant 12). This is happening for business students and

non-engineering students require an information Technology as a course (Participant 13). Curriculum should prepare students for the outside world (Participant 14).

4.4.7 Factor five: ICT Practitioner Skills

There is no computer software currently in place to support the curriculum like CAD and Pastel.

Time was suggested might be the reason for not including as they are required to spend only 3 months for theory only.

No CAD or design software experience.

Not sure on CAD skills for N2 students upwards (Participant 11). No CAD or programs, even for lecturers, no exposure (Participant 12). No software like CAD for engineering students, drawing circuits with components is important (Participant 13). Coding skills for practitioners is important, depends on the practical, and should have CAD in your environment and the curriculum should provide the opportunity to understand the inside of the software tools (Participant 14).

Additional comments:

- Participant 1 commented that there should be programs on Saturdays to acquire those required skills.

- Government must initiate more programs to support e-skills and literacy.

- More laboratories must be established at colleges to enhance more practical especially in the engineering faculty.

4.5 New conceptual factors

The discussion with other interviewees on digital literacy and employability are the first two concepts in the interview questions revealed enabling conditions should exist if e-literacy endeavors are to succeed. These were deemed important and were considered into the e-literacy for employability framework. These two enabling conditions were added into the final e-literacy for employability framework: (a) practical experience and (b) infrastructure.

4.5.1 Practical experience

Practical experience/practical skills not theory only. Currently the college have models, components, detesters, just the basics on electrical engineering for practical at the workshop (Participant 12).

This citation reflects that broad practical experience is needed not only for digital literacy skills but also for core curriculum skills.

This was supported by Participant 13 who believes that lecturers must create an environment where there is a need for using a digital literacy skills by calling on students to *"submit work via e-mail, in pdf format, making a document and attaching it"* instead of hardcopy submission of assignments.

Dacre Pool & Sewell (2007) through the key to employability framework point out that work experience develops competencies and enhances employability prospects. In addition, most employer value experience. Further, (Dacre Pool & Sewell, 2007) recommends a partnership between employers and education are viewed as key in promoting work-related learning, where people with experience are more likely to secure employment through incorporating experience into the course, voluntary basis or part-time work.

Knight & Yorke (2003) view work experience as one of the ways of enhancing employability. Other ways are entrepreneurship modules, career advice and portfolios, profiles and records of achievement. In addition, (Knight & Yorke, 2003) echo Dacre Pool et al. view that employers "prefer to hire people who have workplace experience…" and recommend " work attachment to degree programmes" (Knight & Yorke, 2003). Further, (Knight & Yorke, 2003) point out that even fairly "low and/or casual employment" can assist in boosting work-related capabilities

The Council for Industry and Higher Education (CIHE) in the UK cited in (Haywood et al., 2006, p. 5) add that "having the knowledge and experience of working with relevant modern technology. The ability to apply and exploit information technology".

4.5.2 Infrastructure

Participant 13 highlighted the absence of a functional library with Internet access, no training on Internet skills, and no guidance on CV making as one of the major obstacles in promoting digital literacy. It was also discovered that other participants as well view lack infrastructure a drawback:

"Government must initiate more programs to support e-skills and literacy. More laboratories must be established at colleges to enhance more practical especially in the engineering faculty" (Participant 8).

Infrastructure is required for this particular subject matter (Digital literacy), and the skills for using digital equipment/devices, as digital literacy skills have become a competitive advantage (Participant 14).

McQuaid & Lindsay (2005) through an employability framework mention personal circumstances such as access to resources in a form of transport, finances and social networks as some of the factors that contribute to employability.

Helsper (2008) argue that ICT access is mostly related to where and how people access the Internet. Further, Helsper point out that "access quality, location of access and attitudes towards technologies remain important barriers and enablers that the government policy can influence". In addition, Helsper point out that freedom to use the Internet is associated with home use more than any other location.

4.6 Proposed e-Literacy for Employability Framework

The finding from the reviewed literature and from the analysis of the interviews, the study proposes employability framework with the following factors:

- E-skills for service delivery;

- E-skills for new jobs;

- E-skills for existing jobs;

- E-skills for self-employment;

- ICT practitioner skills;

- Practical experience; and

- Infrastructure.

Table 8 below and Figure 9 present the proposed employability framework

Table 18: Factors of the proposed employability framework (Source: Author)

Employability Framework	
Factors	**E-skills levels**
1. E-skills for service delivery	ICT user skills
2. E-skills for new jobs	
3. E-skills for existing jobs	
4. E-skills for self-employment	E-Business skills
5. ICT practitioner	ICT practitioner skills
6. Experience Enabling	
7. Infrastructure conditions	

The enabling conditions factors point to the fact that the following should be prioritized:

- **Practical experience**

All the students interviewed stated that there is no requirement whatsoever in their curriculum that they should use a computer and most of their assignment are handwritten and submitted manually/physically. The above statements indicate that there is no requirement for using computer at the college as tests and assignments are paper based.

- **Infrastructure**

All respondents indicated that they did not attend any computer course at the college. Some of the respondents acquired computer skills prior college enrolment such as the ITC course prior to enrolling at the college, which includes Microsoft package (Participant 4) and acquired computer skills in high school (Participant 7).
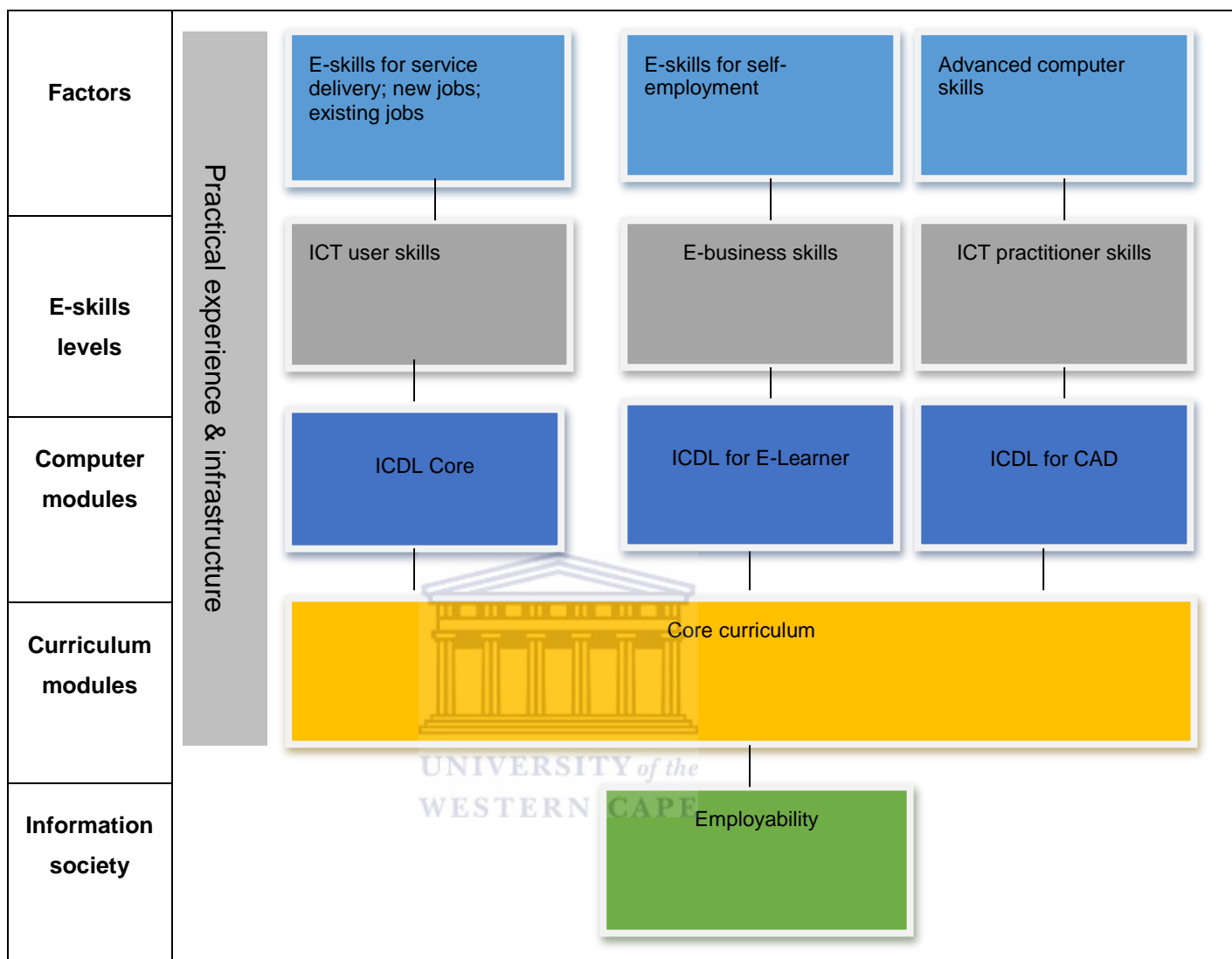
Figure 9: Proposed employability framework for South Africa (Source: Author)

4.7 Summary of the findings

This section provides a summary that links the research findings (see Table 9 below) to demonstrate how the research objectives had been met.

Table 19: Summary of findings

Research objective	Findings

To understand the theoretical and contextual background of promoting employability;	Through literature review in Chapter 2 where the concepts of e-literacy, employability and curriculum were discussed.
To explore existing employability frameworks that might be relevant for promoting employability;	The employability frameworks were also discussed in Chapter 2 as stated above.
To identify and categorize the factors that are relevant for promoting employability obtained from pertinent literature;	The e-Skills National Curriculum and Competency Framework (eSNCCF) factors were used in this study i.e. e-skills for service delivery; e-skills for new jobs; e-skills for existing jobs; e-skills for self-employment; and ICT practitioner skills.
To validate these factors by interviewing key TVET stakeholders and ICT experts;	Upon validation of the eSNCCF factors, lack of these skills was confirmed and two additional factors were uncovered i.e. practical experience (i.e. work-related experience as well as computer related experience) and infrastructure.
To propose an employability framework customized for the South African context; and	The proposed employability framework customized for South African context is presented in Figure 9.
To explain the use of these factors within the proposed employability framework.	This objectives was met by explaining the relevance of these factors in section 4.4 above.

The next chapter provides a conclusion for the study and explains how the objectives of the study have been achieved, the contribution of the study and point out some of the limitations of the study.

CHAPTER 5. CONCLUSION AND RECOMMENDATIONS

The chapter first presents the conclusion, followed by the recommendations. Then the contribution of this study is uttered, followed by mentioning the limitations of the study.

5.1 Conclusion

The purpose of this study was to develop the employability framework. The following research objectives were proposed for this study as follows:

- To understand the theoretical and contextual background of promoting employability;
- To explore existing employability frameworks that might be relevant for promoting employability;
- To identify and categorize the factors that are relevant for promoting employability obtained from pertinent literature;
- To validate these factors by interviewing key TVET stakeholders and ICT experts;
- To propose an employability framework customized for the South African context; and
- To explain the use of these factors within the proposed employability framework.

The first objective was addressed by reviewing pertinent literature on the factors that affect curriculum change and by trying to understand the concept of employability. Investigating the state of e-literacy in South Africa followed. Then the literature on the available frameworks that could provide guidance on the strategies of embedding the e-literacy related employability skills into the TVET curriculum in the context of South Africa and it was discovered that there is no suitable employability model that could be used in the South African context.

The third research objective of the study was to validate the employability related factors by interviewing key TVET stakeholders. In that instance, ten (10) students from Electrical Engineering N6 level were, campus manager, head of division (HOD) and a lecturer as well as an ICT expert from industry. The e-literacy related employability factors were e-skills for service delivery, e-skills for new jobs, e-skills for existing jobs, e-skills for self-employment and ICT practitioner skills. The interviewees have confirmed the validity of the literature review on the e-literacy related employability factors but have discovered two key enabling conditions that should be incorporated into the final e-literacy for employability framework. These enabling conditions are practical experience and infrastructure. Thus, these enabling conditions were incorporated into the final proposed e-literacy for employability framework for TVET colleges in South Africa, which is provided in Figure 7. The e-literacy related

employability factors and the associated enabling conditions were then placed within the employability framework together with an explanation of their usage. By accomplishing these tasks, the fourth and the fifth objectives of the study have been achieved.

5.2 Recalling the e-literacy related employability factors

(i) E-skills for service delivery

The findings in preceding chapter reveal that few TVET students are aware about various government services available online such as the Department of Public Service and Administration (DPSA) and youth service websites such as the National Youth Development Agency (NYDA).

(ii) E-skills for new jobs

The e-skills for new jobs were viewed as important for curriculum vitae typing and online job search. In addition, experts recognise the trend of online job search and report writing skills required by most employers. Further, lack of simulations of real world skills such as online job application is a drawback.
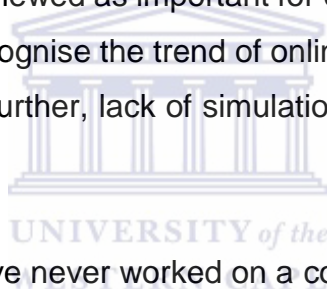
Most N6 electrical students have never worked on a computer.

(iii) E-skills for existing jobs

Most respondents from the college indicated that there was no e-learning initiative. Further, students were not even aware of the concept of e-learning. On the other hand, the expert from industry view e-learning as the future. Further the expert indicated the importance of e-learning as opposed to visiting various libraries, one access an array of material from single point of entry.

(iv) E-skills for self-employment

Most students indicated that they never bought online due to lack of digital literacy skills and affordability. However, my suspicion is that lack of digital literacy skills is a major contribution. This is confirmed by movie and music playing using laptops. There indication by most respondents from the college is that there is no for entrepreneurship. Further, only business students are exposed to entrepreneurship module, not engineering students.

(v)   ICT practitioner skills

The college respondents indicated that there are no computer software skills and hence, no exposure to computer programme such as computer aided design (CAD).

(vi)   Practical experience

Most respondents view both computer and practical work experience as important. In addition, there is no requirement for digital literacy skills in a form of assignment submission via e-mail, instead of hardcopy submission.

(vii)   Infrastructure

Lack of infrastructure was viewed as major drawback. Most respondents pointed out the absence of infrastructure such as library with Internet connection. In addition, computer laboratories are and relevant training. While some respondents mention lack of infrastructure, there is evidence that some of the students have access to infrastructure such as the use of laptops for playing movies and music, and that there is freely available Wi-Fi in the area where the college is situated.
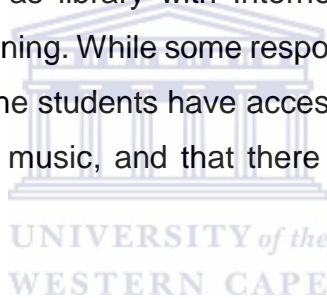
5.3 Recommendations

The recommendations are based on the outcomes of the literature review undertaken for this study and the responses received from the interviews with students, campus manager, HOD, lecturer and an ICT expert. There are proposed in order to assist in overcoming the challenges faced by the colleges in tackling low or lack e-literacy in these institutions. This study proposes two categories of recommendations: the practical use of the proposed framework and the recommendations for future research

5.3.1   Practical recommendations

This research has brought forward an employability framework with main goal of applicability of the framework. The applicability of the framework is also informed by the author's background in studying various employability frameworks, e-Skills National Curriculum Competency Framework (eSNCCF) and other related concepts.

The employability framework for TVET colleges in South Africa has now been proposed and successfully tested by substantial number of key participating TVET College stakeholders. Further testing of this framework which is recommended for greater generalizability of this study, if proven successful, then it can be used by other TVET colleges in South Africa. It is also recommended that the e-literacy related factors and enabling conditions be used in a flexible manner taking into consideration prevailing circumstances due technological evolution and socio-economic conditions faced by the developing world, particularly the in the rural communities. The following practical strategies can be employed to promote e-literacy:

- **Infrastructure:** Make the use of computers compulsory in phases of access (e.g. the school with no computer lab can only promote research from mobile phones and should strive for a computer lab with internet access for assignment submission via e-mail).

- **Teacher training:** Teacher training should incorporate computer training or in-service training for those already in the field.

- **Student training:** student training, including teacher training should be directed towards curriculum (e.g. online job search, attach an assignment on an e-mail, PowerPoint presentation of projects, write assignments in word, using data capturing and manipulation using excel, amongst other exercises).

- **Practical experience:** every school should strive to have a computer lab and the capabilities of the mobile phones that most students have must be exploited. Laptop subsidies and cheaper alternatives (e.g. netbooks and refurbished laptops) should be promoted in order to promote home usage as it is proven that home usage promote appropriation of technology.

The use of the proposed framework will, however, be rather limited if the teaching staff is not capacitated appropriately, and hence, they do not demand the use of employability skills in the classroom in the form of submission of assignments via e-mail, for example. The study could not explore the factors for socioeconomic development. Moreover, the study did not explore mobile skills in detail. Further, the introduction of sustainability as it relates to green ICT was not explored.

5.4 Contribution of the study

The research would contribute to academic understanding of the employability, particularly the e-literacy related factors to the promotion of employability into the TVET sector to assist policy-makers and practitioners. Theoretical, this study has added to the academic understanding of the significance of the concepts of e-literacy and employability from pertinent literature and also from empirical research.

The practical contribution of this research is seen in the fact that it can be incorporated in the main curricula without much complexity. Also, this framework, although designed for the South African context, has a potential to be used in other similar contexts in the developing world.

5.5 Limitations of the study

This section acknowledges some of the limitations of this study. The sample of 14 interviewees does not limit the validity of this study. Additionally, employed graduates from TVET colleges were reached due various constraints. However, challenges in terms of equal participation, particularly on the student focus group favoured the more talkative participants. However, every attempt was made to ensure that everyone views were captured in all the factors of the proposed employability framework.

The study was also restricted by the fact that it is based mainly on the factors from the e-Skills National Curriculum Competency Framework (eSNCCF).

Another limitation of the study was the fact that many interviewees, particularly students, were not familiar with the concept of e-literacy. However, when questions were about computer and Internet usage, students provided valuable contributions to the validity of the factors the proposed employability framework.

These limitations, however, did not impact of the validity of this study.

5.6 Future research suggestions

Due to the limited scope of this study, a number of relevant topics could not be explored. For example, it would be insightful to investigate the framework in a context where the factors and the enabling conditions are catered for. This will assist in further fine-tuning of this framework. Comparative studies could also be carried out to demonstrate transferability of the framework in similar contexts in developing countries.

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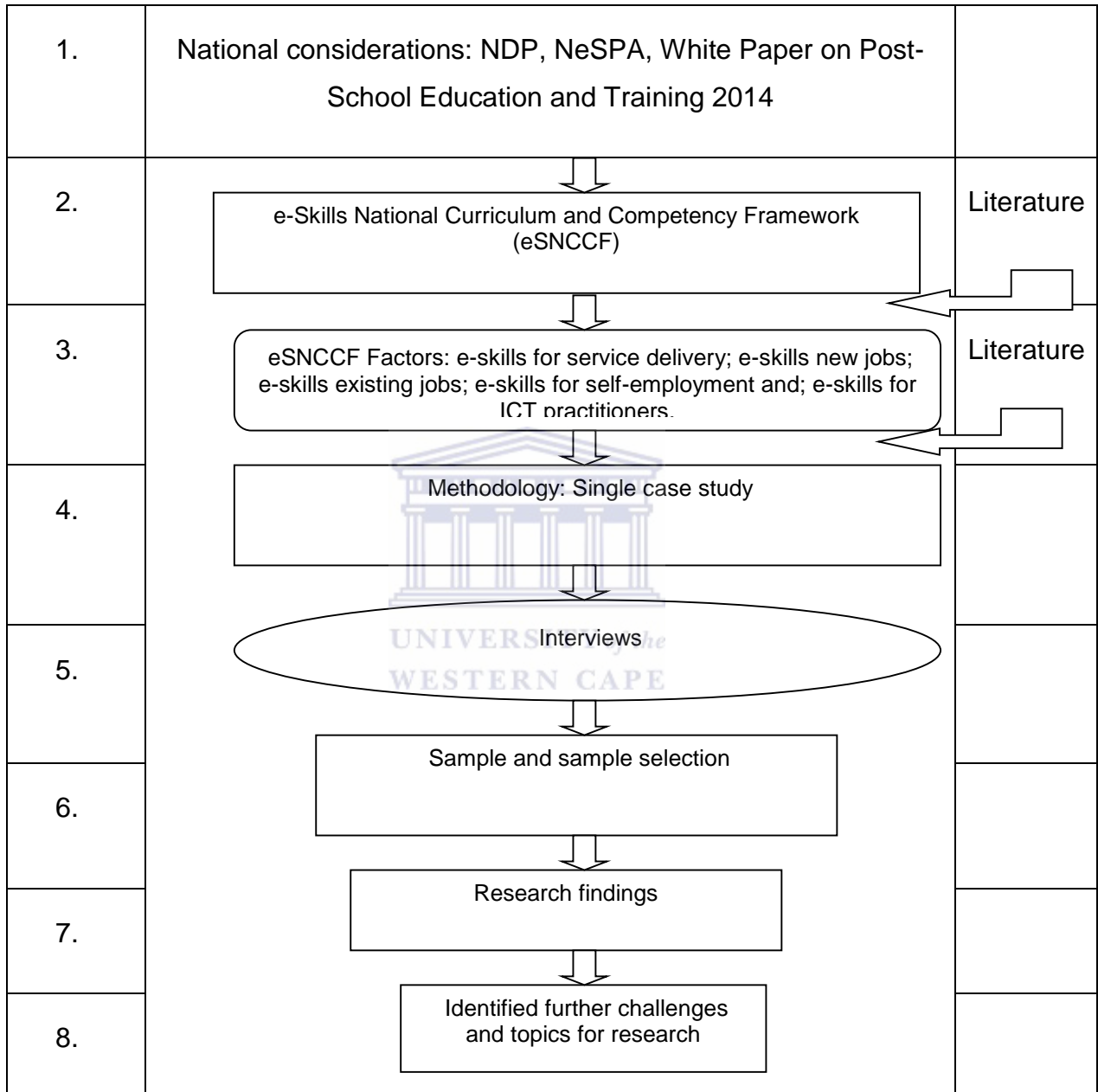Yin, R. K. (1994). *Case Study Research: Design and Methods* (2nd ed.). Thousand Oaks, California, USA: SAGE Publication, Inc.

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APPENDICES

Appendix A: Research Methodology

1.	National considerations: NDP, NeSPA, White Paper on Post-School Education and Training 2014	
2.	e-Skills National Curriculum and Competency Framework (eSNCCF)	Literature
3.	eSNCCF Factors: e-skills for service delivery; e-skills new jobs; e-skills existing jobs; e-skills for self-employment and; e-skills for ICT practitioners.	Literature
4.	Methodology: Single case study	
5.	Interviews	
6.	Sample and sample selection	
7.	Research findings	
8.	Identified further challenges and topics for research	

Source: Adapted from the national research network for e-skills (ReSNeS, 2014)

Appendix B: Consent to Participate in Research

CONSENT TO PARTICIPATE IN RESEARCH

Title: E-Literacy and Employability: A Technical and Vocational Education and Training (TVET) Curriculum Perspective.

You are asked to participate in a research study conducted by Mr. Songezo Mata from the Department of Communications (DoC), Pretoria.

This research study is conducted towards the completion of the researcher's MCom (IS) thesis at the University of the Western Cape.

You were selected as a possible participant in this study because of your knowledge of the matters related to education.

1.   PURPOSE OF THE STUDY
To propose an e-literacy framework that is geared towards promoting employability for the technical and vocational education and training institutions in South Africa.

2.   PROCEDURES
If you volunteer to participate in this study, we would ask you to do the following - to:

1. You will be supplied with the interview questions so that you can prepare for face-to-face interview.
2. You will realize that the interview is semi-structured and will unfold depending on your answers.
3. The interviews will be recorded using an audio recorder, with your permission.

The meetings will take place at the site of your choosing and a time suitable to you.

3.   POTENTIAL RISKS AND DISCOMFORTS
No potential risks are envisaged at this stage. However, if something might come up, it will be dealt with in a sensible and sensitive manner.

4.   POTENTIAL BENEFITS TO SUBJECTS AND/OR TO SOCIETY
It is envisaged that this research will add value to the existing knowledge in the research area of e-literacy by more in-depth understanding of the role of e-literacy in promoting employability in technical and vocational education and training institutions. This can help the national government to adopt effective strategies of promoting employability through e-literacy at the technical and vocational education and training institutions.

5.   PAYMENT FOR PARTICIPATION;
No payments to the participants will be made.

6.   CONFIDENTIALITY
Any information that is obtained in connection with this study and that can be identified with you will remain confidential and will be disclosed only with your permission. Confidentiality will be maintained by means

of referring to the interviewees as Interviewee 1, 2, 3, etc., and by means of themes and categories that will be identified and used in the analysis and discussions of the findings and the outcomes, in the research report, the thesis, and in conference papers and articles that would be submitted for possible publication in academic journals.

The researcher further pledge that any information given by participants will be handled in the strictest confidence, and that the information students give will not be used to reflect negatively on them in any way. The information will be stored in files that will be locked in the filing cabinet of the researcher, in his office.

## 7.   PARTICIPATION AND WITHDRAWAL

You can choose whether to be in this study or not. If you volunteer to be in this study, you may withdraw at any time without consequences of any kind. You may also refuse to answer any questions you don't want to answer and still remain in the study. The investigator may withdraw you from this research if circumstances arise which warrant doing so such as you not attending the monthly meetings over the course of the research period.

8.   IDENTIFICATION OF INVESTIGATORS

If you have any questions or concerns about the research, please feel free to contact me at (012) 427-8586 (o); (cell) 072 026 3196;
E-mail smata@dtps.gov.za

9.   RIGHTS OF RESEARCH SUBJECTS

You may withdraw your consent at any time and discontinue participation without penalty. You are not waiving any legal claims, rights or remedies because of your participation in this research study. If you have questions regarding your rights as a research subject, contact Dr. Zoran Mitrovic, Development of Information Systems, room 4.38, Level 3, EMS building, UWC, or telephonically, (021) 959-2162; or via e-mail at zmitrovic@uwc.ac.za.
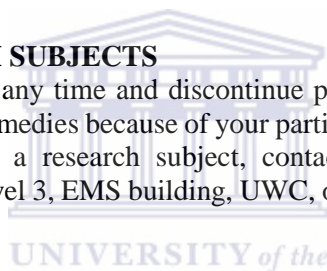
SIGNATURE OF RESEARCH SUBJECT OR LEGAL REPRESENTATIVE

The information above was described to *me, the participant* by Mr. Songezo Mata in *English* and *I am the participant* in command of this language. I was given the opportunity to ask questions and these questions were answered to *my* satisfaction.

I hereby consent voluntarily to participate in this study. I have been given a copy of this form.

_____
Name of Subject/Participant

_____
Name of Legal Representative (if applicable)

_____   _____
Signature of Subject/Participant or Legal Representative   Date

I declare that I explained the information given in this document to _____ [*name of the participant]. H*e/she was encouraged and given ample time to ask me any questions. This conversation was conducted in *English* and *no translator was used.*


_____   _____
Signature of Investigator   **Date**

Appendix C: Student interview questions

Topic 1 (5 min)	**Topic #1: Digital literacy/e-literacy** 1. To begin, please describe the various uses of a computer and tell me the kinds of activities for which you use the computer for here. a. PROBE: Tell me which subjects require computer and internet skills? b. PROBE: Did you attend a course to acquire your computer and internet skills? c. PROBE: Where did you attend the course? d. PROBE: What areas did the course cover? e. PROBE: Explain why you think your current computer and internet skills can make you employable or not employable.
Topic 2 (5 min)	**Topic #2: e-skills for service delivery** 2. What government services do you access online? a. PROBE: Explain the kinds of government services available online? b. PROBE: What types of computer and internet skills are necessary to access government services online? c. PROBE: Explain the computer and internet skills necessary to access government services.
Topic 3 (5 min)	**Topic #3: E-skills for new jobs** 3. Explain the computer and internet skills do you think are necessary for you to get a job after your studies? a. PROBE: Explain how you have used a computer to carry the following tasks: (i) job search; (ii) personal marketing; (iii) online job application; and (iv) CV preparation; (v) career planning; (vi) presentation; (vii) application letter b. PROBE: What are your views on career guidance at this institution? c. PROBE: Explain how career guidance is offered in this institution?
Topic 4 (5 min	**Topic #4: e-skills for existing jobs** 4. What do you understand about e-learning? a. PROBE: Explain your experience on the course you studied via e-learning here or elsewhere? b. PROBE: What do you think make e-learning possible?

Topic 5 (5 min)	**Topic #5: e-skills for self-employment** 5. What computer and internet skills do you think are necessary for you to start your own business? a. PROBE: Explain the computer and internet skills necessary to start your own business? b. PROBE: Explain the application of computer and internet skills for starting a business? d. PROBE: Explain how would you use computer and internet skills to start your own business when you finish your studies? e. What is your opinion the role of computer and internet skills in conducting business?
Topic 6 (5 min)	**Topic #6: ICT practitioner skills** The last thing I'd like to discuss is programming or special software or application skills (CAD, Bookkeeping) 6. Explain your experience of any drawing software or engineering software or business software that you use? a. PROBE: Explain the kind programming language or software you think is necessary for your studies?
Final thoughts (5 minutes)	Those were all the questions that I wanted to ask. 7. Do you have any final thoughts about how computer and internet skills can make you employable that you would like to share? Thank you for your time.
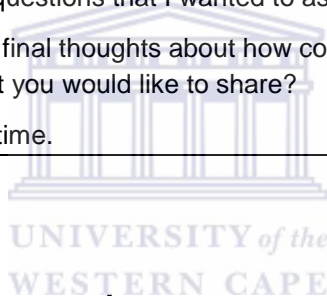
Appendix D: Expert interview questions

Topic 1 (5 min)	**Topic #1: Digital literacy/e-literacy** 1. Explain the digital literacy/e-literacy skills that are important for promoting employability at TVET colleges?

| Topic 2 (20 min) | **Topic # 2 Employability skills**

2. Explain the factors you think can contribute to the promotion of employability of TVET students?

3. Will you please give your opinion on the following digital literacy/e-literacy related employability skills or any other skills that could contribute in the promotion of employability in TVET colleges and how do you think they can be embedded into the TVET curriculum

e-skills for service delivery - Offering of government services online (e-services); **e-skills for new jobs** - Job search; recruitment; selection and career development; Job application; job resumes; interview. **e-skills for existing jobs** - Information, consultation and cooperation; **e-skills for self-employment** - Using spreadsheets; business planning; online presence (e-mail, advertising, social media, website) and search)]; **ICT practitioner skills** - Working with ICT Systems: Specifying, developing, installing, operating, supporting, maintaining, evaluating ICT systems (i.e. CAD) |
| Final thoughts (5 minutes) | Those were all the questions that I wanted to ask.

4. Do you have any final thoughts about how computer and internet skills can make you employable that you would like to share?

Thank you for your time. |

Appendix E: Excerpt from Selected Interviewees

These are responses from the one of the experts interviewed

- Explain the factors you think can contribute to the promotion of employability of TVET students?

    o **Response on employability skills**

"There should be a lot of partnerships between the TVET colleges and employers…should be easy for students to be employed"

"In the past, there were arrangements between industry and colleges, where students reported to employers".

"The TVET curriculum should speak to the needs of the industries"

- Will you please give your opinion on the following digital literacy/e-literacy related employability skills or any other skills that could contribute in the promotion of employability in TVET colleges and how do you think they can be embedded into the TVET curriculum

  o **Response on e-skills for service delivery**

"Curriculum developers are remote to colleges i.e. NCV curriculum have no input from colleges, with content being too high for students from grade 9 and 10….students from these grades struggle a lot".

"NCV should be introduced at lower levels".

"Simulation room with internet access"

Appendix F: Engineering Studies Electrical (Heavy Current) N1 – N6

| CERTIFICATE	Modules	Duration	Entrance Requirements
N1-N3	Engineering Science Engineering Drawings Mathematics Electrical Trade Theory	Each level is one trimester (12 weeks) (Part-time – Only offered on a distance-learning basis.)	Grade 10 or equivalent (with Mathematics and Science)
N4-N6	Electrotechnics Industrial Electronics Logic Systems Mathematics	1 year	N3 or equivalent qualification

Source: (Northlink, 2014)

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Appendix G: Nine Keys to Employability skills

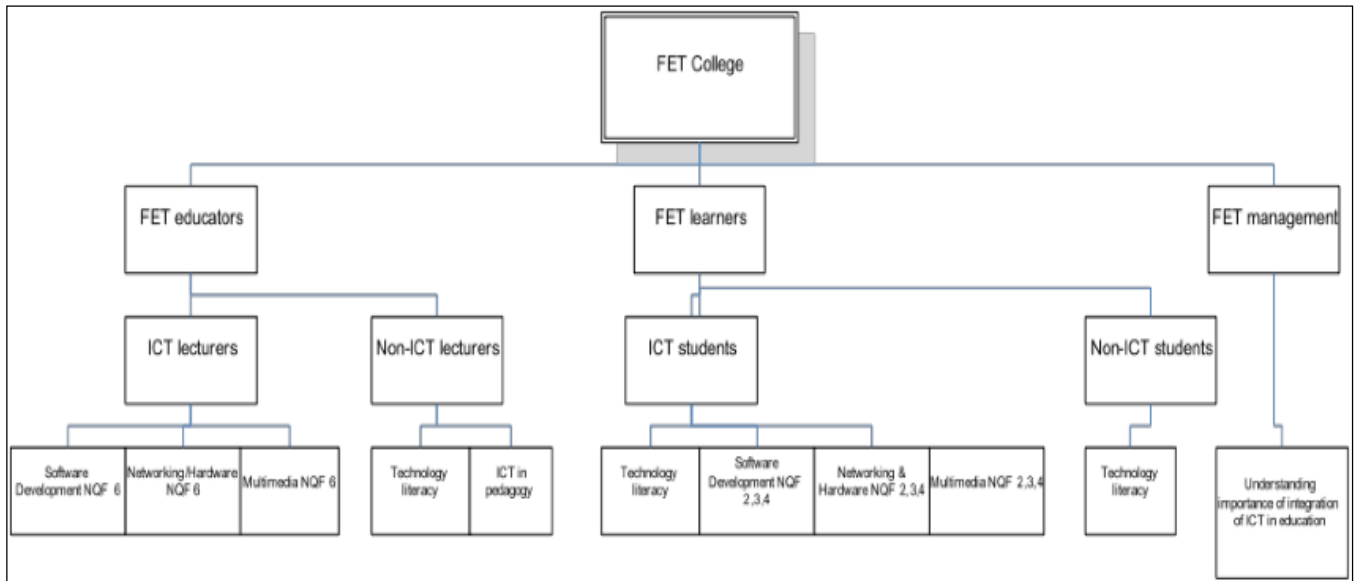| Employability skills	Competencies
Responsibility	Organize work and manage time efficiently Exhibit accuracy, precision, and neatness in work and work habits Demonstrate ability to complete assignments in timely manner Follow oral, visual, written, and multistep directions Display care for tools and materials Strive to improve job performance Seek new assignments when time permits Understand employer expectations
Job-seeking and -getting skills	Become aware of creative potential Utilize creative ability in on-the-job situations Prepare job applications and resumes Conduct career/job search Develop job application letters Demonstrate effective interviewing skills Display understanding of benefits and payroll procedures
Reasoning and problem solving	Display flexibility Integrate creative and innovative ideas Synthesize and process job components Adapt to changing demands of the job Organize work and manage time efficiently Reason and make objective judgments Understand rules and procedures Apply basic skills
Health and safety habits	Observe safety rules Maintain a good work pace and production rate Practice good personal hygiene Dress in a well-groomed, appropriate manner Recognize stress-related situations and deal with them effectively Develop physical stamina and tolerance for the kind of work being done Maintain good personal health
Personal attributes	Develop a good self-esteem and positive self-image Define personal and professional goals Demonstrate emotional stability Exhibit positive attitudes Demonstrate self-motivation and self-management Develop an understanding of motivation for work Exhibit self-confidence and self-awareness Display honesty in personal and work situations

Source: (Poole and Zahn, 1993)

Appendix H: The USEM Account of Employability
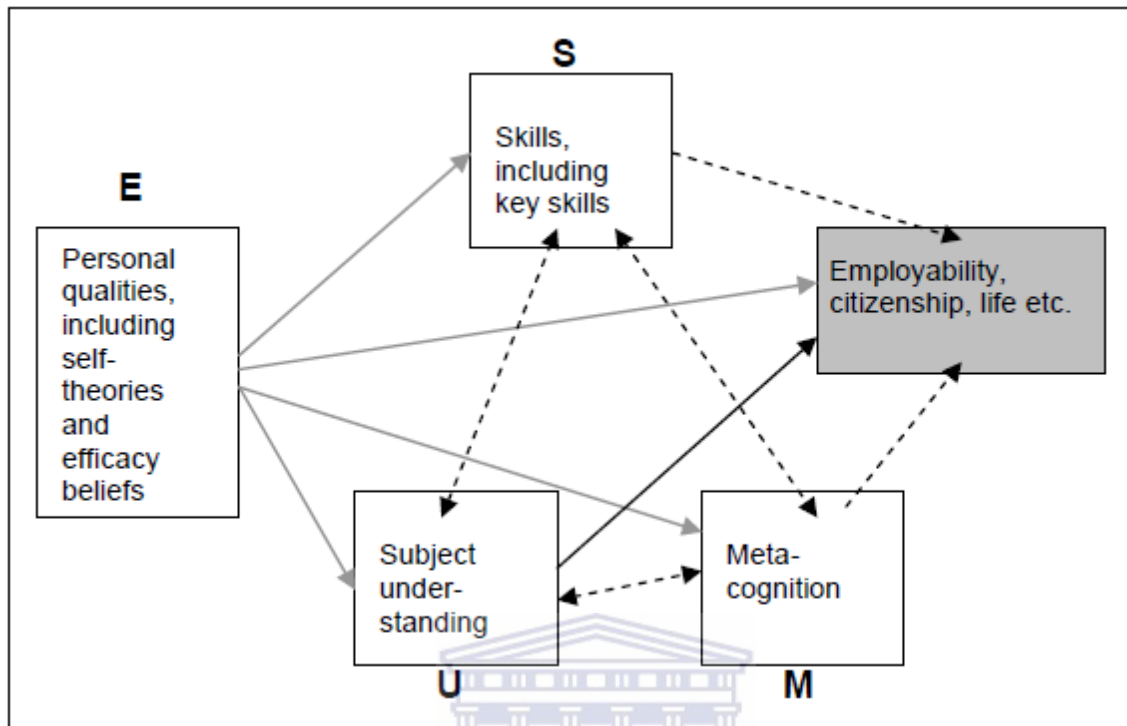
Source: (Knight and Yorke, 2004)

Appendix I: Differentiated e-Skills needed for TVET College Community

Source: (ESI, 2013)