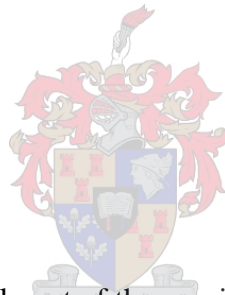


**CRITICAL THINKING SKILLS
AND THE WORKPLACE -**
*a Case Study of newly graduated
Employment Seekers*

by

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Thesis presented in fulfilment of the requirements for the degree of
Master of Philosophy (Information and Knowledge Management)
in the Faculty of Arts and Social Sciences
at Stellenbosch University

Supervisor: Prof. J. Kinghorn

MARCH 2013

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OPSOMMING

Die tesis handel oor die volgende:

Hoofstuk 1 dek die agtergrond, probleemstelling en 'n kort oorsig oor die vaardigheidsgapings wat opgemerk kan word binne die konteks van die kennis-ekonomie.

Hoofstuk 2 handel oor kernkonsepte, naamlik “kritiese denkvaardighede”, die kennis-ekonomie en wersvaardighede.

Hoofstuk 3 sit 'n gevallestudie uiteen. Dit beskryf die metode wat gekies is, die monster asook die uitvoering van die projek.

Hoofstuk 4 bied 'n ontleding aan van die data.

Die laaste hoofstuk bespreek die resultate en hulle implikasies.

SUMMARY

The thesis covers the following chapters

Chapter 1: Background and Research Objectives

This chapter focuses on the background, the problem and its setting and also includes the overview of the knowledge economy and the existing gap in skills.

Chapter 2: Critical thinking and Employability Skills

The focus is on an introduction and definitions of key concepts, namely critical thinking skills, the knowledge economy, and employability skills.

Chapter 3: The Case Study

This chapter offers the chosen research method and design, as well as the reasons for selecting this design, and will describe the methods. The discussion will include the research approach, sampling and data management.

Chapter 4: Presentation and Discussion of the Findings

The discussion includes data interpretation, specific techniques employed and reasons for such strategies.

Chapter 5: Aspects of the Skills Gap

This is the final chapter and it discusses the findings, makes recommendations, and concludes the study.

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DEDICATION

To my two bundles of joy, Ntsakisi Adolf and Ponani Charly, May you grow up using this as a source of inspiration.

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Chapter 1

Background and Research Objectives

1.1 CRITICAL THINKING SKILLS IN THE KNOWLEDGE ECONOMY

A research report, produced by the World Bank in 2007, presents several years of analytical work and research on the knowledge economy in its client countries. The report is about economic development as a process of generating relevant knowledge, and putting that knowledge to work to generate further growth and competitive advantage.²

For organizations to remain competitive, it is argued, a huge need exists for a labour force of critical thinkers who has the ability to link knowledge with business strategy. Thinking is a way of life and yet a complex phenomenon upon which the quality of our lives and that of our thoughts depend.³

Despite its complexity, researchers and specialists agree that thinking skills are basic tools for effective action.⁴ Therefore, the labour force of any given knowledge economy must have thinking abilities of a higher order in order to participate maximally in the knowledge economy, as the latter relies on knowledge that is acquired, created, disseminated and applied to enhance economic development.⁵

The 2007 World Bank Report⁶ on building knowledge economies argue that higher levels of

² World Bank Institute, 2007. Building knowledge economies. Advanced strategies for development.

³ Wade C & Tavis C. 1993. *Critical and creative thinking: The case of love and war*. Harper Collins.

⁴ Wade C & Tavis C. 1993. *Critical and creative thinking: The case of love and war*. Harper Collins.

⁵ World Bank Institute, 2007. Building knowledge economies. Advanced strategies for development.

⁶World Bank Institute, 2007. Building knowledge economies. Advanced strategies for development. World Bank Institute, Knowledge for Development Program. ISBN-13:978-0-8213-6958-6.

knowledge in a society can lead to higher levels of economic growth, provided that the labour force is educated and skilled to the level of being able to create and use knowledge efficiently. This is largely dependent on the country's education and training base, its information and telecommunications infrastructure, and its overall framework of governance.⁷

The rapid advent of electronic devices and other machinery that are taking over more and more human tasks, also increases the need to understand and interact with data and images, thereby emphasizing the need to train and harness critical thinking skills for the labour force in societies. Also important to be borne in mind is the fact that critical thinking can always be improved, either by experience, or by being taught the basic principles of logic and thinking in a formal or informal setting.⁸

Nature has provided every human being with thinking capabilities, i.e. cognitive abilities. Everyone thinks, as it is human nature to do so. As critical thinking is a skill that can be developed and harnessed, this means that critical thinking is not doing what comes naturally, but involves a number of cognitive skills that can be applied to any study, problem, or situation encountered. At times, many non-critical thinkers are characterized by being biased, uninformed or prejudiced when dealing with issues.⁹ Very often, there is a notable difference how critical thinkers and non-critical thinkers deal with whatever situations confront them.

Thinking critically means following specific rules of logic, scientific reasoning, and some general guidelines that are involved.¹⁰ This will mostly be evident in an individual's decision-making abilities. Critical thinkers are likely to demonstrate their abilities to:

- identify and challenge assumptions;
- imagine and explore alternatives; and
- demonstrate a way of reasoning and a deliberate process that is used to interpret or evaluate information and experiences with a set of reflective attitudes and

⁷World Bank Institute, 2007. Building knowledge economies. Advanced strategies for development. World Bank Institute, Knowledge for Development Program. ISBN-13:978-0-8213-6958-6.

⁸Wade C & Tavis C. 1993. *Critical and creative thinking: The case of love and war*. Harper Collins.

⁹Wade C & Tavis C. 1993. *Critical and creative thinking: The case of love and war*. Harper Collins.

¹⁰Wade C & Tavis C. 1993. *Critical and creative thinking: The case of love and war*. Harper Collins.

thoughtfulness.¹¹

According to the World Bank Report, any country's successful transition to a knowledge economy usually involves long-term investments in education to ensure developing innovation capabilities, modernizing the information infrastructure and having an economic environment that is conducive to market transactions.¹²

Sub-Saharan African countries are regarded as low-income countries and have a much greater need to work fast in order to embrace the needs of the knowledge economy in order to make positive changes in their countries.

As a Sub-Saharan country, South Africa forms part of the low-income group of countries mostly characterized by corruption and economic mismanagement.¹³ This may be attributed to a number of factors that are not part of this study, but may include the lack of relevant skills, such as critical thinking skills amongst the labour force.

Another significant limitation to economic growth within the Sub-Saharan countries is the lack of infrastructure. Although enrolment in Sub-Saharan universities has tripled in recent years, the need to structure their education policies towards students' developing and nurturing thinking skills is much greater to ensure that these people participate efficiently and effectively in a developing knowledge economy.¹⁴

Ideally, government and business should work together to identify the skills needed. Business has the responsibility to explain to government the kind of skills that they require in their businesses and organizations. Government must then assist business to ensure labour market as a whole. In this respect, universities and colleges are the machines that have to act as conduits to ensure that the transition from school to the workplace is smooth.

1.2 CRITICAL SKILLS VERSUS EXPECTATIONS IN THE WORKPLACE

In the South African context, students obtain their professional certificates and other accreditation certificates for academic qualifications from traditional universities, universities

¹¹ Marrapodi J. 2003. Critical thinking and creativity: an overview and comparison of the theories. A paper presented in partial fulfilment of the requirements of ED7590 Critical Thinking and Adult Education.

¹² World Bank. 2007. Knowledge for Africa development: ten priorities for Africa. Department of Science and Technology.

¹³ http://en.wikipedia.org/wiki/sub-saharan_Africa accessed 2011/07/19.

¹⁴ http://en.wikipedia.org/wiki/sub-saharan_Africa accessed 2011/07/19.

of technology, and further education and training centres. The above-mentioned higher education institutions are at the centre of the supply for skills into the labour market. Also, the existence and availability of private training institutions that add to the supply pool of skills needed in the job market need to be acknowledged. Universities across the globe are aware of the intense pressure to equip graduates with core transferable generic skills that are needed in many different types of employment.¹⁵ And most of them work hard to deliver work-ready new graduates to make productive contributions to the organizational objectives shortly after being employed.¹⁶

However, employers continue to voice their dissatisfaction regarding young graduates' work readiness, despite the universities' awareness and attempts to produce for the workplace's soft skills. Teichler,¹⁷ Smith,¹⁸ Wacramasinghe and Perera,¹⁹ and Jones²⁰ all argue that the need to prepare a workforce in transferable skills - those cognitive skills including information technology, problem solving and personal skills - remain central to occupational competence in all sectors and at all levels.

Warhurst,²¹ Wackramasinghe and Pereira,²² and Higson and Andrews²³ describe the skills requirements for entry level graduates and the graduate job applicants' actual skills for their entry level. Employability skills are the basic skills necessary for attaining, keeping, and doing well in a job. These skills include attitudes and actions that enable workers to get along with their fellow workers and supervisors and to make sound critical decisions.

¹⁵ Mason G. *et al.* 2009 Employability skills initiatives in higher education: What effects do they have on graduate labour markets' outcomes. *Education Economics* 17 (1): 1-30.

¹⁶ Mason G. *et al.* 2009 Employability skills initiatives in higher education: what effects do they have on graduate labour markets outcomes. *Education Economics* 17 (1): 1-30.

¹⁷ Teichler U. 1999. Research on the relationship between higher education and the world of work: Past achievements, problems and new challenges. *Higher Education* 38: 169-190.

¹⁸ Smith SM. 2002. The skill building challenge: Preparing a bridge for the workforce skills gap.

¹⁹ Wickramasinghe V & Perera L. 2010. Graduates' university lectures and employers' perceptions towards employability skills. *Education and Training* 52 (3): 226-244.

²⁰ Jones M, McIntyre J & Naylor S. 2010. Are physiotherapy students adequately prepared to successfully gain employment? *Physiotherapy* 96: 169-175.

²¹ Warhurst C. 2008. The knowledge economy, skills and government labour market intervention. *Policy Studies* 29 (1): 71-76.

²² Wickramasinghe V & Perera, L. 2010. Graduates', university lecturers' and employers' perceptions towards employability skills. *Education and Training* 52 (3): 226-244.

²³ Andrews J & Higson H. 2008. Graduate employability, soft skills versus hard skills business knowledge: A European study. *Higher Education in Europe* 33 (4): 411-422.

Employability skills refer to attributes in terms of knowledge, skills and attitudes and how these assets are used and deployed in a given setting.²⁴ Unlike occupational or technical skills, employability skills are generic by nature, rather than job specific, and cut across all types of industry, business sizes and job levels, and they require both firmly developed intellectual skills and abilities to be employed as a competitive advantage.

In many countries, the labour market for graduates from higher education institutions has been predominantly driven by supply.²⁵ “Labour supply” refers to individuals who participate in the labour market.²⁶

The young graduate’s labour market is characterized by a number of severe problems, the most fundamental being that institutions of higher learning are unable to facilitate the progression of young people from school to other learning or employment activities.²⁷ The work of Warhurst,²⁸ Phillips and Bond,²⁹ and Wicramasinghe and Perera³⁰ substantiate that, very often, when young graduates take up employments for the first time, they are found to lack requisite skills to function optimally in a given knowledge economy, and to hit the ground running. These requisite skills are those that enable an individual to get the work done efficiently and effectively. Such skills include generic soft skills that are needed in young graduates in order to function in any job. The lack of these skills clearly reveals the mismatch between the output of schooling and the actual employment opportunities available in the job market. Practically, this means that the demand for certain skills exceeds the supply.

The term, “labour demands” refers to the private and public entities that employ individuals.³¹ Many studies have been conducted to identify the kind of skills that employers in industry

²⁴ Wickramasinghe V & Perera L. 2010.

Graduates’, university lecturers’ and employers’ perceptions towards employability skills. *Education and Training* 52 (3): 226-244.

²⁵ Teichler U. 1999. Research on the relationship between higher education and the world of work: Past achievements and new challenges. *Higher Education* 38: 169-190.

²⁶ Daniels RC. 2007. Skills shortage in South Africa: A literature review.

²⁷ Kraak A. 2004. *An overview of South African human resource development*. HSRC Press.

²⁸ Warhurst C. 2008. The knowledge economy, skills and government labour market intervention. *Policy Studies* 29 (1) 71-86.

²⁹ Phillips V & Bond C. 2004. Undergraduates’ experience of critical thinking. *Higher Education Research and Development* 23 (3): 277-294.

³⁰ Wickramasinghe V & Perera L. 2010. Graduates’, university lecturers’ perception towards employability skills. *Education and Training* 52 (3): 226-244.

³¹ Daniels, Reza C. 2007 Skills shortage in South Africa: A literature review.

need. Basic soft skills are high on demand. According to the Indiana Business Research Center, credentialing in the form of degrees and certificates is important; however, projections of social skills to 2014 indicate a high demand for all occupations in active listening, critical thinking, speaking, active learning, writing, time management and social perceptiveness.³² The table below indicates that basic and social skills are the most in demand in professional and business services.

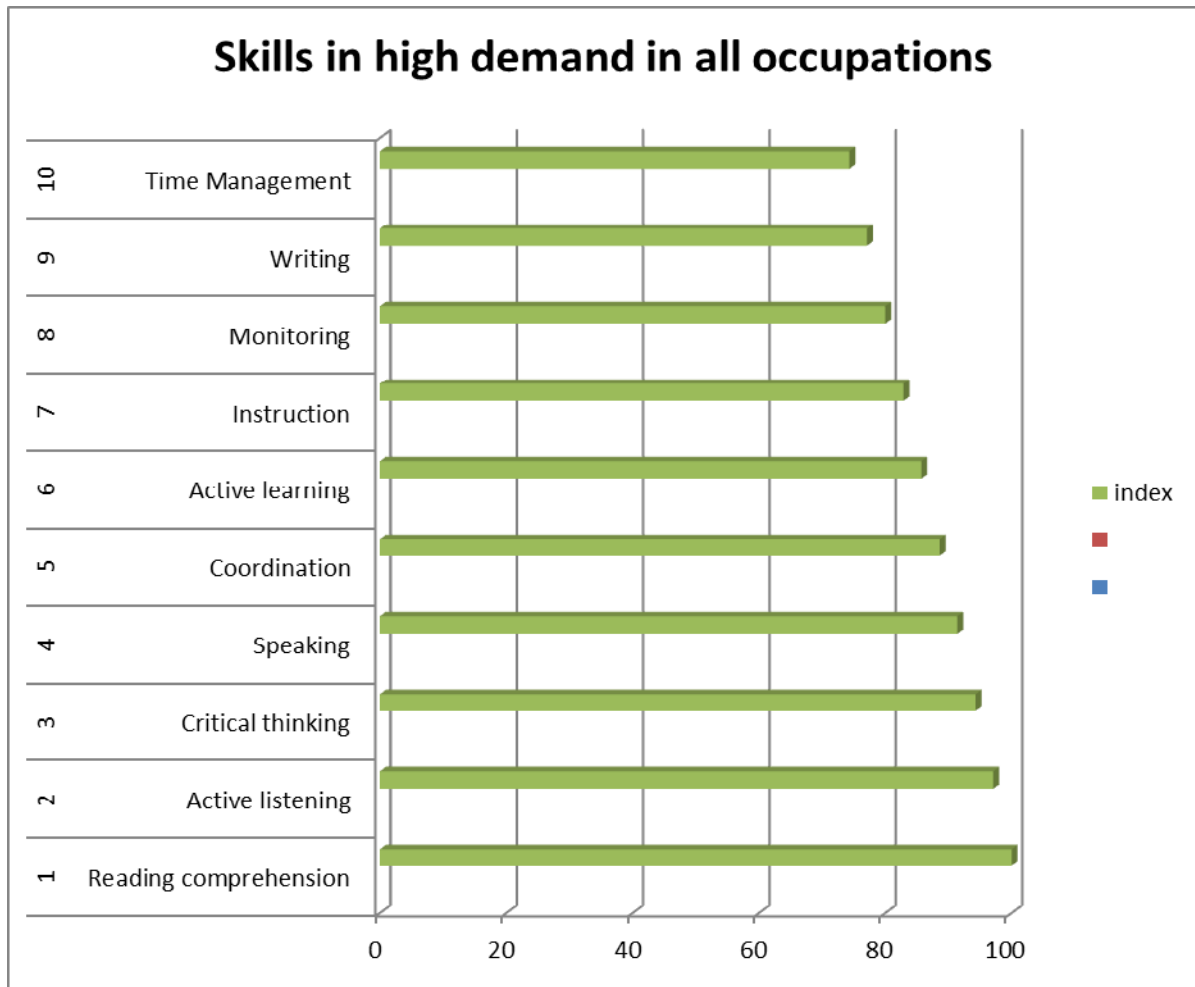


Figure 6. Skills in highest demand for all occupations³³

The above graph indicates how social skills are key among specialized skills that are required in a growing economy like that of South Africa. Above all, critical thinking is at 94.3%, thus confirming that it is one of the most sought-after skills by industry managers.

The shift in the trends of the global economy to a knowledge-based economy dictates that there should be a link between graduate skills and the competencies required in the labour

³² The hard facts about social skills. 2011. <http://www.bettersoftskills.com/research.htm> accessed 2011/08/29.

³³ <http://www.incontext.indiana.edu/2007/september/1.asp> accessed 2011/08/29.

market.³⁴ Various authors, including Andrews and Higson,³⁵ Warhurst,³⁶ and Wacramasinghe and Perera,³⁷ have expressed their concerns regarding the increasing gap between the skills and capabilities of students upon graduating, and the requirements and demands in the global labour market.³⁸ These skills and competencies include the ability to interpret, absorb and also process complex information for application in the knowledge economy.

1.3 THE RESEARCH QUESTION

There is a wide spread belief that students are graduating from institutions of higher learning unprepared for the world of employment. The employment world requires more than only technical and academic skills. It requires a set of personal thinking skills and attributes that enable people to perform efficiently and effectively in their workplace. The complaint is that newly graduates are immature at this level and are therefore unable to make a smooth transition from studenthood to the working world.

A number of reports³⁹ issued by employers' associations express to the view that the work-readiness of new graduates (including being in possession of knowledge, attitudes and commercial understanding that will enable them to make positive contributions to the organizations that will employ them) is a cause for concern.

The research reported on in this thesis takes as its point of departure the assumption that the widespread belief is rooted in reality. This is confirmed by intuition, but also by the consideration that there is no reason why South Africa will be any different from those countries analysed in the literature referred to up to now.

In this respect the advent of the knowledge economy impacts specifically on the already existing skills gap. The knowledge economy adds to the list of basic skills required.

³⁴ Andrews J & Higson H. 2008. Graduate employability, soft skills versus hard skills business knowledge: A European study. *Higher Education in Europe* 33 (4): 411-422.

³⁵ Andrews J & Higson H. 2008. Graduate employability, soft skills versus hard skills business knowledge: A European study. *Higher Education in Europe* 33 (4): 411-422.

³⁶ Warhurst C. 2008. The knowledge economy, skills and government labour market intervention. *Policy Studies* 29 (1): 71-76.

³⁷ Wickramasinghe V & Perera, L. 2010. Graduates', university lecturers' and employers' perceptions towards employability skills. *Education and Training* 52 (3): 226-244.

³⁸ Andrews J & Higson H. 2008. Graduate employability, soft skills versus hard skills business knowledge: A European study. *Higher Education in Europe* 33 (4): 411-422.

³⁹ Mason G *et al.* 2009. Employability skills initiatives in higher education: What effects do they have on graduate labour market outcomes? *Education Economics* 17 (1): 1-30.

Particularly important is the increased volume of available information and the advanced skills required to process that information.

The knowledge economy has emerged, and is emerging, and should be encouraged to emerge.⁴⁰ The advent of the knowledge economy directs more and more societies around the world to use information to build knowledge for human development. To achieve this, the knowledge economy requires people with a wide range of skills and abilities to meet its demands. These skills and abilities are essential for productive participation in the knowledge economy. Amongst others, the skills required in a knowledge economy include the following: effective communication, thinking skills, team work, habits of learning, and information literacy skills, which may also include attitudes, such as determination, emotional intelligence, enthusiasm and commitment.

In the broadest sense, therefore, this thesis investigates the problem of a “gap” between the formal supply of skills (in people) and the demand as expressed in expectation of employers, keeping in mind the context of the knowledge economy.

This is, of course, a very wide topic and there are many factors that influence the “gap”. The knowledge economy is also not a stagnant economy, but is constantly changing. Therefore the “gap” will also change over time and from place to place.

To bring focus to the investigation and to narrow it down to a scope which allows for useful research, the broad question is concretised as follows:

- in this thesis only the factor of *critical thinking skills* will be investigated
- a case study with a sample group of students and businesses will be reported

Specifically, therefore, this thesis investigates the different perceptions of critical thinking skills held by prospective employees (who are newly graduated) and prospective employers.

At the crux of productive participation in the knowledge economy, is a set of conceptual tools with associated intellectual skills and strategies useful for making reasonable decisions about what to do, or what to believe, namely, critical thinking skills.⁴¹

⁴⁰ Warhurst C. 2008. The knowledge economy, skills and government labor market intervention. *Policy Studies* 29 (1): 71-76.

⁴¹ Rudinow J & Barry VE. 2004. *Invitation to critical thinking*. Belmont.

Critical thinking is said to be a defining characteristic of a university graduate⁴² and the basis of life-long learning.⁴³

A critical thinker should be able to apply the following basic guidelines in a given work environment:

- ask questions
- define a problem
- examine evidence
- analyse assumptions and possible biases, and avoid emotional reasoning
- avoid over-simplification of facts
- consider other interpretations, and
- must have the ability to tolerate uncertainty.⁴⁴

In the narrowest sense this thesis, therefore, investigates the perceived differences between prospective supply and the demand from prospective employers of critical thinking skills in the SA economy (against the backdrop of the developing knowledge economy).

1.4 RESEARCH DESIGN

The research which is reported in this thesis consisted of two parts.

The thesis is rooted in an extensive literature analysis focussing on the notion of ‘critical thinking skills’ and cognate concepts.

In light of the theory in this regard a small case study was designed and executed as set out below.

The selection of TUT students derived from the fact that the University had embarked on a program to appoint students in temporary positions in several of its service points in an effort to enhance their employability upon entering the jobs market. These are students who, therefore, we can expect to consciously reflect on their employability and develop their own expectations about the work environment, but also images of their personal abilities.

Step 1

The first step was to develop an instrument that was circulated to employers to determine

⁴² Phillips V & Bond C. 2004. Undergraduates’ experiences of critical thinking. *Higher Education Research and Development* 23 (3): 277-294.

⁴³ Phillips V & Bond C. 2004. Undergraduates’ experiences of critical thinking. *Higher Education Research and Development* 23 (3): 277-294.

⁴⁴ Wade C & Travis C. 1993. *Critical and creative thinking: The case of love and war*. Harper Collins.

their expectations concerning the various soft skills of first entrants in the job market that are required for productive participation in the knowledge economy.

Step 2

A second comprehensive tool particular to critical thinking skills was developed and was distributed to managers of companies in a variety of contrasting institutions and organizations, such as libraries, government departments, universities, research institutions and parastatal organizations.

Step 3

A self-evaluation tool particular to critical thinking skills was developed and distributed to the students and was returned to the researcher via electronic mail. Follow-up interviews were then conducted with the same selected sample. The interviews included an open-ended question to further determine the students' level of understanding of critical thinking skills.

Step 4

Based upon the results of the responses from the self-evaluation tool of the student survey, the researcher developed a questionnaire for a face-to-face follow-up interview with the students for more in-depth understanding of their responses. The interviews were conducted at the home library where students were appointed. For research and ethical considerations, the students signed an informed consent for participation in the follow-up interviews.

Step 5

The researcher opted for a statistical software package called Stata v11 to analyse the data because of its inherent advantages, which include increased user-friendliness, a wide range of available statistics, the speed of completion and graphics. The data was further captured on the Microsoft Excel program for graphics.

The necessary ethical clearances from both TUT (where the case study was conducted with the students) and the US (as the degree granting institute) were obtained.

1.5 DELIMITING THE STUDY

As was stated above, the broad question which lies in the background of this thesis is quite wide and involves a large number of factors.

The decision to limit the scope of investigation to the factor of ‘critical thinking skills’, and to approach the issue on a case basis, helps to bring some coherence into the undertaking. Even so, further delimitations need to be made explicit.

Firstly, although there is almost consensus in SA today that the education system is below par, it does not follow necessarily that the (assumed) “gap” is caused by a failing education system only – or even primarily. Three possible scenarios can logically be provided to account for the “gap”. It can be that the education system is inadequate, or that employers hold too high expectations, or both. This thesis cannot offer an authoritative verdict on which of the three are correct. The only attempt that can be legitimately made here is to try to understand the “gap” as well as is possible in light of the evidence derived from literature and the case study.

Secondly, critical thinking skills is a neat concept on paper, but in real life it is intertwined with a host of other skills, both cognitive and emotional. Isolating critical thinking skills is necessary from a research and academic point of view, but is not possible in real life. Many aspects ascribed to critical thinking skills, or used to identify it, overlap with other human traits. We can, therefore, only approximate the object of investigation.

Thirdly, the nature of the investigation into critical thinking skills in this thesis, always meant that personal perceptions were going to dominate. Although perceptions often play a more forceful role than ‘realities’ in the affairs of societies and people, the fact remains that it is dangerous to equate perceptions with fact. Any possible conclusions that may be drawn from this thesis for teaching curriculae or business practices must bear in mind that the empirical data generated in this research reflect no more than perceptions.

Finally, as is the case with all case studies, the study of select students at TUT may not necessarily reflect the general trend. Particularly when learning is at stake, the scope for divergence is big. On the other hand, these being students from a prominent tertiary institution in SA, it is reasonable to expect that some generalisation is possible.

1.6 THESIS LAYOUT

The structure of the thesis is as follows:

Chapter 1: Background and Research Objectives

This chapter focuses on the background, the problem and its setting and also includes the overview of the knowledge economy and the existing gap in skills.

Chapter 2: Critical thinking and Employability Skills

The focus is on an introduction and definitions of key concepts, namely critical thinking skills, the knowledge economy, and employability skills.

Chapter 3: The Case Study

This chapter offers the chosen research method and design, as well as the reasons for selecting this design, and will describe the methods. The discussion will include the research approach, sampling and data management.

Chapter 4: Presentation and Discussion of the Findings

The discussion includes data interpretation, specific techniques employed and reasons for such strategies.

Leedy⁴⁵ indicates that the human mind can think about only so much information at a time. In order for data to be interpreted and for meaningful analysis, the researcher will have to organize the data collated in its various formats.

Chapter 5: Aspects of the Skills Gap

This is the final chapter and it discusses the findings, makes recommendations, and concludes the study.

⁴⁵ Leedy PD & Ormrod J.E 2005. Practical research: Planning and design. 8th Pearson Education International.

Chapter 2

Critical Thinking and Employability Skills

2.1 INTRODUCTION

This chapter focuses on the theoretical foundations of the three selected variables namely, critical thinking, the knowledge economy, and employability skills.

Universities across the globe are increasingly required to produce highly skilled graduates who are able to respond to the ever-changing and complex needs of the workplace.⁴⁶ This is due to the fact that the knowledge generated by emerging technologies have given rise to knowledge societies and a new vehicle for economic growth, known as the knowledge economy,⁴⁷ which requires a range of knowledge, skills and experience to begin work and provide the required services for customers.

In order to address the problem in question, a literature review was conducted to obtain as much relevant and current information as possible on the area of critical thinking and logic, the knowledge economy and employability skills.

To address the prevailing situation, it is of fundamental importance to explore the role of higher education institutions in building the human capital that will ensure the necessary set

⁴⁶ Andrews J & Higson H. 2008. Graduate employability, soft skills versus hard business knowledge: A European study. *Higher Education in Europe* 33 (4): 411-422.

⁴⁷ Andrews J & Higson H. 2008. Graduate employability, soft skills versus hard business knowledge: A European study. *Higher Education in Europe* 33 (4): 411-422.

of skills to participate effectively in the knowledge economy. In 2006, the World Bank's Knowledge Economy Forum⁴⁸ adopted the knowledge economy framework as the organizing principle for participating in the knowledge-based economy. Previous studies have indicated that a successful transition to a knowledge economy involves long-term investments in education, the development of innovation capabilities, modernization of the information infrastructure, and having an economic environment that is conducive to market transitions.

Due to the fact that many employers find young graduates' quality and relevant skills unsatisfactory, there is a need to effect changes in the education system or in a way institutions of higher learning intervene in terms of preparing graduates to venture into the job market. To effect these changes, education systems need to change with the objective of supporting basic competencies needed for participation in the knowledge economy. Figure 1 below indicates the schematic representation of the variables.

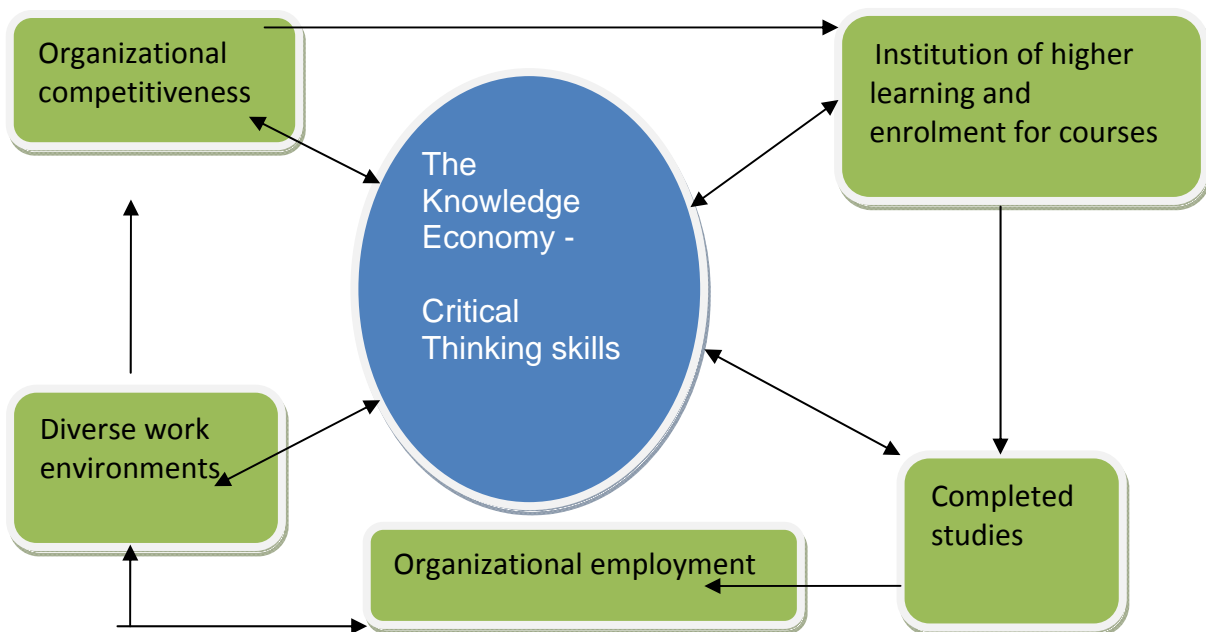


Figure 1. *Relations between variables*

2.2 THE KNOWLEDGE ECONOMY

The last decade of the 20th century has brought the rise and greater emphasis of a new system of creating wealth that was no longer based on brawn, but based purely on the mind - the

⁴⁸ World-Bank Institute. 2007. Building knowledge economies. Advanced strategies for development.

knowledge economy.⁴⁹ The Organization for Economic Co-operation and Development (OECD) defines a country with a knowledge-based economy as one where the production, diffusion and use of technology and information are key to its economic activity and sustainable growth.⁵⁰ The term “knowledge economy” originally emerged in the 1960s with the work of Machlup in 1962, and later in that of Bell in 1974, and in Porat and Rubin’s in 1977, among others, and came into existence following the commercialization of information and communication technologies.⁵¹

Smith argues that the knowledge economy, at best, is a widely-used metaphor, rather than a clear-cut concept, while, in 2008, Roberts and Armitage question the validity of the notion by suggesting that the contemporary economy is as much characterized by ignorance as by knowledge. Furthermore, Godin suggests that the knowledge-based economy is simply a concept that the Organization for Economic Co-operation and Development (OECD) mainly promotes to direct policy makers’ attention to issues of science and technology relevant to the economy.⁵²

According to Houghton and Sheahan,⁵³ the knowledge economy is what is obtained when organisations bring together powerful computers and well-educated and creative minds for competitive advantage, and to create wealth.

Lengnick-Hall and Lengnick–Hall⁵⁴ define the knowledge economy as an entity that encompasses all jobs, companies and industries in which people’s knowledge and capabilities determine competitive advantage, rather than the capabilities of machines or technologies, because firms in the knowledge economy compete with their abilities to exploit scientific, technical and creative knowledge abilities and networks.

As difficult, if not impossible, as it may seem to define knowledge, it is possible to define a

⁴⁹ George E. 2006. Positioning higher education for the knowledge based economy. *Higher Education* (52): 589–610.

⁵⁰ George E. 2006. Positioning higher education for the knowledge based economy. *Higher Education* (52): 589–610.

⁵¹ Roberts J. 2009. The global knowledge economy in question. *Critical Perspectives on International Business* 5(4): 285-303.

⁵² Roberts J. 2009. The global knowledge economy in question. *Critical Perspectives on International Business* 5(4): 285-303.

⁵³ Houghton J & Sheehan P. 2000. A primer on the knowledge economy. CSES Working Paper no 18.

⁵⁴ Legnick Hall ML & Legnick Hall CA. 2003. *Human resource management in the knowledge economy: New challenges, new roles, new capabilities*. San Francisco.

certain type of knowledge at a certain level by exploring its context. Today, our real challenge is not to define knowledge specifically, but to spend our efforts in exploring the context, as we seek to explore and identify key elements of the context that impact on a particular knowledge interaction. It is also important to note that knowledge extends beyond information, as it applies to facts acquired through study, investigation, experience or observation.⁵⁵

In line with these definitions, the United Kingdom's Economic and Social Research Council (ESRC) argues that the term "knowledge economy" is used to describe the economic structure emerging in the global information society in which economic success increasingly depends on the effective utilization of intangible assets, such as knowledge, skills and innovative potential.⁵⁶ Knowledge is an essential force in economic development, therefore it is extremely important for nations to identify, enhance, and exploit intangible assets in various areas of their development, especially education, information and communication technology.

The knowledge economy requires people with soft skills – i.e. a wide range of abilities and attributes including the ability to communicate effectively and to think critically. In today's global labour market, employers do not seek employees with only technical skills, but also those who have demonstrated an ability to think logically and analytically in order to communicate the results of their work in a multitude of settings, to work both independently and in teams, and to be real problem solvers.

The 2007 World Bank Report indicates that any country's successful transition to a knowledge economy usually involves long-term investments in education to ensure the development of innovation capabilities, modernizing the information infrastructure and having an economic environment that is conducive to market transactions.⁵⁷ Sub-Saharan African countries are regarded as low-income countries that have a much greater need to work fast in order to leapfrog and make rapid changes in their countries. Tertiary institutions in a knowledge-based society must enhance their training and produce a qualified and adaptable labour force that will be able to innovate and generate new knowledge for organizations in

⁵⁵ Tiwana A. 2002. *The knowledge management toolkit: Orchestrating IT, strategy, and knowledge platforms*. 2nd edition, Prentice Hall.

⁵⁶ Roberts J. 2009. The global knowledge economy in question. *Critical Perspectives on International Business* 5(4): 285-303.

⁵⁷ World-Bank, 2007. Knowledge for Africa development: Ten priorities for Africa. Department of Science and Technology.

order to enhance their competitive edge. Therefore, in a knowledge-based economy, the emphasis should be on the content provided at institutions of higher learning, as they are a conduit through which prospective employees with various careers are produced.

Therefore, it is imperative for the low-income group of countries to work towards developing a conducive knowledge economy that is characterized by well-educated *knowledge workers* with creative minds to create wealth and to remain competitive.⁵⁸

2.3 KEY CHARACTERISTICS OF THE KNOWLEDGE ECONOMY

There are notable differences between a traditional economy and the knowledge economy. A knowledge economy is characterized by the creation of business clusters around centres of knowledge, such as universities. The driving forces of the knowledge economy are globalization, information/knowledge intensity, computer networking, and connectivity. Knowledge-enhanced products and services also characterize it. Human capital and competencies are a further key component of value in a knowledge-based organization where communication is viewed as fundamental to knowledge flows.⁵⁹

2.3.1 *The knowledge worker*

With the advent of the knowledge economy, work and employment has changed. Unlike a manual worker, a knowledge worker produces ideas. The term “knowledge worker” refers to people who use their heads more than their hands to produce value.⁶⁰

This is based on the fact that knowledge has become an essential factor of production, together with the traditional tangible factors. The main task for knowledge workers is to identify and solve problems and, by doing so, they employ their cognitive skills in a skilful manner to analyse the content, subject, or a problem in a way that clarifies the relevance and accuracy. The primary purpose of a knowledge worker’s job involves the creation, distribution and application of knowledge,⁶¹ and their tasks involve the use of thinking skills. These workers have abstract intellectual knowledge, which involves high levels of conceptual

⁵⁸ World-Bank, 2007. Knowledge for Africa development: Ten priorities for Africa. Department of Science and Technology.

⁵⁹ Knowledge Economy. http://en.wikipedia.org/wiki/knowledge_economy accessed 2008/07/02.

⁶⁰ Vlad V (ed). 2010. *Talent management of knowledge workers: Embracing the non traditional workforce*. Palgrave Macmillan.

⁶¹ Vlad V (ed). 2010. *Talent management of knowledge workers: Embracing the non traditional workforce*. Palgrave Macmillan.

skills.⁶² A knowledge worker operates and functions in an environment that is characterized by the following:

- the growing importance of knowledge as an input into the economy
- the increasing importance of information and communication technologies
- the rising importance of knowledge as an economic output
- a growing commercialization of knowledge through, for instance, intellectual property rights
- a growing number of knowledge workers
- the increasing impact of knowledge across all sectors of the economy
- a rise of knowledge management practices
- globalization as a force driving the expansion of the knowledge economy.⁶³

Every knowledge worker possesses two broad types of knowledge, namely, explicit and tacit knowledge. The interaction between these two forms of knowledge reinforces the idea that effective learning takes place by means of a combination of experiential learning and formal learning. However, the effective interaction and utilization of tacit and explicit knowledge is essential for maximum participation in a knowledge economy for enhanced competitiveness.⁶⁴

2.3.2. *Explicit knowledge*

This is knowledge that can be expressed in words and numbers. This kind of knowledge can be shared formally and systematically in the form of data, specifications, manuals, drawings, audio and video tapes, compact disc programmes, and a variety of documentation.⁶⁵ Therefore, explicit knowledge can be articulated and be disseminated through conventional electronic channels, as it is well supported by the IT.⁶⁶ In today's global economy, the key organizational resource is explicit knowledge, which anyone can access and use.

⁶² Warhurst C. 2008. The knowledge economy, skills and government labour market intervention. *Policy Studies* 29 (1): 71-86.

⁶³ Roberts J. 2009. The global knowledge economy in question. *Critical Perspectives on International Business* 5(4): 285-303.

⁶⁴ Psarras J. 2006. Education and training in the knowledge-based economy. *VINE* 36(1): 85-96.

⁶⁵ Beccera-Fernandez I, Gonzalez A & Sabherwal R. 2004. *Knowledge management: Challenges, solutions, and technologies*. Prentice-Hall, New Jersey.

⁶⁶ Tiwana A. 2002. *The knowledge management toolkit: orchestrating IT, strategy, and knowledge platforms*. 2nd edition. Prentice Hall.

2.3.3 Tacit knowledge

Tacit knowledge is difficult to share as it resides in the owner's brain. It cannot be taught in lectures and is not available in any textbook, database, manual or newsletter for distribution.⁶⁷

This kind of knowledge includes insights, intuition and hunches, which are difficult to express and formalize and therefore difficult to share.⁶⁸ However, it can be shared by means of different methods, such as direct interaction, practical experiences and face-to-face social interaction.

This kind of knowledge is also known to be very elusive. Polanyi says, "We can know more than we can tell," whilst Leonard and Sensiper go even further by saying, "We can often know more than we realize."⁶⁹ However, Nonaka and Takeuchi suggest that tacit knowledge becomes explicit through the process of externalization during a social interaction. This knowledge informs our daily activities without us having to think of it as knowledge. Therefore, without any doubt, tacit knowledge requires involvement for the transfer of such skills to take place and, during periods of experiential learning experiences, have to be shared through social interaction. So, for tacit knowledge to materialize, the people engaged in the interaction should be surrounded by a supportive environment.⁷⁰

In a work environment, tacit knowledge is that which draws on accumulated experience and learning, and is deeply rooted in action and an individual's commitment to a specific context. It also has an important cognitive dimension, because it consists of mental model beliefs mostly taken for granted, hence the difficulty in articulating them.⁷¹ The TUT presumes that the provision of a platform for students to be exposed to a working environment prior to their formal appointment in the job market, and that through their interaction with permanent staff, they will obtain and internalize processes such as experience and individual talents. This can be clearly demonstrated by the dynamic process, called the SECI model that best describes the conversion modes from tacit to tacit, explicit to explicit, tacit to explicit and explicit to

⁶⁷ Haldin-Herrgard T. 2000. Difficulties in diffusion of tacit knowledge in organizations. *Journal of Intellectual Capital* 1 (4): 357-365.

⁶⁸ Beccera-Fernandez I, Gonzalez A & Sabherwal R. 2004. *Knowledge management: Challenges, solutions, and technologies*. Prentice-Hall, New Jersey.

⁶⁹ Stenmark D. 2001. Leveraging tacit knowledge. *Journal of Management Information Systems* 17 (3): 9-24.

⁷⁰ Ehin C. 2008. Un-managing knowledge workers. *Journal of Intellectual Capacity* 9 (3): 337-350.

⁷¹ Harvard business review on knowledge management, 1998. Harvard Business School Press.

tacit knowledge.⁷² According to Sanchez,⁷³ because learning is personal by nature and very difficult to extract from people, learning must be encouraged by bringing people together under the right circumstances, because the assets of knowledge are built through the process of learning and the ability to exploit the flows of knowledge.⁷⁴ The diagram below indicates some key facets of knowledge.

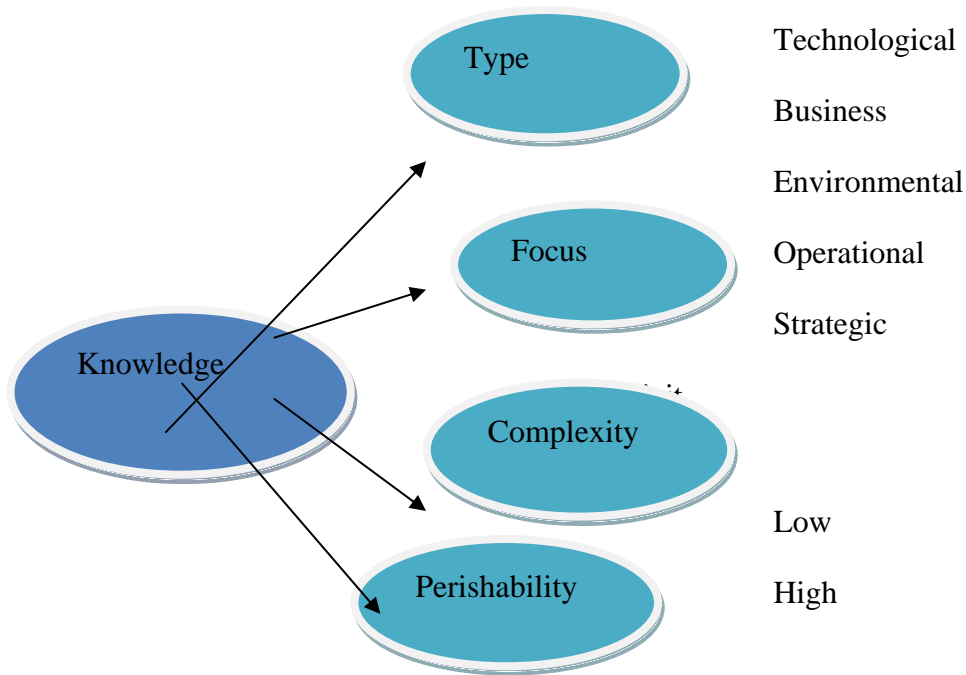


Figure 2. A map of key facets of knowledge⁷⁵

Because knowledge is all about facts and ideas that have been acquired through experience, it bears the following characteristics:

- It is muddy, fuzzy and partly unstructured.
- It lies in connections, conversations between people and people’s ability to compare situations, problems and solutions.
- It is highly dependent on the owner.

Knowledge is a key resource in intelligent decision making which actually involves the ability to think in a critical manner in forecasting, design, planning, diagnosis and the overall

⁷² Haldin-Herrgard T. 2000. Difficulties in diffusion of tacit knowledge in organizations. *Journal of Intellectual Capital* 1 (4): 357-365.

⁷³ Sanchez R. 2005. Tacit knowledge versus explicit knowledge: Approaches to knowledge management practice.

⁷⁴ Boisot MH. 1998. *Knowledge assets: Securing competitive advantage in the information economy*. Oxford University Press.

⁷⁵ Tiwana A. 2002. *The knowledge management toolkit: Orchestrating IT, strategy, and knowledge platforms*. Prentice Hall.

liberty to make predictions about particular matters.⁷⁶

2.4 CRITICAL THINKING SKILLS

2.4.1 Defining critical thinking skills

For a valuable shared understanding of critical thinking, various authors' definitions will be examined.

Dewey⁷⁷ defines critical thinking as an active, persistent and careful consideration of a belief or supposed form of knowledge in the light of the grounds that support it and further conclusions to which it tends. In Fischer,⁷⁸ Glaser defines critical thinking as an attitude of being disposed to consider, in a thoughtful way, the problems and subjects that come within the range of one's experience, knowledge of the methods of logical inquiry and reasoning, as well as some skills in applying those methods. Critical thinking calls for a persistent effort to examine any belief or supposed form of knowledge in the light of evidence that supports it. Another famous contributor to the development of the critical thinking theory, Robert Ennis, in Fischer,⁷⁹ defines it as reasonable, reflective thinking that is focused on deciding what to believe or do.

Richard Paul⁸⁰ says it is a mode of thinking about any subject, content or problem in which the thinker improves the quality of his or her thinking by skilfully taking charge of the structures inherent in thinking and imposing intellectual standards upon them.

Critical thinking is a set of conceptual tools with associated intellectual skills and strategies useful for making reasonable decisions about what to do or believe. This is according to Rudinow and Barry.⁸¹

It is an intellectually disciplined process of actively and skilfully conceptualizing, applying, analysing, synthesizing and/or evaluating information gathered from, or generated by, observation, experience, reflection, reasoning, or communication as a guide to belief and action.

⁷⁶Tiwana A. 2002. *The knowledge management toolkit: Orchestrating IT, strategy, and knowledge platforms*. 2nd edition. Prentice Hall.

⁷⁷ Fischer A. 2001. *Critical thinking: An introduction*. Cambridge University Press.

⁷⁸ Fischer A. 2001. *Critical thinking: An introduction*. Cambridge University Press.

⁷⁹ Fischer A. 2001. *Critical thinking: An Introduction*. Cambridge University Press.

⁸⁰ Fischer A. 2001. *Critical thinking: An Introduction*. Cambridge University Press.

⁸¹ Rudinow J & Barry VE. 2004. *Invitation to critical thinking*. Belmont.

Cottrell⁸² unpacks the definition even further and defines it as a complex process of deliberation which involves a wide range of skills and attitudes that include:

- Identifying other people’s positions and arguments and conclusions
- Evaluating evidence for alternative points of view
- Weighing up opposing arguments and evidence fairly
- Being able to read between the lines, see behind surfaces, and identify false or unfair assumptions
- Recognizing techniques used to make certain positions more appealing than others, such as false logic and persuasive devices
- Reflecting on issues in a structured way, bringing logic and insight to bear
- Drawing conclusions about whether arguments are valid and justifiable, based on good evidence and sensible assumptions
- Presenting a point of view in a structured, clear, well-reasoned way that convinces others.

The above definitions provide a variety of perspectives of various scholars in the field of critical thinking.

In 1909 and 1941 respectively, Dewey and Glaser shared the idea that critical thinking is a persistent and a careful consideration, or considering in a thoughtful way, and a persistent effort to examine any belief or action.

Ennis⁸³ (1989) and Paul (1993) use the terms “reasonable” and “reflective thinking” on decisions what to do, and skilfully taking charge of the structures inherent in thinking. Rudinow⁸⁴ (2004) also alludes to conceptual tools and skilfully conceptualizing, whilst Cottrell sums it up by indicating that it is a complex process of deliberations involving a wide range of skills and attitudes.

Earlier definitions of critical thinking emphasized the cognitive component that critical thinking is a set of skills or mental procedures and frames. These definitions are concerned with the methods and rules of formal logic. However, in his later definition, Ennis emphasizes the intentional and motivational aspect of critical thinking which other scholars in

⁸² Cottrell S. 2005. *Critical thinking skills: Developing effective analysis and argument*. 2nd edition Palgrave Macmillan.

⁸³ Ennis RH. 1962. A concept of critical thinking. *Harvard Education Review* 32: 81-111.

⁸⁴ Rudinow J & Barry VE. 2004. *Invitation to critical thinking*. Belmont.

the critical thinking field termed as “a critical thinking disposition,” because the disposition to think critically includes a person’s motivation.⁸⁵

For the purpose of this study, of the above definitions, the following working definition has thus been formulated:

Critical thinking is a way of thinking about any content, subject or a given problem in a skilful manner of analysing, assessing, evaluating gathered information, observing, reflection, reasoning, communicating, checking for clarity, accuracy, precision, relevance, depth, breadth, significant logic and fairness as a guide to a belief or an action, and to determine whether there is adequate justification to accept the conclusion as true.

2.4.2 Critical thinking as a generic skill

In cognitive psychology, the use of cognitive skills or strategies that increase the probability of the desirable outcomes is critical thinking⁸⁶ - a skill that allows for engagement and interaction in, and with, the world. These skills include problem solving, reasoning and decision making. A critical thinker, as described by Ennis,⁸⁷ is one who can grasp the meaning of a statement and judge whether there is ambiguity in the line of reasoning or whether statements contradict each other and an inductive conclusion is warranted.⁸⁸

2.4.3 Critical thinking as a component of life-long skills

Critical thinking is one of a cluster of characteristics that forms part of self-directed or autonomous learning and self-assessment. An autonomous learner can be profiled as a learner who:

- Is methodological and disciplined
- Is logical and analytical
- Is reflective and self-aware
- Is curious
- Is open and motivated
- Is flexible

⁸⁵ Kum Kelly YL. 2009 Assessing students’ critical thinking performance: Urging the measurements using multi-purpose format. *Thinking Skills and Creativity* 4 (1): 70-76.

⁸⁶ Phillips V & Bond C. 2004. Undergraduates’ experiences of critical thinking. *Higher Education Research and Development* 23 (3): 277-294.

⁸⁷ Ennis RH. 1993. Critical thinking assessment. *Theory into Practice* 32 (3): 179-186.

⁸⁸ Phillips V & Bond C. 2004. Undergraduates’ experiences of critical thinking. *Higher Education Research and Development* 23 (3): 277-294.

- Is interpersonally competent
- Is persistent and responsible
- Is venturesome and creative
- Is confident
- Has a positive self-concept
- Is independent and self-sufficient
- Has information and retrieval skills
- Is skilful at learning processes
- Develops and uses criteria for evaluating arguments.

The above skills focus on being critical - a holistic and an integral part of learning.⁸⁹ In order to best define critical thinking, it is imperative to indicate that it is derived from three sources, that is, cognitive psychology and philosophy and it stems from logic, which is a branch of philosophy that deals with the rules of correct reasoning.⁹⁰ This field is characterized by the form of reasoning called “an argument,” which is a set of reasons given to support something.⁹¹ An argument can be either deductive or inductive.

According to Epstein,⁹² critical thinking is an evaluation whether we should be convinced that some claim is true or some argument is good, as well as a formulation of good arguments. Critical thinking is a cognitive activity associated with using the mind and thereafter expressing it verbally or in a non-verbal setting.

Regarding the cognitive process, cognitive science is the way in which individuals deal with information, which informs us that individuals and their social context co-evolve because cognitive capabilities develop in interactive contexts.⁹³ These interactive contexts can be divided into cognitive, affective and psychomotor skills.

Cognitive Skills	Affective skills	Psychomotor skills
• Synthesis	• Internalizing values	• Adaptation

⁸⁹Phillips V & Bond C. 2004. Undergraduates’ experiences of critical thinking. *Higher Education Research and Development* 23 (3): 277-294.

⁹⁰ *World-book Encyclopaedia* 2001. V12

⁹¹ *South African Concise Oxford Dictionary*. 1999. The dictionary unit of South African English.

⁹² Epstein RL. 2002. *Critical thinking*. 2nd edition. Wadsworth.

⁹³ Turvani M. 2001. Micro-foundations of knowledge dynamics within the firm. *Industry and Innovation* 8 (3): 309-323.

<ul style="list-style-type: none"> • Analysis • Application • Comprehension • Recalling 	<ul style="list-style-type: none"> • Organizing • Prioritizing • Valuing • Active participation awareness and attention 	<ul style="list-style-type: none"> • Complex overt response • Mechanism • Guided response • Set response • Perception
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Table 1. Bloom’s Taxonomy⁹⁴

The development of communication tends to lead to a shared approach in developing cognitive processes, despite its highly idiosyncratic nature. This process, that Cederblom and Paulsen⁹⁵ refer to as “critical reasoning,” can teach one how to learn to evaluate arguments and is likely to improve the quality of one’s arguments by cultivating an attitude of relative detachment.

2.5 DEFINING “SKILLS”

The issue is not only one of critical thinking. To have critical thinking *skills* involves more than “just” thinking. Skill is the ability to do something well.⁹⁶ Skills refer to an individual’s level of proficiency at performing a particular task, or the capability to perform a job well. Skills can be divided into technical elements that can be referred to as “hard,” and behavioural elements that can be referred to as “soft.” Soft skills include approaches and attitudes that are intangible and difficult to describe⁹⁷ and measure.

The meaning of the word “skill” includes proficiency, competency and expertise in some activity. The essential element of a skill is the ability to make and implement an effective sequence of choices so as to achieve a desired objective.⁹⁸

⁹⁴ Yoo Jeung Joy Nam. 2009. Pre-employment skills development strategies in the OECD.

⁹⁵ Cederblom J & Paulsen DW. 1996. *Critical reasoning: Understanding and criticizing arguments and theories*. 4th edition. Belmont.

⁹⁶ *South African Concise Oxford Dictionary*.1999. The dictionary unit of South African English.

⁹⁷ Daud S. *et al.* 2011. Enhancing university business curriculum using importance-performance approach: A case study of business Management Faculty of a University of Malaysia. *International Journal of Educational Management* 25 (6): 545-569.

⁹⁸ Nelson-Jones R. 1996. *Effective thinking skills: Preventing and managing personal problems*. Cassell.

2.5.1 *The art of critical thinking skills*

As a cognitive activity, critical thinking takes place in the mind. When someone gives reasons for support of a view point, they are engaged in an act of presenting an argument. As alluded to above, arguments can be categorized into two types, namely, deductive and inductive. An argument consists of two parts called “the premises” and “the conclusion.” At the basis of critical thinking skills, is the art to have mental capabilities and skills to know and apply the premise and conclusion in a statement or a paragraph of words.⁹⁹ A critical thinker’s attitude usually is different from that of a person who merely engages in a disagreement.

This application takes place in the mind while utilizing the skill and cognitive abilities, which is doing something well following the basic principles of logic. For an individual to be able to follow and apply the basic principles of logic, a complex process of cognitive development, comprising three principal concepts that affect the development process, should have taken place. The three concepts, assimilation, accommodation and equilibration are associated with the formation of schemata that, according to Piaget, is considered to be the basic building blocks of thinking.¹⁰⁰

Critical thinkers will mostly evaluate their point of view by applying either inductive or deductive reasoning. This is referred to as “the cognitive process” as structured below.

REMEMBER – this is retrieving relevant knowledge from a long-term memory.

- Recognizing and
- Recalling

UNDERSTAND – Determining the meaning of instructional messages.

- Interpreting,
- Exemplifying,
- Classifying,
- Summarizing,
- Inferring,
- Comparing,
- Explaining

APPLY – Carrying out or using procedure in a given situation.

- Executing,

⁹⁹ Cederblom J & Paulsen DW. 1996. *Critical reasoning: Understanding and criticizing arguments and theories*. 4th edition. Belmont.

¹⁰⁰ Piaget’s constructive constructivism. <http://projects.coe.uga.edu/epltt/index.php?title=piaget> accessed 2011/06/04.

— Implementing

ANALYSE - Breaking material into its constituent parts and detecting how the parts relate to one another and to an overall structure or purpose.

— Differentiating,

— Organizing,

— Attributing

EVALUATE – Making judgments based on criteria and standards.

— Checking,

— Critiquing

CREATE – Putting elements together to form a novel coherent whole and making an original product.

— Generating,

— Planning,

— Producing.¹⁰¹

In tabulating the cognitive process as indicated above, it does not by any means indicate that the process is hierarchical, however the process is interdependent.

2.5.2 Deductive arguments

This is one of the two basic forms of scientific reasoning. The argument perspective is from the more general to the more specific. Arguments, in which the conclusion can be drawn with certainty, are called deductive arguments;¹⁰² and those based on laws and accepted principles are generally applied in deductive reasoning. A good deductive argument is one with true premises, which would mean that the conclusion must be true. Therefore, deductive arguments are meant to guarantee the conclusion.

2.5.3 Inductive reasoning

The argument perspective is from a particular to a more general instance. It works the other way from specific observations to broader generalizations.¹⁰³ This is a form of reasoning that uses available evidence to generate a conclusion.¹⁰⁴ It also involves constructing a hypothesis based on limited evidence and testing it against other evidence. Figure 3 below demonstrates the flow of reasoning according to Cederblom and Paulsen:¹⁰⁵

¹⁰¹ Krathwohl DR. 2002. A revision of Bloom's Taxonomy: An overview. *Theory into Practice* 41 (4): 212-218.

¹⁰² Van den Brink-Budgen R. 2000. *Critical thinking for students: Learn the skills of critical assessment and effective argument*. 3rd edition. How to Books.

¹⁰³ Burney, SMA 2008. Inductive and deductive research approach.

¹⁰⁴ Zimbardo P et al. 1995. *Psychology : A European text*. Harper Collins.

¹⁰⁵ Cederblom J & Paulsen DW. 1996. *Critical reasoning: Understanding and criticizing arguments and theories*. 4th edition. Belmont.

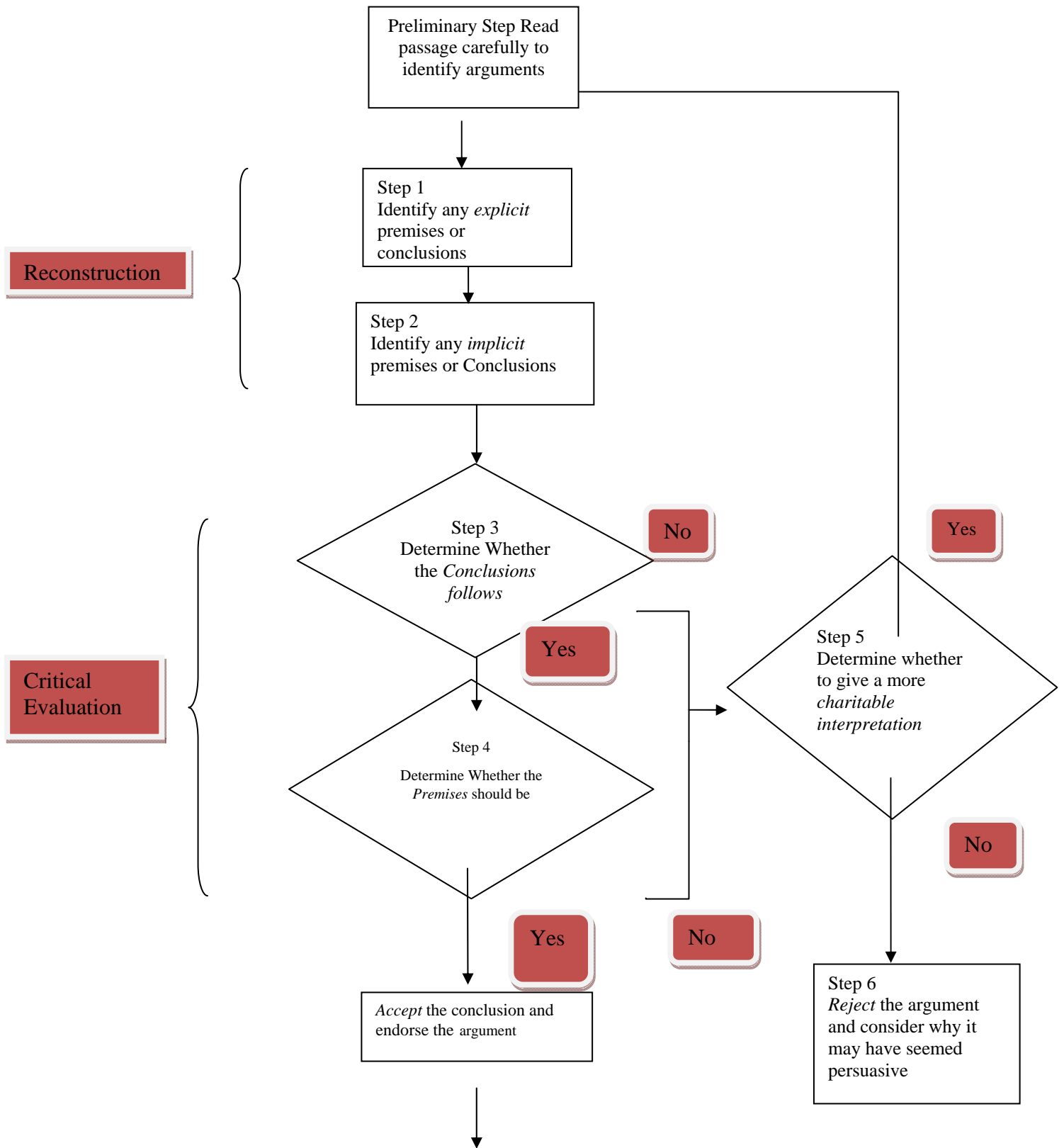


Figure 3. Six steps to understanding and evaluating arguments¹⁰⁶

The preliminary step is very important as it enables one to determine whether what is put

¹⁰⁶ Cederblom J & Paulsen DW. 1996. *Critical reasoning: Understanding and criticizing arguments and theories*. 4th edition. Belmont.

forth is an argument, as opposed to a description, explanation and classification. The step that follows the preliminary step is to identify any explicit premises or conclusion.¹⁰⁷ This is when words are used like, “since,” “because” and “in view of,” which are premise indicators and often occur just after a conclusion has been given.¹⁰⁸ This is a very important step as it tends to confuse arguments and explanations. An explanation is used to show what caused something or what purpose it serves. Step 3 is to determine whether the conclusion follows and will often be carried out in the process of adding implicit premises or an implicit conclusion. Step four determines if the premises should be accepted or rejected; if accepted, then the evaluation has been completed and the argument can be endorsed. In the case of a rejected premise, the next step is to determine whether to give a more charitable interpretation if the argument is unacceptable. Step 6 is helpful if the parties can be involved in a direct exchange with the person who has offered the argument or with the audience that may have been persuaded by it.

2.5.4 Misconceptions about critical thinking

The most common misconception is that critical thinkers think in a rigidly structured pattern, mostly associated with being logical.¹⁰⁹ However, it is true that when one learns to evaluate arguments, one examines the patterns formed by the statements that make an argument. Another misconception is that education and the education system develop and enhance thinking, so the more you are educated, the better thinker you are.

Another common misconception is that, suppose there is a right and wrong point of view, some people are attracted to the notion that each person has his or her own way of regarding things and that no one way is better than another.¹¹⁰ The abilities to think, make decisions, and solve problems are inherent and there is very little one can do to develop them. Edward de Bono,¹¹¹ and many other scholars in the critical thinking field, disagree and have proven that thinking is a skill that can be enhanced by training and practise. Therefore, it is correct to agree that decision making, problem solving, and creative thinking can be developed and

¹⁰⁷ Cederblom J & Paulsen DW. 1996. *Critical reasoning: Understanding and criticizing arguments and theories*. 4th edition.

¹⁰⁸ Moore BN & Parker R. 2007. *Critical thinking*. 8th edition.

¹⁰⁹ Cederblom J & Paulsen DW. 1996. *Critical reasoning: Understanding and criticizing arguments and theories*. 4th edition. Belmont.

¹¹⁰ Cederblom J & Paulsen DW. 1996 *Critical reasoning: Understanding and criticizing arguments and theories*. 4th edition. Belmont.

¹¹¹ De Bono E. 1985. *Six thinking hats*. Penguin Books.

improved.

2.6 EMPLOYABILITY SKILLS

There has been a considerable amount of debate as to the meaning of employability skills. The term “employability” is used to refer to an individual’s ability to gain employment appropriate to his/her educational standard.¹¹²

Employability skills means a set of achievements that comprise skills, understanding and personal attributes that make an individual more likely to secure and succeed in a chosen occupation. These attributes are part of the move towards developing human capital to meet the needs of the knowledge economy.¹¹³ In Bridgstock,¹¹⁴ Bowden defines employability as skills and dispositions that may attract potential employers to an individual. The broader definition of employability is said to involve self-belief and an ability to secure and retain employment and also to improve an organization’s productivity and income earning prospects. It also requires competing effectively in the job market for new job opportunities.¹¹⁵ Employers refer to employability as work readiness, or a mix of essential attributes that enables one to perform a job efficiently and effectively. This means that an employee has the skills, knowledge, and attitude to contribute productively upon commencement of employment.¹¹⁶

This thesis dwells on effective participation in an information and knowledge-intensive economy; the workers must not only maintain and develop discipline and specific skills, but also generic skills that are transferable to many situations and areas.¹¹⁷ These generic skills are essential for employability. Critical thinking is one of the many employability generic skills that were derived from three sources, that is cognitive psychology, logic and

¹¹² Wickramasinghe V & Perera L. 2010. Graduate’s university lectures and employer’s perceptions towards employability skills. *Education and Training* 52 (3): 226-244.

¹¹³ Bridgstock R. 2007. The graduate attributes we’ve overlooked: Enhancing graduate employability through career management skills. *Higher Education Research and Development* 28 (1): 31-44.

¹¹⁴ Bridgstock R. 2007. The graduate attributes we’ve overlooked: Enhancing graduate employability through career management skills. *Higher Education Research and Development* 28 (1): 31-44.

¹¹⁵ Bridgstock R. 2007. The graduate attributes we’ve overlooked: Enhancing graduate employability through career management skills. *Higher Education Research and Development* 28 (1): 31-44.

¹¹⁶ Mason G *et al.* 2009. Employability skills initiatives in higher education: What effects do they have on graduate labour market outcomes? *Education Economics* 17 (1): 1-30.

¹¹⁷ Bridgstock R. 2007. The graduate attributes we’ve overlooked: Enhancing graduate employability through career management skills. *Higher Education Research and Development* 28 (1): 31-44.

philosophy.¹¹⁸

2.7 PRE-EMPLOYMENT DEVELOPMENT OPPORTUNITIES

In order for new graduates to gain employment in today's challenging economic situation, it is becoming increasingly important for the students to gain the skills that will enhance their prospects of employment, as academic subject knowledge is no longer sufficient.¹¹⁹ Many higher education institutions around the world create various types of opportunities to enhance employability skills among young graduates. In these opportunity initiatives, the assumption of institutions of higher learning is that providing employability development opportunities will enable the student to develop the employability skills required in the job market and will ultimately secure employment for them.¹²⁰ Despite the complexities of the employability model, higher education institutions still provide a range of employability development opportunities for students, including the development of attributes that are mostly important for obtaining and keep the job.¹²¹

2.8 CONCLUSION

The past 20 years have brought an explosion in the application of computing and communication technologies. This has impacted on each and every aspect of our daily lives, the business chain, and the application of knowledge to all aspects of the economy. This trend necessitates that, in any given knowledge economy, government policies need to refocus on the development of the human capital by providing broad-based formal education. In today's global knowledge economy, employers seek employees who are able to think critically and to manage their knowledge resources to gain a competitive advantage. Nowadays, employers need graduates who are equipped with interactive personal and generic skills. These skills tend to be more important than the graduates' academic performances.¹²²

¹¹⁸ Phillips V & Bond C. 2004. Undergraduate experiences of critical thinking. *Higher Education Research and Development* 23 (3): 278-294.

¹¹⁹ Steven C & Fallows S. 2000. Building employability skills into a higher education curriculum: A university-wide initiative. *Education and Training* 42 (2): 75-82.

¹²⁰ Lee H 2001. Defining and measuring employability. *Quality in Higher Education* 7(2): 97-109.

¹²¹ Lee H. 2001. Defining and measuring employability. *Quality in Higher Education* 7(2): 97-109.

¹²² Daud S *et al.* 2011. Enhancing university business curriculum using importance-performance approach: A case study of business management faculty of a university of Malaysia. *International Journal of Educational Management* 25 (6): 545-569.

In Beard,¹²³ Thacker and Yost note that the ability to work with others and communicate ideas is critical to a future employee. In a knowledge economy, deeper levels of service skills are required, as most of these skills are mainly tacit.

¹²³ Beard D, Schwieger D & Surendran K. 2008. Integrating soft skills assessment through university, and programmatic efforts at an AACSB accredited institution. *Journal of Information Systems Education* 19 (2): 229-240.

Chapter 3

The Case Study

3.1 INTRODUCTION

This chapter will address the research methods that were used in conducting the study. The methodology used includes the research design, sampling, data collection instruments and procedures and methods of analysis.

3.2 STUDY APPROACH

According to Wicramasinghe and Perera,¹²⁴ Warhurst,¹²⁵ and Bidgstock,¹²⁶ many young graduates enter the job market while lacking the essential skills that go beyond a mere qualification. The aim of this study was to conceptualize and identify key corporate related soft skills and competencies that employers require of business graduates. The thesis is confined to exploring the perception of critical thinking skills with particular emphasis on language use, argument, logic and problem solving skills among young graduates and senior students who are temporarily appointed at a University of Technology's service department in an effort to enhance their employability skills. However, the University is not prescriptive about the kind of skills to be enhanced and to what level they should be enhanced. The purpose of this chapter is to address the methods used in this study. As for all other case

¹²⁴ Wickramasinghe V & Perera L. 2010. Graduates', university lecturers' and employers' perceptions towards employability skills. *Education and Training* 52 (3): 226-244.

¹²⁵ Warhurst C. 2008. The knowledge economy, skills and government labour market intervention. *Policy Studies* 29 (1): 71-86.

¹²⁶ Bridgstock R. 2009. The graduate attributes we've overlooked: Enhancing graduate employability through career management skills. *Higher Education Research and Development* 28 (1): 31-44.

studies, the researcher will collect data from individuals by means of structured survey questionnaires and interviews. The methods used include research design, population and sampling, data gathering procedures and statistical analysis.

3.3 RESEARCH METHODOLOGY

In addition to the searches for electronic and print literature that were conducted to execute this study, a case study was pursued in order to present a comprehensive description and explanation of the research problem at hand. In this case study, the researcher was able to collect data on the individuals on whom the investigation focused.¹²⁷

The researcher collected as much data as possible that is inclusive of empirical evidence, to determine the logical interrelations of the various key components of the variable, critical thinking skills.¹²⁸ Quantitative research is meant to give numerical results that can be presented in the form of graphs and charts. Because this is a deductive research approach, it placed great emphasis on the methodology and procedures employed when conducting the study. Against this background, this study follows the qualitative and quantitative research approach methodology. Triangulation was also employed, as multiple sources of data were collected in order to support the hypothesis.¹²⁹

3.4 UNIT OF ANALYSIS AND RECRUITMENT OF STUDENTS

Universities across the globe are increasingly required to produce highly skilled graduates who are able to respond to the ever-changing, complex needs of the workplace.¹³⁰ In addition, organizations and government institutions are taking the responsibility to equip senior and post-graduate students and, in some instances, young graduates, with working opportunities to develop and enhance transferable soft skills and competencies integral to graduate employability and necessary for them to function in a knowledge economy. In a bid to address the existing skills gap in the labour market the TUT recruits and appoints senior students from any discipline in various service departments, including the libraries, and remunerates them according to the University tariffs.

¹²⁷ Leedy PD & Ormrod JE 2010. *Practical research: Planning and design*. Pearson Education International.

¹²⁸ Babbie ER. 1973. *Survey research methods*. University of Hawaii. Wadsworth.

¹²⁹ Leedy PD & Ormrod, JE. 2010. *Practical research: Planning and design*. Pearson Education International.

¹³⁰ Andrews J & Higson H. 2008. Graduate employability, soft skills versus hard business knowledge: A European study. *Higher Education in Europe* 33 (4): 411-422.

The unit of analysis is set in three of the nine sparsely distributed libraries of the University, located in the Gauteng Province. The selection of the respondents was largely based on the nature of the study, an instrumental case study. The main focus was on critical thinking skills, while closely examining the impact of the program for appointing student assistants to provide services in the libraries and Electronic Resource Centre (ERC) and to assess the kind of skills that are enhanced in the process.

The recruitment and selection process of the students was conducted formally. All relevant protocol of staff recruitment was observed in detail. The key requirement was that, for any student to be considered for a position in the library and its ERC, they had to perform well academically. This process is to ensure that students undergo the test that they may encounter upon venturing into the formal job market. The key responsibilities, as per the job advertisement, included registration of new members, selling of computer consumables, assisting clients in printing, scanning, photocopying and faxing, the creation of e-mail accounts, trouble shooting and the orientation of new students. Following the interviews, students were offered positions and signed a contract aligned to the University policies and regulations. During the first week of their employment, the students attended training programs that focus mainly on the key responsibilities, as indicated above. No training that is geared towards enhancing critical thinking skills and the assumption is that exposure to being in a work environment will enhance the global skills required in the workplace.

3.5 LEVEL OF ANALYSIS

As addressed in various studies by Warhurst,¹³¹ Wicramasinghe and Perera,¹³² amongst others, the concern focuses on the workers' lack of employability skills and competence of knowledge in many countries. The lack of skills referred to, amongst others, are effective communication skills (both written and verbal), team work, information literacy, habits of learning, critical thinking skills and other non-subject related skills necessary for an individual to succeed in a work environment. Individuals' employability is largely dependent upon their assets in terms of knowledge, skills and attitude, and how these assets are deployed.¹³³

¹³¹ Warhurst C. 2008. The knowledge economy, skills and government labour market intervention. *Policy Studies* 29 (1): 71-86.

¹³² Wickramasinghe V & Perera L. 2010. Graduates', university lecturers' and employers' perceptions towards employability skills. *Education and Training* 52 (3): 226-244.

¹³³ Wickramasinghe V & Perera L. 2010. Graduates', university lectures' and employers' perceptions towards employability skills. *Education and Training* 52 (3): 226-244.

University graduates who emerge in the industry for the first time, do not have the requisite range of knowledge skills and experience to provide the quality of service that customers require; for successful participation in the knowledge economy, there is a need for senior students to be exposed to a working environment. By their very nature, critical thinking skills are tacit; therefore, the transfer of these skills from one individual to another is largely based on a number of issues. These issues may differ in various environments and can also depend on the level of absorptive capacity and the complexity of the knowledge that is being transferred.¹³⁴

This study attempts to assess the graduates' perception when they are ready to enter their first employment, and the perception as expected by employers when selecting students for entry-level graduate jobs. This is due to the fact that the education provided at graduate level, with its emphasis on developing critical and analytical thinking, tends to develop a student's academic employability, rather than enhance their prospects for employment in a specific job.¹³⁵

3.6 LOCATION OF ANALYSIS

The TUT is located in three South African provinces, namely Gauteng, Limpopo and Mpumalanga. The University recruits and appoints senior students (as per the criterion in 3.2.1) in various service departments, including the libraries; they have been enrolled for any discipline and are from diverse social backgrounds. The unit of analysis is set at the two Gauteng campus libraries.

3.5.1 The Tshwane University of Technology

This University was established in 2004 following a government-instructed merger of three former Technikons.¹³⁶ The TUT is one of the largest contact institutions in South Africa. Although the University is located in three South African provinces, the seat is situated in the economic hub of the country, the Gauteng Province. The overall enrolment across campuses is over 50 000.

¹³⁴ Dhanaraj C *et al.* 2004. Managing tacit and explicit knowledge transfer in IJVs: The role of relational embeddedness and the impact of performance. *Journal of International Business Studies* 35 (4): 428-442.

¹³⁵ Cox S & King D. 2006. Skills sets: An approach to embed employability in course design. *Education and Training* 48 (4): 262-274.

¹³⁶ A Technikon was a Technological Higher Education Institution in South Africa.

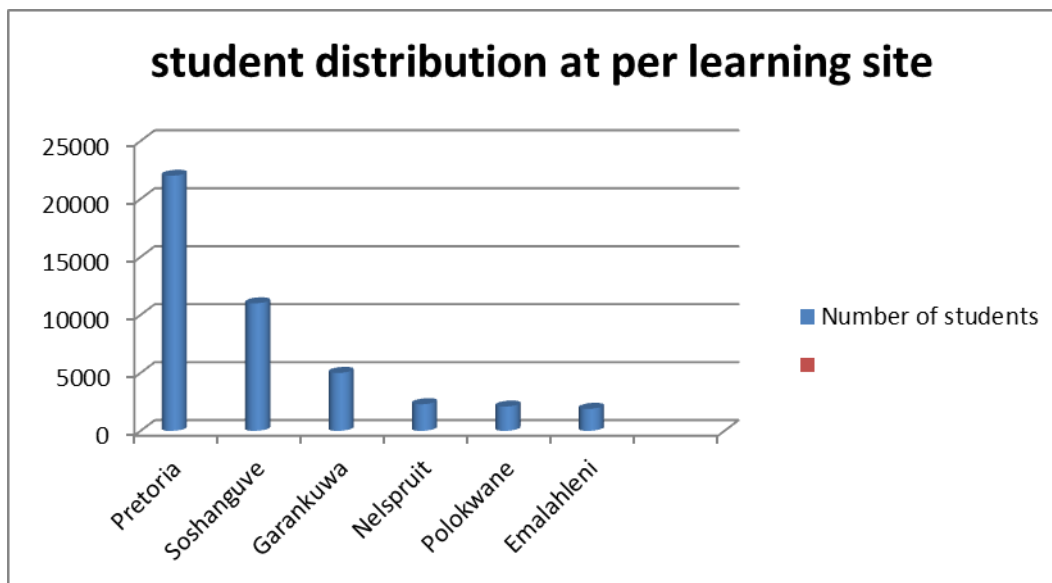


Figure 5. Student distributions per learning site

3.5.2 The libraries

The Library and Information Service (LIS) is an academic support directorate that is present in all campuses of TUT. As an academic support directorate, the LIS of the TUT adopted the one-stop-shop model of service delivery in view of the fact that, nowadays, industry managers expect well-rounded graduates with excellent information and computer skills. Therefore, the LIS provides the following services to the University community:

- Training to use facilities
- Training and assistance to find information
- Access to computers for typing assignments in the ERC.

3.5.3 The Electronic Resource Centre

The ERC is a hands-on computer laboratory that falls under the auspices of the LIS. The main function of the ERC is to support students in pursuit of their academic activities. The facility is used, inter alia, to:

- Send and receive formal and informal electronic mail.
- Have electronic discussions with fellow students, lecturers and other academic experts.
- Type, print and save projects, assignments, tutorials, personal CVs, etc.
- Search and obtain information mainly for academic purposes.
- Learn how to search and filter information.

- Learn how to use the e-assessment tools and facilities.
- Have access to databases to which the LIS of the TUT subscribe.

By providing all the services listed above, the Library and Information Service provide access to relevant information resources and train the clients to utilize the resources maximally.

STATEMENT: *When I enter into the formal employment I will want to have the ability to:*

	1	2	3	4	5
1. Speak and understand English well					
2. Debate well by sticking to a point of view					
3. Ask and seek clarification of questions					
4. Articulate thoughts coherently					
5. Use your time wisely					
6. Use the technology for thinking purposes					
7. To think under pressure					
8. Plan ahead and think strategically					
9. To cope with uncertainty					
10. Test conclusions against relevant criteria and standards					
11. Focus on core aspects of the issue					
12. Think open-mindedly within alternative systems of thought					
13. Detect inconsistencies and common mistakes in reasoning					
14. Justify reasoning in terms of evidence presented					
15. Demonstrate a good reasoning skill					
16. Be attentive to details					
17. Clearly define an issue or a problem					
18. Solve problems systematically					
19. Analyse arguments by assessing the underlying assumptions					
20. Assess the validity of inferences made in a particular circumstance					
21. Decide on the action to be taken, based on the assessment of the situation,					
22. Think in a logically consistent manner					

23. Demonstrate good presentation skills					
24. Accurately identify the essence of an issue					
25. Deal in an orderly manner with parts of a complex whole					
26. Justify reasoning in terms of evidence presented					
27. Demonstrate good listening skills					
28. Ignore fact in favour of opinion					
29. Make superficial inferences for financial gain					
30. Discard relevant information for professional gain					

Table 2 Students Questionnaire

Data is collected using a five point scale. The scale below ranges between 1 and 5:

1 indicates that the characteristic is not important at all

and

5 indicates that the characteristic is extremely important

- 1 Not important
- 2 Slightly important
- 3 Important
- 4 Very important
- 5 Extremely important

Skill	1	2	3	4	5
Effective communication skills (verbal & written)					
Team work					
Information					

literacy					
Habits of learning					
Critical thinking skills					
Strong work ethics					

Table 3 *Innitial short survey*

3.7 QUESTIONNAIRE DESIGN FOR INDUSTRY MANAGERS

For the initial tool to begin the research, the researcher developed a questionnaire that was sent to ten service-oriented companies that were randomly selected in Polokwane in Limpopo Province and Pretoria in Gauteng Province. The aim of the developed questionnaire was to investigate the skills gap between first entrants to the job market and the job requirements, and also to find what employers deem as important amongst the following soft skills listed hereunder (see annexure A).

The focus of this investigation was not based on subject knowledge skills, but skills that require tacit learning.

The following set of skills were to be ranked on a scale of 1 to 5, with 1 indicating not important at all, and 5 indicating that the skills were of extreme importance, i.e. effective communication skills, team work, information literacy, habits of learning and critical thinking skills. Results of this short survey indicated that effective communication skills were of extreme importance to all the companies, followed by critical thinking skills.

Skill	Percentage
1. Effective communication	46%
2. Team work	8%
3. Information literacy	2%
4. Critical thinking	43%
5. Habits of learning	1%

Table 4. *Results of the initial short survey*

The basis of the questions were informed by the theoretical basis of the 2007 World Bank¹³⁷ Report on its client members and the prevailing situation in the Sub-Saharan African region, owing to its ability to interpret, analyse and evaluate ideas and arguments. As per generally acceptable trends in research, the researcher took into serious consideration that, in formulating the questions, the respondents would be competent to respond and that the questions were relevant to their fields of work. It was also important that the format of the questionnaire is spread out and be as uncluttered as possible to depict a professional presentation that has been ratified by two independent Universities with excellent reputations.

The following key components of critical thinking were considered when compiling the questionnaire:

- *Language*, a fundamental medium of our thinking. It is also a basic environmental material within which our thoughts take form and gain expression, therefore it cannot be separated from the four primary purposes, namely as an informative, directive, expressive and persuasive purpose. The essential function of language is communication, which is mainly used to achieve a common understanding.¹³⁸
- *Arguments* are instruments used for rational persuasion,¹³⁹ and are a composition, the primary purpose of which is to persuade a person by appealing to his/her reasoning capacity. And, a composition should consist of a set of claims, one of which is called “the conclusion” and is understood or intended to be supported by others called “the premise.”¹⁴⁰
- *Logic* is a branch of philosophy that distinguishes between two methods of reasoning, namely deductive and inductive. Deductive arguments are said to be valid and that an argument, the premise of which is true, would mean that the conclusion is true. Inductive reasoning is said to rely on strength, thus an argument with a true premise would mean that the conclusions probably are true.¹⁴¹
- *Problem solving* is to address the issues at hand employing the basic rules of logic.

¹³⁷ World Bank Institute, 2007. *Building knowledge economies. Advanced strategies for development*. World Bank Institute, Knowledge for Development Program. ISBN-13:978-0-8213-6958-6.

¹³⁸ Rudinow J & Barry VE 2004. *Invitation to critical thinking*. Belmont.

¹³⁹ Munson R et al. 2004. *The elements of reasoning*. 4th edition. Thomson. Wadsworth.

¹⁴⁰ Rudinow J & Barry VE 2004. *Invitation to critical thinking*. Belmont.

¹⁴¹ Moore BN & Parker R. 2007. *Critical thinking*. 8th edition.

This involves reading and understanding what the issue is all about, thus identifying the arguments. Identify the unknown variable, then identify the explicit variables and the relationship between the known and the unknown variables and use this to solve a problem.¹⁴²

- *Assumptions* relate to filling the gaps in reasoning. These are the parts of an argument that are unstated, but play as important a role in the argument as those that are stated.¹⁴³
- *Emotion* is an instinctive or intuitive feeling, as distinguished from reasoning or knowledge.¹⁴⁴ Emotions relate to human experiences. They can affect human beings' patterns of thinking and can be either positive or negative. Emotions cannot be ignored in any given circumstance; however, it is important to have the ability to manage them.

3.8 DATA COLLECTION PROCEDURES

Based on ethical considerations associated with research, the researcher obtained formal permission to conduct this study at the TUT. Permission to collect data using the survey research method was granted by the University (see annexure B).

In the researcher's view, many studies had been conducted in the communication area, hence the decision to pursue research on critical thinking skills. Also, because the researcher believes that critical thinking skills should initiate any cause for action that includes problem solving, critical analysis and sound professional judgment in the workplace. A second questionnaire particular to critical thinking skills was then developed and distributed to 64 managers of various companies in Pretoria, Gauteng Province, and Polokwane, Limpopo Province. The aim of the questionnaire was to determine what expectations prospective employers hold as regards the critical thinking skills of new entrants to the job market. The questionnaire consisted of 42 questions that were ranked on the 5 point likert scale (see annexure C).

The distribution of questionnaires was as follows:

Description	Limpopo	Gauteng
University Managers	5	12

¹⁴² Cederblom J & Paulsen DW. 1996. *Critical reasoning: Understanding and criticizing arguments and theories*. Belmont. Wadsworth.

¹⁴³ Van den Brink-Budgen R. 2000. *Critical thinking for students: Learn the skills of critical assessment and effective argument*. 3rd edition. How to Books.

¹⁴⁴ *South African Concise Oxford Dictionary*. 2002. Oxford University Press.

Government Departments	7	3
Private Companies	6	2
State owned agencies	4	11
Banks/postal services/law firms (industry)	9	7
TOTALS	31	33

Table 5. Distribution of companies

3.9 QUESTIONNAIRE ADMINISTRATION

The researcher designed the self-evaluation questionnaire and based it on the components of critical thinking (as discussed in 3.2.5) and a letter explaining the purpose accompanied it. A subsequent request was sent to the respondents by electronic mail. Although impersonal, an electronic mail questionnaire to collect data is becoming an increasingly popular method of communication, also for survey researchers. The researcher selected this method due to the low cost of distribution. Another factor for consideration was that the absence of the researcher provided greater anonymity to the respondents.¹⁴⁵ The 41 questionnaires were all returned via electronic mail. An e-mail reminder to complete the questionnaires was sent to all non-respondents. The data collected related to the managers' perceptions and what they expect from young graduates' critical thinking abilities when they are employed for the first time in their organizations or institutions.

The returned questionnaires were coded, saved in a Micro-Soft office folder. The raw data was then processed in a Microsoft Excel program. Thereafter it was up-loaded into a statistical software package used to analyse data, called Stata VII. Frequency tables were employed to describe the distribution of responses according to categories of items. The response rate of 62% includes that of a follow-up request for responses.

3.10 QUESTIONNAIRE DESIGN FOR STUDENTS

Based on the same principles of the questionnaire that was distributed to industry managers, the researcher designed another tool to be distributed to the student assistants working in the

¹⁴⁵ Frankfort-Nachmias C & Nachmias D. 2008. *Research methods in social science*. 7th edition. Worth Publishers.

libraries and ERC. The students were selected based on the fact that they were senior students at a University of Technology and had been appointed to serve the clients of the libraries and ERC, with the aim of equipping and enhancing their own skills and experience in the workplace.

Library/Electronic Resource Centre	Number of students
Soshanguve	31
Garankuwa	26
Pretoria	18
Total	75

Table 6. Distribution of student sample

For this study, the sample of the student population was drawn from three libraries of the TUT that are based in Gauteng. These senior students, appointees in the libraries and ERC, have responsibilities as indicated in 3.2.1.

The aim of the questionnaire was to ascertain the students' perceptions regarding critical thinking skills and whether they thought that they would have the ability to present the many attributes related to critical thinking skills in a work environment (see annexure E).

The questionnaire was based on critical thinking skills under the following key factors, namely:

- Language
- Argument
- Logic
- Problem solving.

According to the *Concise Oxford English Dictionary*, logic is reasoning conducted or assessed according to strict principles of validity,¹⁴⁶ The questions relating to logic were meant to test the students' ability to evaluate arguments as required in critical thinking. The logic part assesses whether the argument either proves, demonstrates, or supports its conclusion.¹⁴⁷

Being a logical thinker is equated to the ability to distinguish between arguments that are

¹⁴⁶ *Concise Oxford English Dictionary*, 2001. Pearsall, Judy. Oxford University Press.

¹⁴⁷ Moore NB & Parker R. 2007. *Critical thinking*. McGraw-Hill. 8th edition.

strong and relevant and those that are weak or irrelevant to a particular question at issue. Logical procedures take the form of closely independent sets of propositions that support each other.¹⁴⁸ Also, in reality, the key factors of critical thinking are sequential and interrelated because failure to think in a logical manner results in failure to present an argument and subsequent failure to solve problems. This is a situation that no institution or organization desires. The consequences of being unable to arrange the components of thinking in a logical sequence may yield undesirable detrimental effects to any company or organization.

This involves taking arguments apart into their structural elements for better understanding on how they are designed to work.¹⁴⁹ This is an attempt to support or prove a claim or an assertion by providing a reason for accepting it.¹⁵⁰ The ability to evaluate an argument is to determine whether certain conclusions necessarily follow from the information in the statements that are given.

A problem exists when there is a difference between the actual situation and the desired situation.¹⁵¹

For anyone to solve a problem, they must change either the actual situation or the desired situation. Either way, it involves the principles of logic, the use of language, and the manner in which outcomes of such an activity will be presented. To arrive at the desired situation, the following steps in problem solving should be engaged in order to identify the problem correctly. This is arguably the most critical part of making a decision because it informs what action should be taken.¹⁵²

- Explore the nature of the problem
- Generate alternative solutions
- Choose among alternative situations
- Implement the chosen alternative

¹⁴⁸ Franchfort-Nachmias C & Nachmias D. 2008. *Research methodology in the social sciences*. 7th edition. Worth Publishers.

¹⁴⁹ Rudinow J & Barry VE. 2004. *Invitation to critical thinking*. Thomson Wadsworth.

¹⁵⁰ Moore BN & Parker R. 2007. *Critical thinking*. McGraw Hill.

¹⁵¹ Huber GP. 1980. *Managerial decision making*. Scott, Foresman & Company.

¹⁵² Drummond, Helga. 1996. *Effective decision making*. 2nd edition. Kogan Page.

- Control the solution.¹⁵³

The ability to use the above factors, and to be classified as a critical thinker, depends on how well one applies the standards and various parts that form part of thinking. The above combined factors are normally internalized, then used in an explicit manner to demonstrate the thinking abilities of the person processing them. This can be equated to weighing up the evidence presented and arguments that may follow. In this manner, the thinking is likely to become more profound, accurate, broader, more relevant and fair. These are the basics of thinking well which also rely on the ability to take thinking apart.

3.11 QUESTIONNAIRE ADMINISTRATION

Based on ethical considerations, the researcher applied for research clearance from the TUT's Research Ethics Committee to collect data from the sample as identified in 4 above???. Approval to distribute the questionnaire was granted by the Research Ethics Committee of the University. The approval was specific in that the permission granted was for data collection by means of questionnaire only.

Questionnaires were sent to the managers of the libraries and ERCs for distribution to the students working in their environments. All responses were sent to the researcher via e-mail communication owing to the low costs involved.

3.11.1 Returned student questionnaires

Of the 75 questionnaires distributed to student assistants, 51 were all returned via electronic mail. The response rate of 68% is inclusive of those who received a follow-up request for a response. These returned questionnaires were coded and saved in a Micro-Soft Office folder. The raw data was then processed in a Microsoft Excel program. Thereafter, it was up-loaded into a statistical software package used to analyse data, called Stata VII. Frequency tables were employed to describe the distribution of responses according to categories of items.

3.11.2 The informed consent of students

Following the analysis of the questionnaire, the researcher deemed it fit to develop a questionnaire for interviews to be used as a follow-up measure. The researcher again applied to the Research Ethics Committee of the TUT requesting approval to collect data by means of face-to-face interview sessions with the students who had responded to the initial questionnaire on critical thinking skills. The Research Ethics Committee granted approval to

¹⁵³ Huber, George P. 1980. *Managerial decision making*. Scott, Foresman & Company.

collect data by means of interviews, on condition that the researcher received the participants' consent, based on the fact that, when a study involves human beings and for ethical research considerations, researchers need to obtain the participants' consent, which was also meant to provide prior information to them about the follow-up interviews related to the questionnaire on critical thinking skills.¹⁵⁴

Also, for legal and cultural values and the fact that social scientists generally agree that research involving human participants should be performed with their informed consent, an informed consent form was generated and distributed to the participants for their further participation in the interviews following the questionnaire¹⁵⁵ (see annexure D). These signed forms were returned to the researcher via electronic mail.

3.11.3 Students' interviews

In social sciences, data can be obtained in a formal or informal setting and may involve verbal and non-verbal responses. Since each data collection method has its own advantages and limitations, the researcher deemed it fit to use two or more methods of data collection to test the hypothesis.¹⁵⁶ In this study, a questionnaire for the purpose of in-depth interviewing of the students was designed based on the results of the self-evaluation questionnaire to which students had responded a month before.

This was geared to unearth information that could not have been obtained by means of the initial student survey tool and was done in this manner because the concept of critical thinking is both philosophical and abstract, hence the necessity to seek a deeper understanding beyond the self-evaluation survey questionnaire. The interviews took place at the various libraries where the students were working. There were very few hassles, as the researcher set and confirmed the dates, times and venues for the interviews in advance.

The interviewer introduced herself and the accompanying observer, and presented a brief background of the study, despite the participants not being unenlightened, as they had initially participated in the self-evaluation questionnaire and had signed the consent form beforehand. The intention was to ensure that the students clearly understood their

¹⁵⁴ Leedy PD & Ormrod, JE. 2010. *Practical research: Planning and design*. 9th edition.

¹⁵⁵ Frankfort-Nachmias C & Nachmias D. 2008. *Research methods in social science*. 7th edition. Worth Publishers.

¹⁵⁶ Frankfort-Nachmias C & Nachmias D. 2008. *Research methods in the social sciences*. 7th edition. Worth Publishers.

participation and that the study, with their participation, is worthwhile. The 45 minute interviews with each student were conducted in an informal and relaxed atmosphere. Questions that were misunderstood were repeated and clarified.¹⁵⁷

The researcher recorded the interview responses verbatim on the answer sheet. It is also important to indicate that, during the interviews, observers took turns in sitting in during the proceedings to ensure that the line of questioning was consistent throughout the interviews of the 46 participating student assistants.

3.12 DELIMITATION OF THE SURVEY

The assumption is that the students are appointed to service the clients of the library and the ERC and that they will enhance their employability skills by being exposed to a work environment, so that, upon graduation, they will be readily employable.

The first selected sample comprised industry managers who, in their respective organizations or companies, have staff recruitment in their job profiles. The second group of the selected sample consisted of senior students employed on a part-time basis in the libraries and ERCs of the University. The managers' and students' social backgrounds did not form part of the study. The focus of the study remained the perception of the existing gap with regard to generic employability skills, with particular reference to critical thinking skills.

¹⁵⁷ Frankfort-Nachmias C & Nachmias D. 2008. *Research methods in the social sciences*. 7th edition. Worth Publishers.

Chapter 4

Presentation and Discussion of the Findings

4.1 INTRODUCTION

In this chapter, the data findings will be presented and a comparison of various responses on the questionnaire and interviews will be explored.

The time that a young graduate is faced with upon entering the job market for the first time is the most critical in their life. This is precisely because there are expectations from the young graduate as well as the prospective employer. These expectations are on both sides and they vary because none of the participants have control over the expectations. Very often the expectations are not met¹⁵⁸.

As was pointed out in previous chapters, the world economy is rapidly moving into a phase known as the knowledge economy. The only difference may be the level of advancement per country. However, despite the level of advancement, critical thinking skills (however understood) is amongst the most important and sought after skills that are expected by prospective employers from young graduates entering the job market for the first time. This is due to the fact that all companies and organizations in the various knowledge economies are striving to keep to cutting-edge global competitiveness.

It is against this background that the chapter will present and analyse the responses gained through the empirical process outlined in chapter 3.

To make the presentation as coherent as possible, the responses have been grouped into 4 categories, as follows:

¹⁵⁸ Mason G. et al. 2009 Employability skills initiatives in higher education: what effects do they have on graduate labour markets outcomes. *Education Economics* 17 (1): 1-30

- Language
- Argument
- Logic
- Problem solving

In the presentation that follows, the results from the surveys (both for managers and for students) are presented in graphical formats, and the results from the personal interviews are reported on in the follow-up discussions.

4.2 LANGUAGE

Under the heading of Language the following questions in the survey are grouped:

When recruiting new entrants into my company/organization I want the entrant to have the ability to:

1. Fluently speak and understand English
2. Comprehend and use language with accuracy and clarity
3. Debate well by sticking to a point.
4. Clearly define an issue or a problem

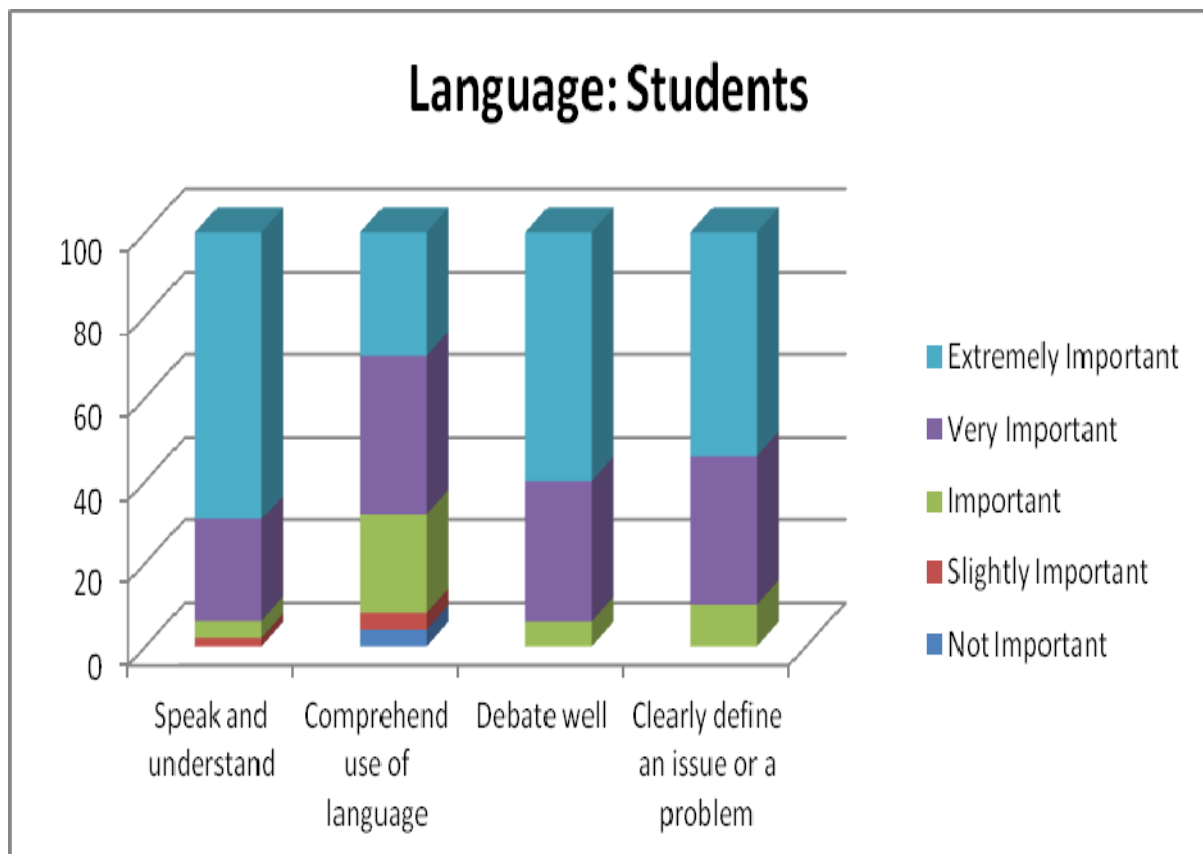


Figure 7. Language: Industry

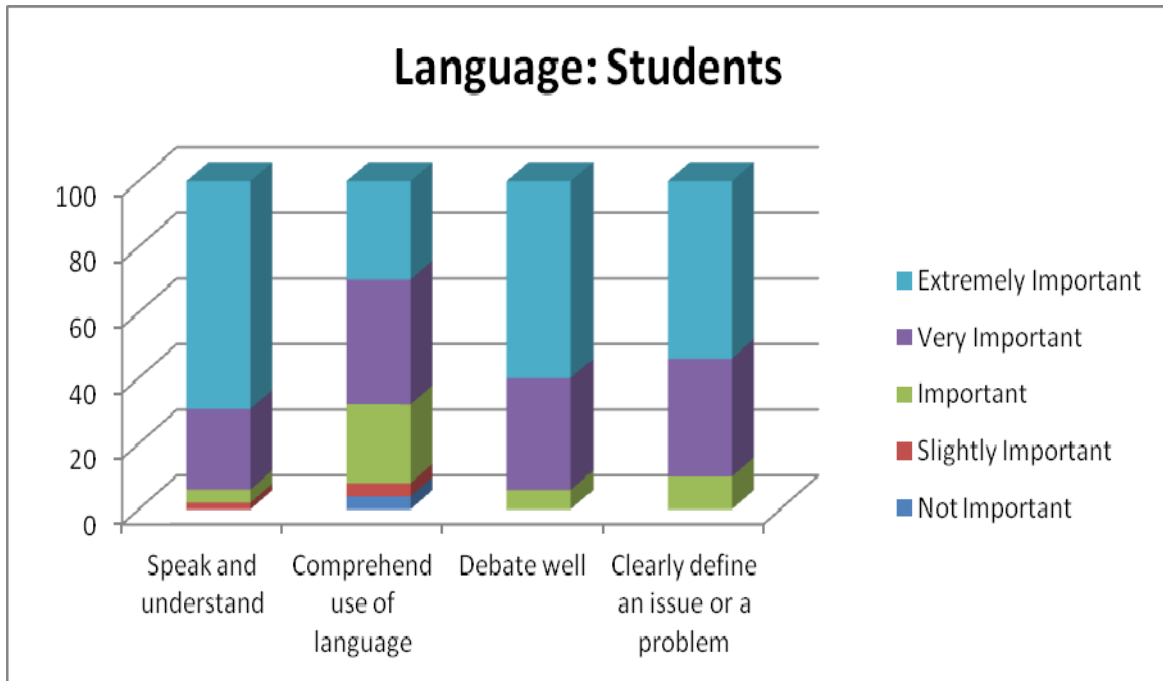


Figure 8. *Language: Students*

The above graphs indicate that 44 % of the managers expect that it is only important for the young graduates to have the ability to speak and understand English well. As indicated in chapter 3, that language is a fundamental medium of our thinking. Although in the business environment and due to the advent of the internet and computer use, human beings in organizations spend time interacting face-to face and using various forms of communication. Therefore it is practically impossible to find any job function in any field of employment where communicating effectively our thinking through the language use is not vital.¹⁵⁹ Whilst the language components of critical thinking skills are perceived to be *important* by industry managers for young graduates entering the job market for the first time, there is a considerable amount of managers at 22% who feel the skill is of *extreme importance*. Most businesses and organizations would always look for assertive speakers who are able to deliver their message in a positive and direct manner, and at the same time maintaining respect for the people whom the message is being delivered to. In a verbal communication setting the most important skills that can be displayed that carries a lot of impact is not the content of the message but the manner in which it is said. The ability to debate well by sticking to a point and the ability to strip verbal arguments of irrelevancies are indicators that can demonstrate whether the communicator has the ability to comprehend and use

¹⁵⁹ Brounstein M, et al. 2007 Business communication: communicate effectively in any business environment. John Wiley and sons

language with accuracy and clarity. On the question about the ability to ask and seek clarification of questions, 54% of managers responded that it was of extreme importance, while 60% of the students responded that it is of extreme importance too. The trend in the follow-up interviews with the students highlighted the fact that students are extremely appreciative of the fact that being employed as a student assistant enhanced their verbal communication skills because they work with students from various ethnic groups and therefore the language of communication is English and their English skills have improved tremendously. Responding to the question on the importance to articulate thoughts coherently, 91% of the students did not understand the question despite repeated attempts to clarify the terminology used, they either asked that it be skipped or repeated. 9% responded that it is important to articulate your thoughts coherently, “to ensure that you do not lose focus on what you are thinking and you analyze and organize your thoughts to avoid mistakes and to put the message across”. Worth noting is that the respondents use English as their second language.

Whilst the importance of language is stressed, Brounstein¹⁶⁰ cautions that language shouldn't be a mirror in which one admires one's intelligence.

4.3 ARGUMENT

Under the heading of Argument the following questions in the survey are grouped:

When recruiting new entrants into my organization, I want the entrant to have the ability to

1. Strip a verbal argument of irrelevancies and phrase it in its essential terms
2. Test generalizations and conclusions arrived at
3. Focus on the core aspects of the issue
4. Render accurate judgements about specific things and qualities in everyday life
5. Make and judge observations
6. Articulate thoughts coherently
7. Analyze arguments plausibly
8. Evaluate inferences

¹⁶⁰ Brounstein, M et al. 2007 Business communication: communicate effectively in any business environment John Wiley and sons

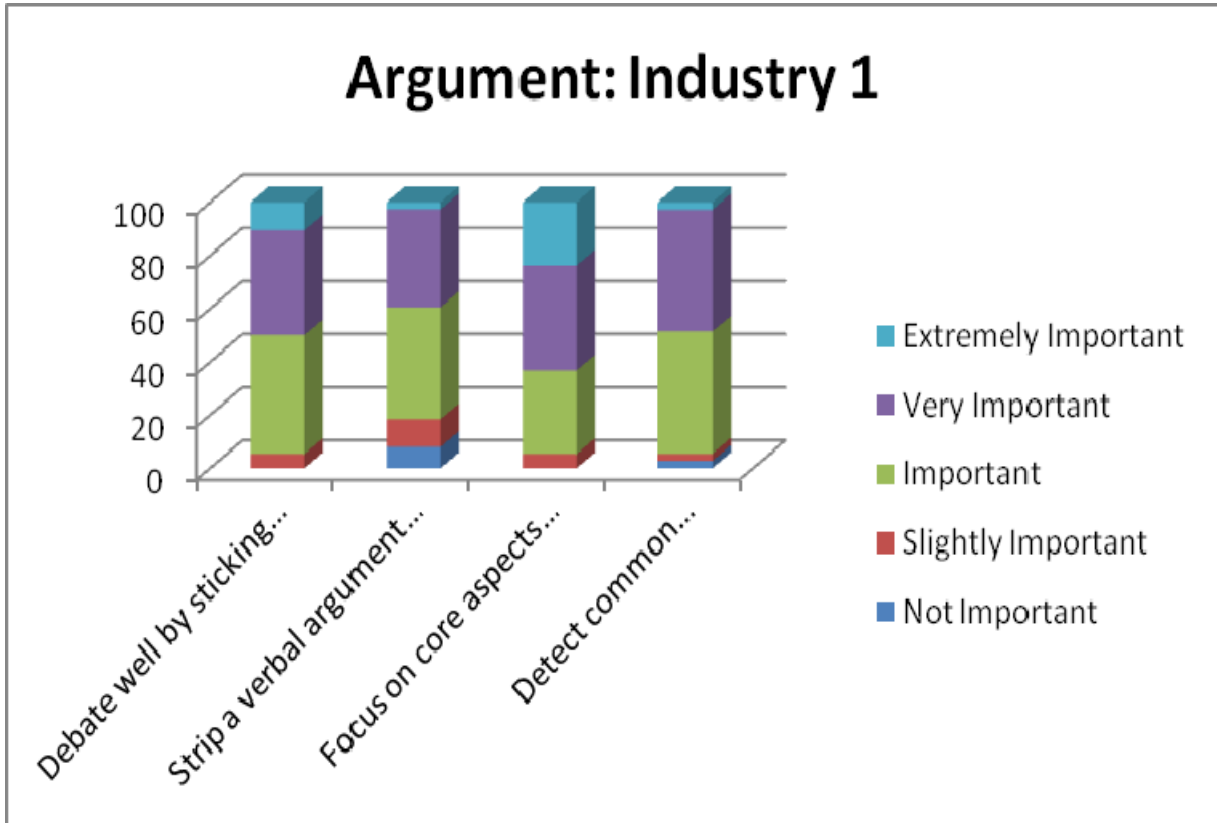


Figure 9. *Argument: Industry1*

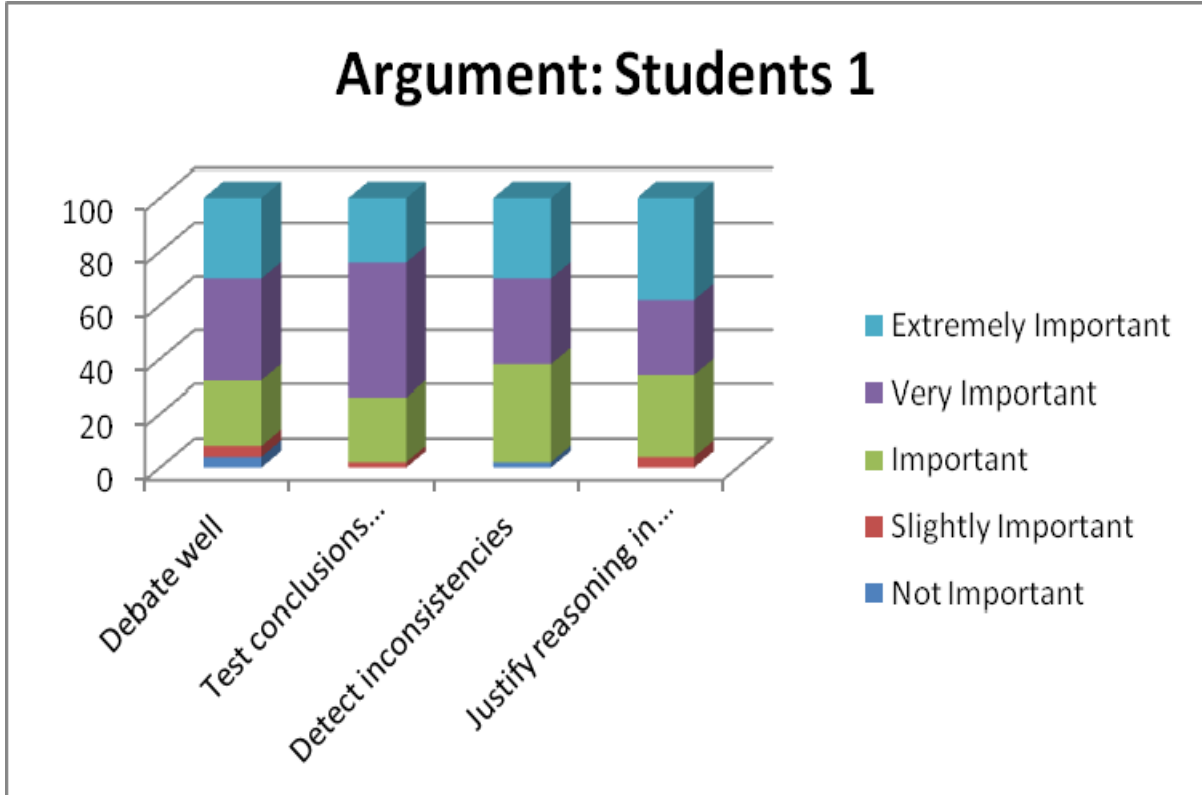


Figure 10. *Argument: Students1*

The pattern according to the graph above indicates that 47% of managers in industry feel it is important for young graduates to render accurate judgments about specific things and qualities in everyday life and also to analyze arguments plausibly. It is very important to detect inconsistencies and common mistakes in reasoning. This may be attributed to the fact that inconsistencies may be viewed or perceived as someone who undermines trust or is not honest.¹⁶¹ 36% of young graduates indicate that it is *important* to detect inconsistencies and common mistakes in reasoning and 55% say it is *very important* to accurately identify the essence of the issue. 44% of industry managers say that it is *important* to debate well by sticking to a point whilst the students 38% percent of the students say it is *very important*. 44,9% say it is *very important* to analyze arguments by assessing the underlying assumptions. An assumption is a claim which is taken to be true without an argument.¹⁶²

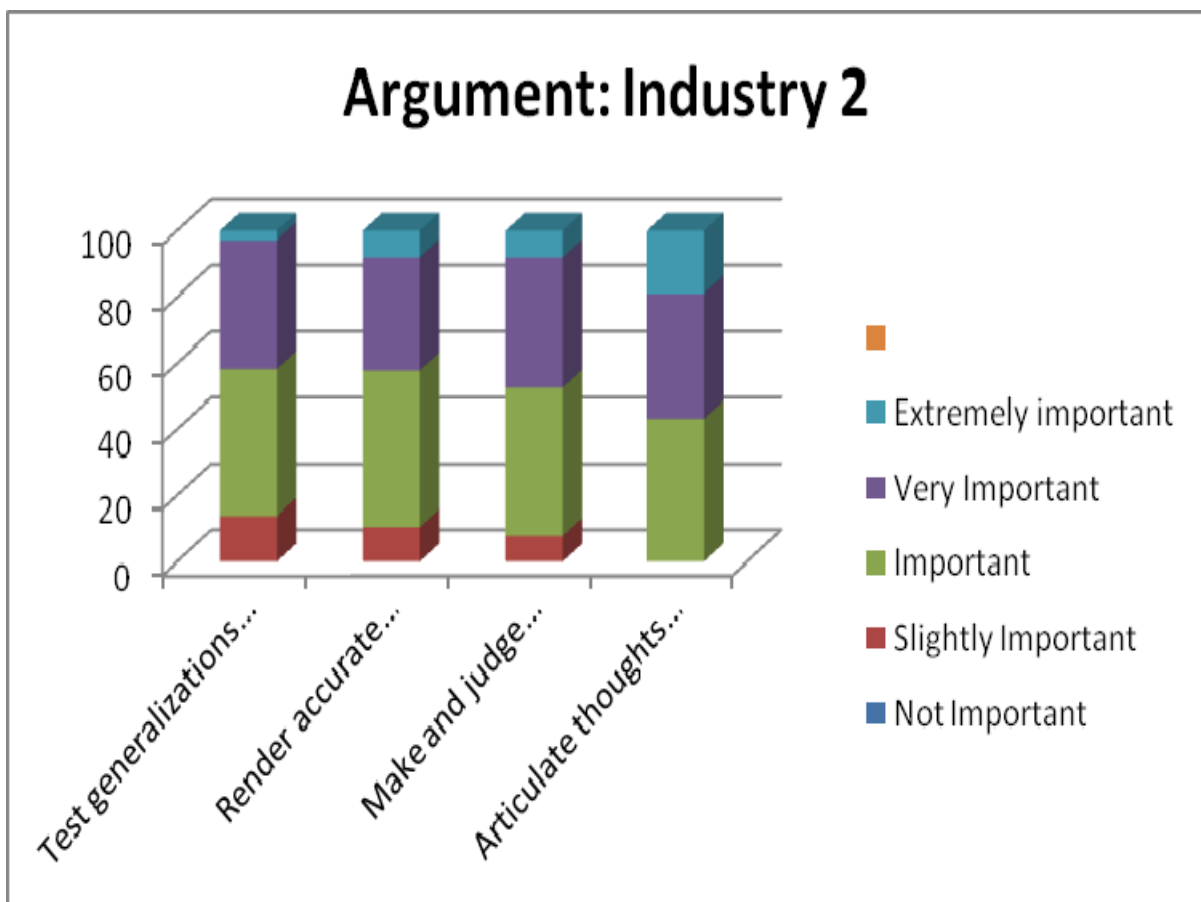


Figure 11. *Argument: Industry 2*

¹⁶¹ Reina DS, Reina ML. 1999. Trust and Betrayal in the work place: building effective relationships in your organization. Berrett-Koehler Publishers.

¹⁶² Rudinow J, Barry, VE. 2004. Invitation to Critical thinking. Thomson Wadsworth

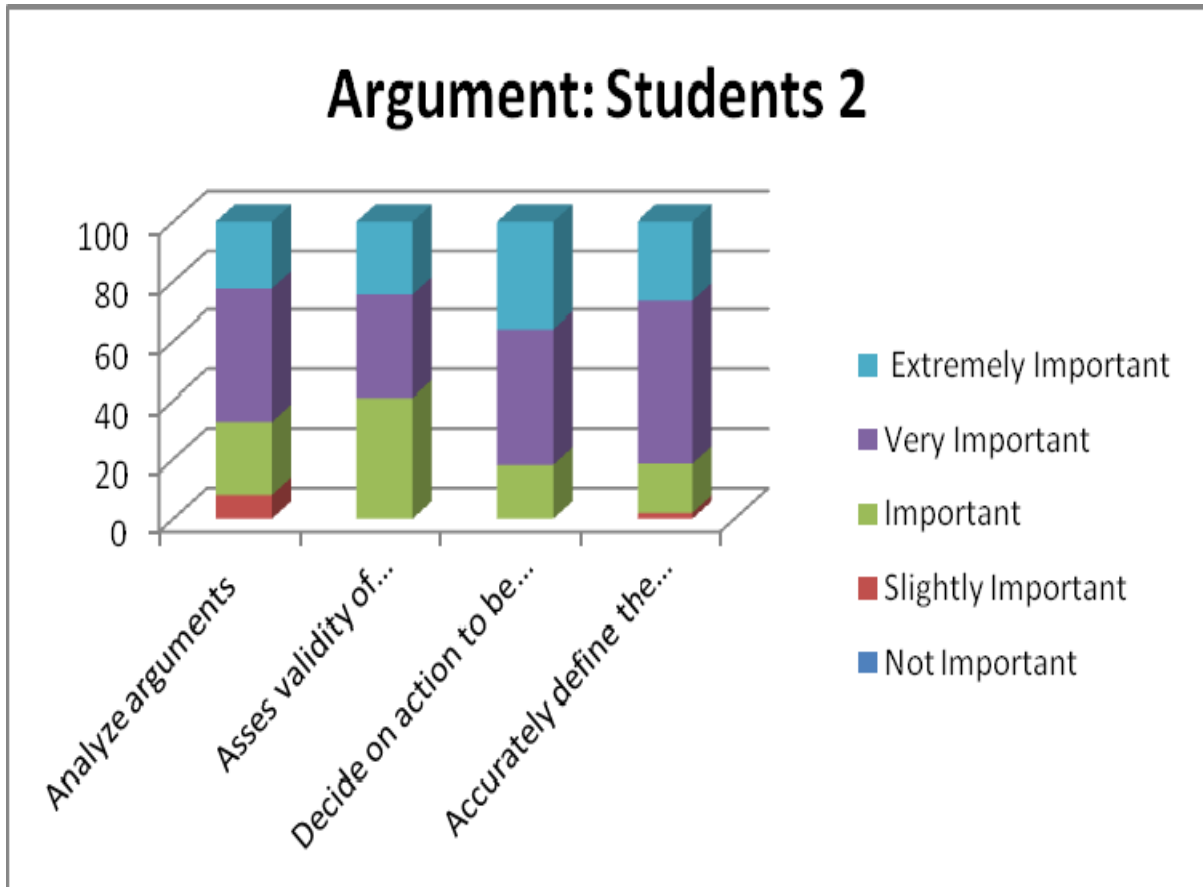


Figure 12. *Argument: Students 2*

4.4 LOGIC

Under the heading of Logic the following questions in the survey are grouped:

1. Debate well by sticking to a point
2. Strip a verbal argument of irrelevancies and phrase it in its essential terms
3. Understand logical connections between different ideas
4. Detect inconsistencies and common mistakes in reasoning
5. Test generalizations and conclusions arrived at
6. Render accurate judgements about specific things and qualities in everyday life
7. Ask and seek clarifications of questions
8. Make and judge observations

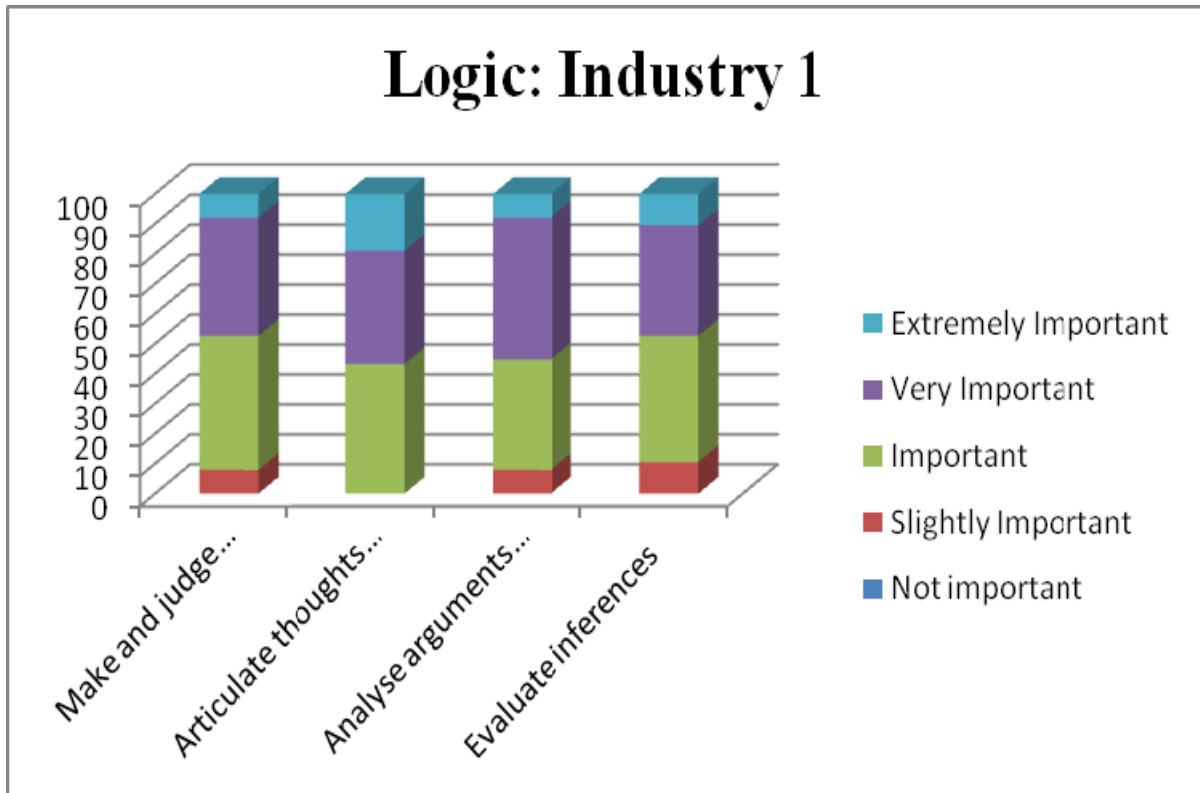


Figure 13. *Logic: Industry 1*

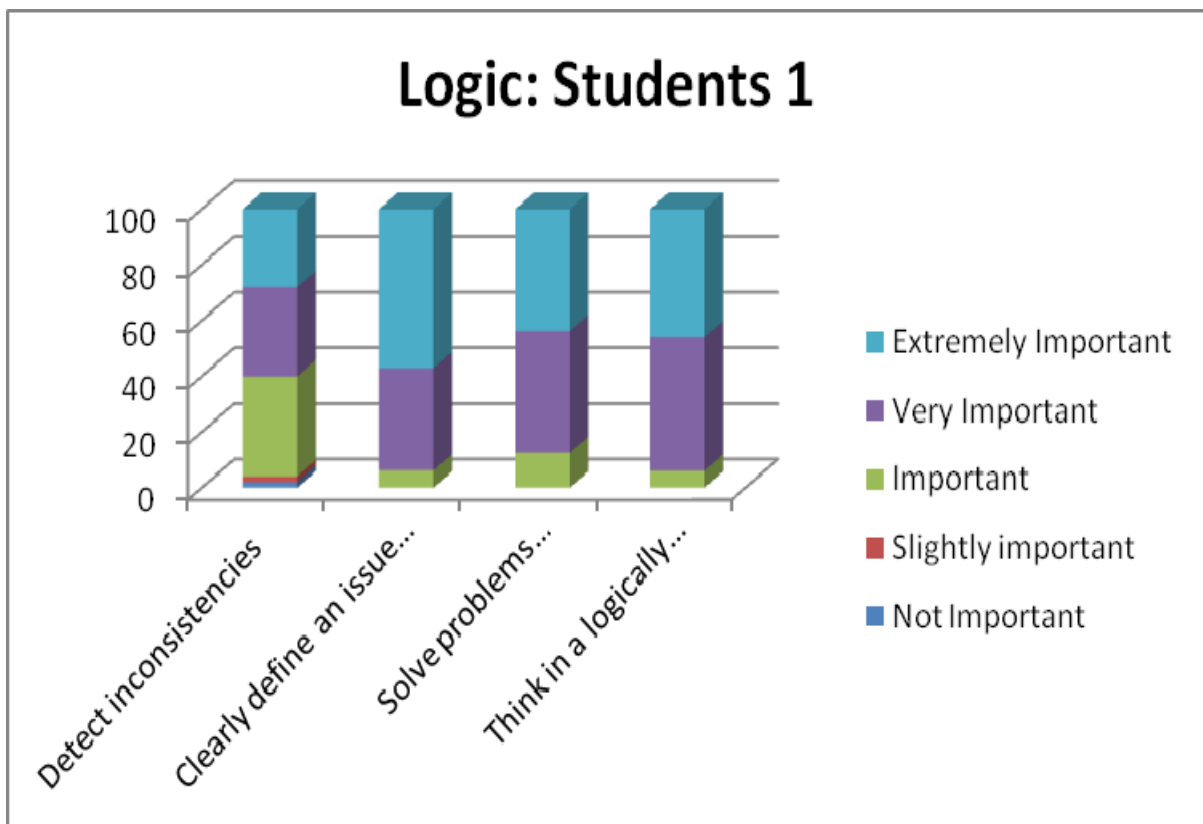


Figure 14. *Logic: Students 1*

57% of the students indicate that it is extremely important to clearly define an issue or a problem, while 46% say it is extremely important to demonstrate a good reasoning skill. Based upon the follow-up interview 47% of the students responded that critical thinking skills is to

- “think out of the box” and be able to read into a situation which others cannot read.
- “think fast and do more than three tasks at the same time”.

On being asked whether they regarded themselves as critical thinkers?

- 98% responded that they regarded themselves as critical thinkers based on the definition of critical thinking skills as given above.

2% could not respond to the question and requested the researcher to skip the question. Evidence gathered from the face to face in-depth interviews on the question on “do you think you have enhanced your logical thinking skills by working here and why?”

- 51% responded that their logical skills were enhanced because since employment they can “think a little bit faster” 47% responded that they are not sure because they could not define logical thinking and 2% that they were not sure that their logical thinking skills have been enhanced by the routine work they were doing.

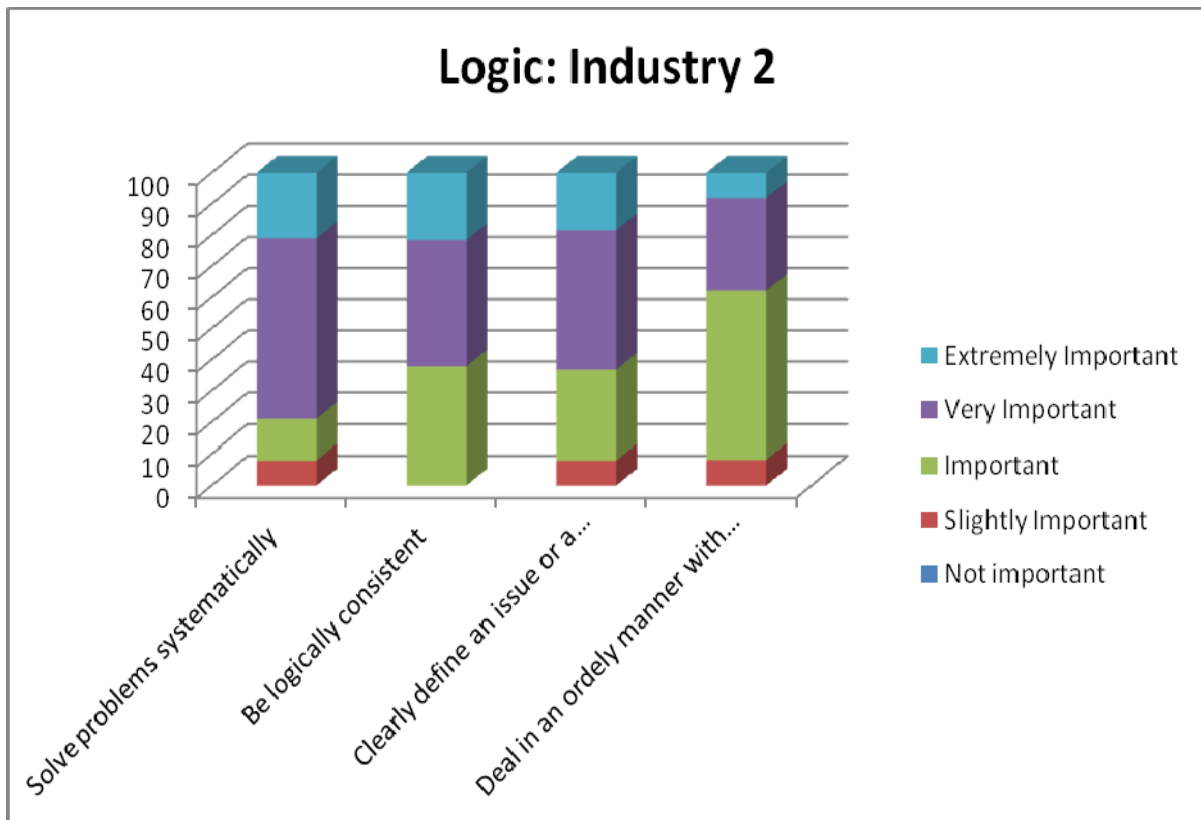


Figure 15. Logic: Industry 2

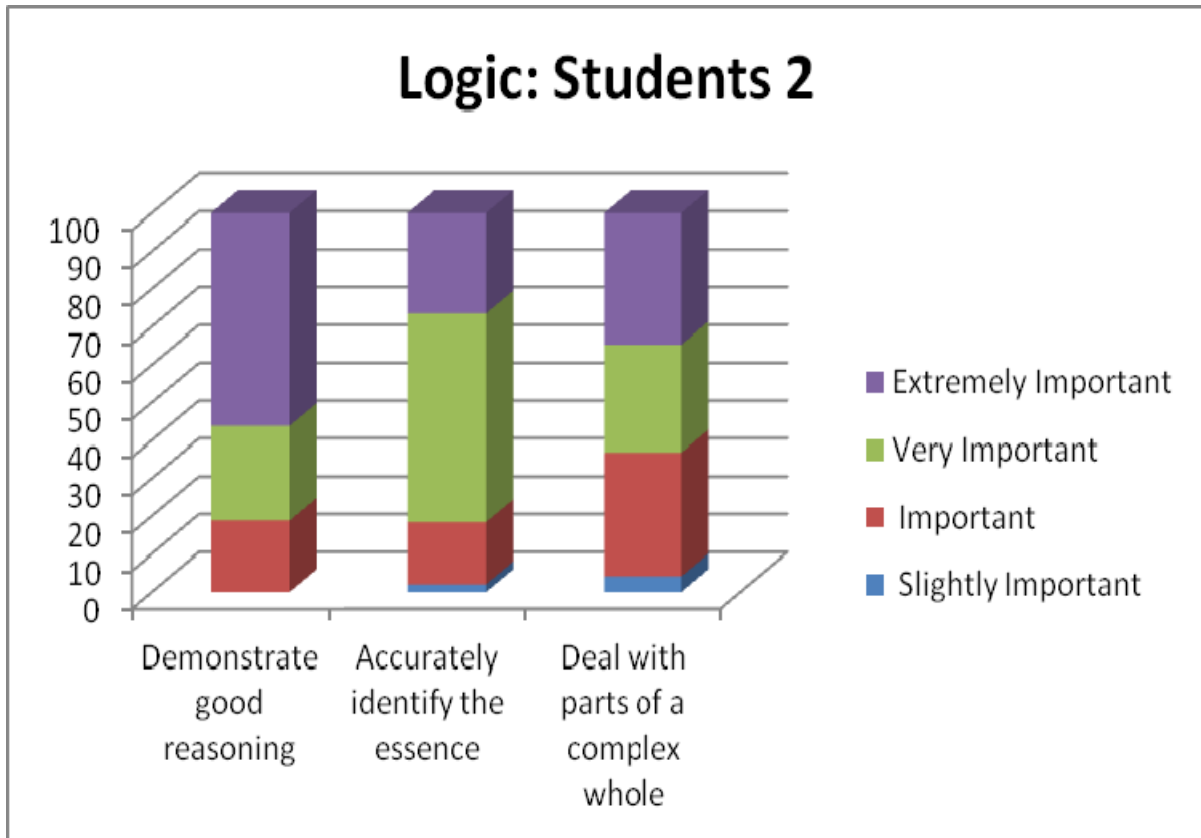


Figure 16. *Logic: Students 2*

4.5 PROBLEM SOLVING

Under the heading of Problem Solving the following questions in the survey are grouped:

1. Think in an open mind
2. Solve problems systematically
3. Clearly define an issue or a problem

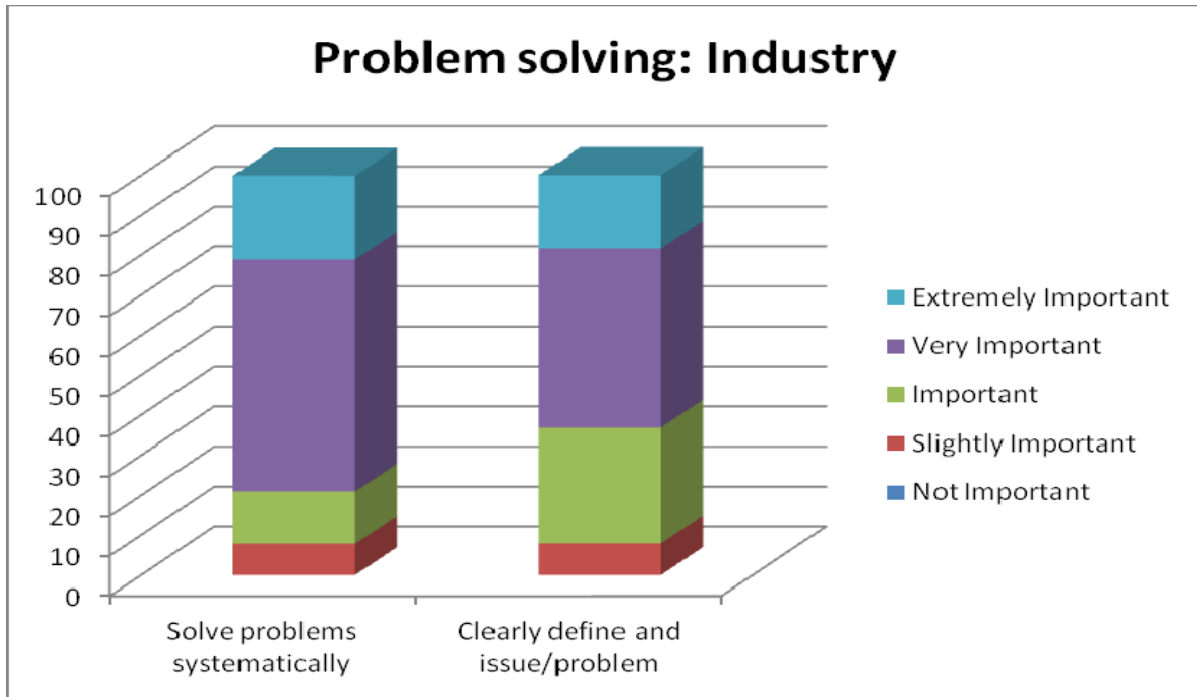


Figure 17. *Problem solving: Industry*

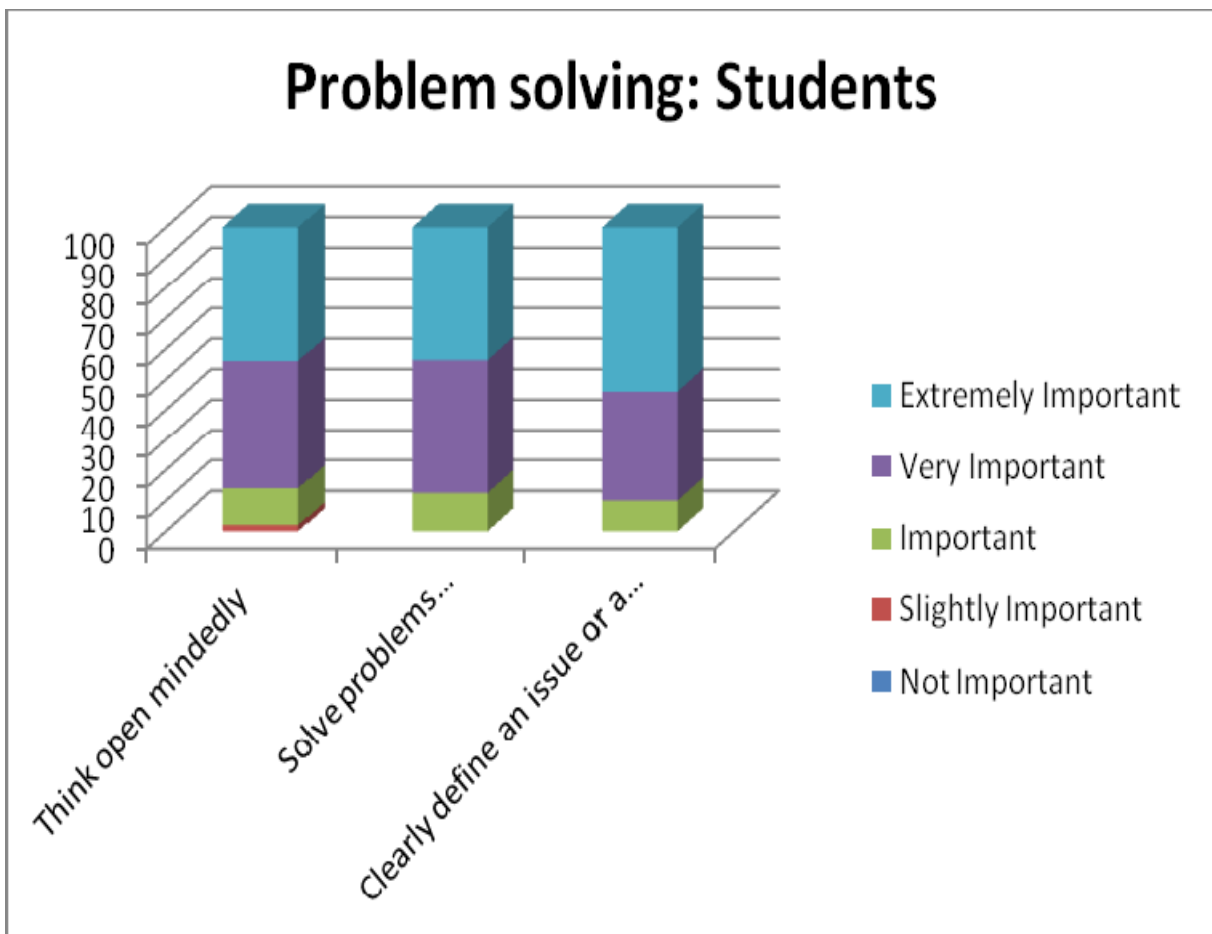


Figure 18. *Problem solving: Students*

In the follow-up interview, the researcher picked up that the kind of work that is conducted by student assistants in the Libraries and ERC's did not require the use of problem solving skills as such. Instead, student's assistants could not differentiate between troubleshooting and problem solving. 68 % of the student assistants indicated that the work they are doing is basically routine work that is *boring* and that they do it for financial gain because the experience they are getting is irrelevant to their field of study.

4.6 GENERAL OBSERVATIONS

Expectations clearly play a major role in the introduction into employment of a first time employee.

Attitudes or expectations are formed early in life and are likely to be more resistant to change than the ones that developed later in life¹⁶³. There is a direct relationship between performance and expectation. In order for a new employee to complete his life-space the employee needs to be motivated and incorporated into the interior of the company by managers.¹⁶⁴ This is the critical stage where a manager needs to define the contribution quality as expected from the new employee. The manager has a responsibility to ensure that the expectations are clearly spelt out and that they are understood by the employee. Because working in a knowledge-based economy an individual requires performing at high level of their cognitive domain so that they are able to display their conceptual skills. Managers have to also understand that the transition from schooling to the workplace is very often traumatic and stressful for young graduates who may have just ventured into the job market.¹⁶⁵

Against this background the study also focussed on key expectations of managers and prospective employees.

4.6.1 *The Expectations of Managers*

The graph below is based on the results of the short survey conducted by the researcher as illustrated in chapter 3 figure 3.6.

¹⁶³ Hall DT, Berlew DE. 1996. The socialization of managers: effects and expectations on performance. *Administrative Science Quarterly*. 11 (2): 207-223

¹⁶⁴ Hall DT, Berlew DE. 1996. The socialization of managers: effects and expectations on performance. *Administrative Science Quarterly*. 11 (2): 207-223

¹⁶⁵ Jusoh M, Simum M, Chong SC. 2011. Expectation gaps, job satisfaction and organizational commitment of fresh graduates: roles of graduates, higher learning institutions and employers. *Education and Training* 53 (6): 515-530

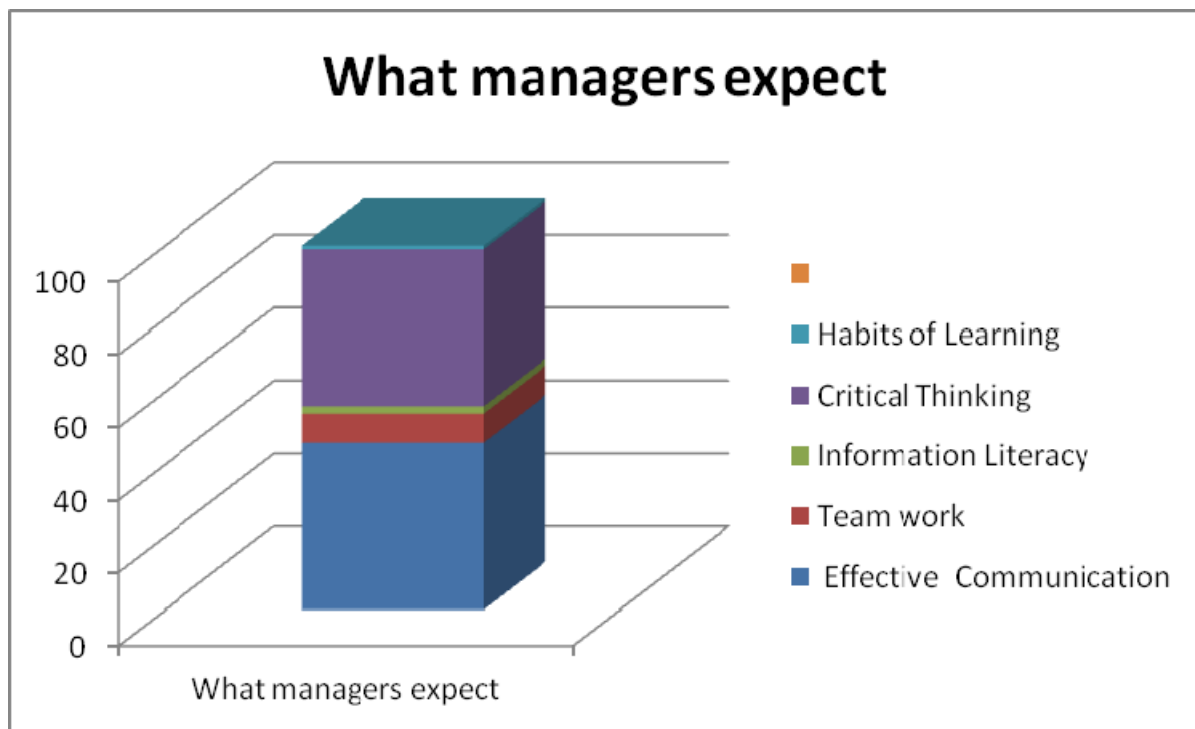


Figure 19. *What managers expect?*

The industry manager's response and expectations are based on the initial survey and the self evaluation questionnaires that were sent to them. On the question of the ability to seek clarifications of questions 54% of managers responded that this is of extreme importance. Regarding arguments 47% of managers feel it is important for young graduates to render accurate judgements about specific things. 44% of managers say that it is important to debate well by sticking to a point. These key conceptual skills are Language, Argument Problem solving skills and Logic and they are interdependent in nature.

4.6.2 Language Skills overrated by Students

Based on the results of the survey, it is evident that the students have unrealistic expectations about their own critical thinking skills and abilities. With regards to language skills, 68% responded that they will have the ability to speak and understand English well whilst the in-depth interview revealed that 91% of the students could not understand the question on the ability to articulate thought coherently despite repeats by the interviewer. According to the level descriptors for the South African National Qualifications Framework¹⁶⁶, these students will acquire an NQF level 7 qualification at the end of the academic year. It is expected that this student is able to demonstrate detailed knowledge of the main areas of one or more

¹⁶⁶South African Qualifications Authority 2010. Level Descriptors for the South African National Qualifications Framework.

particular field including an understanding of and an ability to apply key terms, concepts, facts and principles of a particular discipline. The interview depicted a sense of a sub-standard level of the English language skills that would have remained unknown had the researcher relied only on the self evaluation questionnaire that was initially sent out before the interview. The students are also expected to be able to present and communicate complex information in a reliable and coherent manner using appropriate professional conventions.

The ability of a student to demonstrate an ability to identify, evaluate and solve problems is also another SAQA NQF level 7 descriptor. They are also expected to gather evidence and apply solutions based on evidence appropriate to the discipline. These descriptors dictate the need for high order level of skills to optimally participate in a given setting, as solving problems systematically is a key component of critical thinking abilities. Furthermore the researcher also found that while students are happy to be earning a salary by working in the library and electronic resource centre, they were not entirely excited at the fact that the kind of experience they were gaining was not relevant to their field of study.

4.6.3 Critical Thinking Skills according to Students

Over the years, people have been educated and they continue to be educated. The primary aim of this education is particularly at college level is to foster a student's thinking ability to make decisions, effectively make judgments' and to think critically.¹⁶⁷

In an attempt to respond to the research question, the working definition of this study has

Critical thinking is a way of thinking about any content, subject or a given problem in a skilful manner of analyzing, assessing, evaluating gathered information, observing, reflection, and reasoning, communicating, check for clarity, accuracy, precision, relevance, depth, breadth, significance logic and fairness as a guide to a belief or an action and the determination of whether there is adequate justification to accept the conclusion as true.

The follow-up interviews presented the researcher with an excellent opportunity to build a rapport with the participants and were able to follow-up on questions for more in-depth answers.¹⁶⁸ When students were asked what critical thinking is, 47% responded that it is to

¹⁶⁷ McMillan JH, 1987. Enhancing College Students Critical Thinking : A review of studies. Research in Higher Education. Agathon press.

¹⁶⁸ Leedy, Paul D. and Ormrod, Jeanne Ellis. 2010. Practical Research : Planning and design. 9th Edition

think out of a box, and to be able to read into a given situation which other cannot read. 51 % responded that it is to think fast and to do more than three tasks at the same time. On being asked whether they are critical thinkers or not, 96% responded that they are critical thinkers and the answers varied from

- I am honest, reliable,
- I can do more than three tasks at the same time
- I can solve problems,
- I have interpersonal skills and
- I can work without showing emotions.
- Able to see things that other cannot see
- I have the ability to think for myself
- I make decisions that benefit me
- I do not ask anybody to think for me
- I am able to deal with all the challenges I am faced with.

The responses above demonstrated to the researcher that the students did not know what *Critical Thinking is* and subsequently concluded that they are not critical thinkers themselves because none of the above statements form part of the cognitive process as detailed in chapter 2.

2% responded that they are not sure whether they were critical thinkers or not and asked the researcher to skip the question.

Another 2% responded that they are

- naturally creative
- have creative business ideas
- are able to think deep about a task
- always look for more details of the topic at hand

It is acknowledged that the above responses reflect a different perspective from the 96% that responded that they are critical thinkers without the profound understanding of the meaning of critical thinking. The latter demonstrate minimal understanding which maybe a result of

critical thinking and creative thinking that is more often than not contrasted. Creative thinking is expansive, inventive and unconstrained while critical thinking is focused disciplined, logical and constrained.¹⁶⁹

4.6.4 On Problem Solving according to Students

During the interviews, students were asked if they think they have enhanced their problem solving skills and why, 41% responded that they yes, they have greatly enhanced their problem solving skills because they have learned to resolve conflicts that may arise between students in the library or Electronic Resource Centres. 47% responded yes, that they can solve problems and the reasons given varied from:

- I can assist the student to print a document on the computer
- I can show the student to PDF a document
- I can clear paper jam from a photocopier
- I can tell where to find what books per subject
- I can teach other students how to search the internet
- I can teach other students how to make photocopies
- I can do three tasks at the same time

The responses above are indicative of 47% of students who are not very well conversant with the actual meaning of problem solving skills, yet in terms of the level descriptors for the South African National Qualifications framework these students are to be able to identify, evaluate, and solve problems in unfamiliar concepts, gather evidence applying solutions based on evidence and procedure appropriate to the field.¹⁷⁰ The responses above also present an indication that the students are not able to differentiate between troubleshooting and multitasking and problem solving. This is a crystal clear demonstration that the students are still lacking in terms of an ability to understand the different forms of knowledge and forms of explanation typical within the area of operation¹⁷¹. By definition multitasking is the ability of humans to handle the demands of multiple tasks and although it is a critical human

¹⁶⁹ Handbook of creativity edited by Sternberg Robert J. 1999. Cambridge university press.

¹⁷⁰ South African Qualifications Authority 2010. Level Descriptors for the South African National Qualifications Framework.

¹⁷¹ South African Qualifications Authority 2010. Level Descriptors for the South African National Qualifications Framework.

behaviour that allows people to cope even in more complex environment,¹⁷² it may and may not put to a test persons problem solving abilities.

2% responded that the work they do is routine work and not challenging and they wouldn't say their problem solving skills have been enhanced by their employment in the Electronic Resource Centre or library.

It is clear, based on the results that only 2% of the students understood the context the question on problem solving skills was asked.

Problem solving and creative thinking skills are central to any organizations ability to deal with dysfunctional relationships and achieve its strategic objectives.¹⁷³

4.6.5 Using technology for thinking purposes?

The advent of information technology has made the development of problem solving, critical thinking and high-order thinking skills crucial for future success.¹⁷⁴ Kelman¹⁷⁵ in Hopson has identified has identified higher-order skills as one are that could be improved by using the computer. The students responses to the question on the use of technology for thinking purposes were as indicated in the graph below.

¹⁷² Spink A. et al. 2006. Multitasking during web search sessions . *Information Processing and Management*. 42 264-275

¹⁷³ Carneval AP. 1988. Workplace basics: the skills employers want. American society for training development. Washington

¹⁷⁴ Hopson MH, Simms RL, Knezek GA. 2002. Using Technology-enriched environment to improve Higher-Order Thinking skills. *Journal of research on Technology in Education*. 34 (2): 109-119

¹⁷⁵ Kelman P. 1989. Alternatives to integrated instructional systems. Paper presented at the national educational computing conference. Nashville TN.

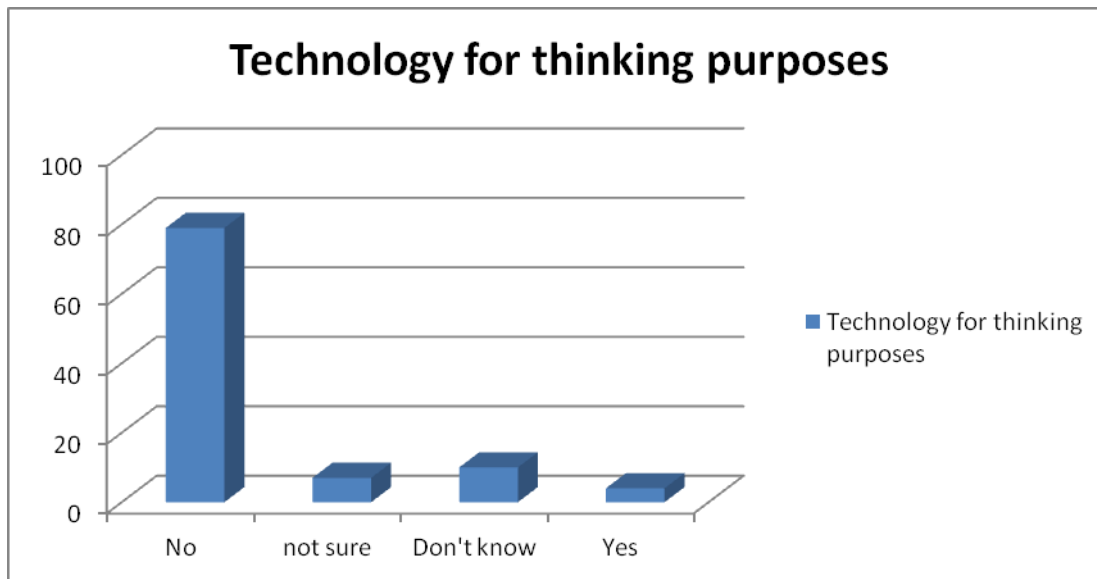


Figure 22. *Using Technology for thinking purposes*

79 % of the students said they do not think it is important to use technology for thinking purposes and only 4% said yes. On probing further the students who responded that it is not important advanced reasons such as

- The brain can do a good job
- Technology will make us lazy
- People do not think anymore because of “Google”

The 4% who responded that it is important to use technology for thinking purposes responded that using technology

- Guides the thinking process
- Assist in thinking
- Helps in calculation

There are inherent benefits for using technology as an aid for the thinking purposes in an organization. The benefits maybe both tangible and intangible in nature such as

- Improved customer service quality
- Deeper knowledge and understanding of customers
- Improved decision-making abilities
- Enhanced competitive advantage

— Improved profits¹⁷⁶

4.6.6 *Student Reflections on their Internships*

The university introduced the practice of appointing student assistants as a response to the preparation of students and young graduates for the transition from school to the working world. In so doing, it was the university's response to address the call by industry managers that the skills supplied to the labour market are in many ways inadequate for maximum participation in the knowledge economy. The assumption is that in creating these opportunities they provide a platform for students to acquire workplace skills.

During interviews 71% of the students reported that their main concern was the opportunity of earning a salary. On probing further on this question, most students cited poor family background for the reason for seeking the internship employment.

9% responded that they wanted to experience the work environment. 7% thought the work would be challenging but it was not and they are disappointed. 8% responded that they were excited and were looking forward to work in a computerized environment. 5% responded that they knew all about the kind of work done by student assistants because their friends worked the previous year.

On being asked to "mention the skill you didn't have before that you feel has been enhanced by your employment here" 64% responded that they enhanced their computer skills, 26% responded that they enhanced their communication skills while 3% responded that they enhanced their time management skills. 7% said they enhanced their human relation skills.

On being asked what skills would you say you have learned from permanent staff employed here? 31% responded that they have learned to be professional, 16% said human relations and 53% responded that because they mostly work after-hours they do not interact with the staff and therefore they have not learned anything from them. Computer, communication, time management and human relations are very important skills in today's global market for various employees.

Respondents were also asked to mention the main reason for applying for the position in the Library and electronic resource centre 71% responded that it was for financial gain citing poor financial backgrounds as the main reason. On probing further the respondents indicated

¹⁷⁶ Sheng H, Nah F, Siau K. 2005. Strategic implications of mobile technology: a case study using value-focused thinking. *Journal of Strategic Information Systems*. 14 269-290

that they are happy to be working however they did not believe that the acquired work experience will count in their favour when they seek employment related to their field of study. The skills enhancement part is the assumption as conceived by the university management.

4.7 CONCLUSION

This chapter was to present and discuss the detailed findings of the study regarding the key factors of critical thinking skills. What emerged from the study, given the unstructured nature of the intervention program is a new set of skills as per students. The skills are professionalism, human relations, computer and communication skills. Communication skills featured strongly on the initial survey to industry managers and it also emerged with the new skills that students feel they have enhanced by being exposed to a work environment indicates that it is a very important skills that has to be enhanced at all costs with its various facets covered to ensure a holistic development and nurturing of the skill.

A communication skill is a very important component of critical thinking skill. For anyone to be able to display the skill in a convincing manner in a work place, it is quite imperative to be able to speak and understand the language. Also, comprehension comes to play. The ability to debate well and clearly define issues preceded by comprehension which highly involves the individuals cognitive abilities.

Throughout the follow-up interviews, there was no student who mentioned analytical, problem solving and creative thinking skills, as skills that they have acquired by being exposed into the working environment. This can be attributed to the fact that the skills enhancement program, is unstructured and it remain to be the responsibility of the student to learn whatever skill they would like or that they will come across.

The continuations of such unstructured skills enhancement programs tend to ignore and not take into cognisance the employer's wish list of skills they would like to be developed among graduates¹⁷⁷ will in the long run be one-sided and neglect certain areas that need to be developed that are required to cope with the complex demands of today's world particularly in the workplace. Creative abilities and capabilities are more and more important to face the challenges of the emerging knowledge economy and information societies.

¹⁷⁷ Wilton N. 2008. Business graduates and management jobs: an employability match made in heaven? *Journal of Education and Work*. 21 (2): 143-158

Chapter 5

Aspects of the Skills Gap

5.1 INTRODUCTION

Today's job market is highly competitive; hence employers continually seek employees who will advance the competitiveness of their institution or organization. In view of the fact that new employees are mostly supplied to the labour market by universities, and Further Education Colleges in the South African context, the need to have a close and strong alliance between the concerned parties is increasing by the day. Industry managers on the other hand need to be considerate and understand that the transition from an academic institution to a formal work place is a major change in any person's life and therefore careful management is necessary. In any organization or institution, when a new person or people arrive to begin work, there are various issues that may include shock, culture change, and expectations of both employers and employees that may require particular attention to be explored and understood for better management. ¹⁷⁸

Industry practitioners and higher education institutions need to collaborate in order to share information of what is required and needed to train the prospective employees. Failure to initiate practical and functional collaborations will instead widen the existing gap and mismatch between the supply and demand of relevant skills to the work place.

This thesis investigated some aspects of the existing gap regarding critical thinking skills and further discussions below will reflect on the gap. Given the fact that TUT deliberately developed a transition programme this chapter will reflect more on how universities should equip students with these skills. These skills are not only of pivotal importance to perform and do well during their studies but to prepare them for the future in their workplaces and in

¹⁷⁸ Graham C. 1995. Delivering the promise: the transition from higher education to work. *Education and Training* 37 (1): 4-11.

their social lives where sound decisions are to be made on a daily basis¹⁷⁹. The implications of the skills gap for industry will not be dealt with here in detail. Being employed in the higher education sector, the researcher is not adequately schooled to speak on behalf of industry.

4.2 UNDERSTANDING THE EXPECTATIONS

As indicated above, a critical moment in the working life of any person is when they enter the job market for the first time. During this critical time for both the employer and employee, there are expectations and as alluded to in literature, very often the expectations are not met. The first few months to a year is a very critical period for learning for the new employee of the company's expectations and the direction the company is working towards. This is precisely the time when the employer critically observes the performance of the new employee whilst on the other hand the employee is trying to find his or her feet by understanding the organizational mission, vision and most importantly strategy. In so doing the employee, presents the employer an opportunity to assess him or her in terms of job performance.

The South African Concise Oxford Dictionary¹⁸⁰ defines expectations as, a belief that something will happen or be the case. In an interaction or engagement, there are two kinds of expectations namely, explicit and implicit.¹⁸¹ Explicit expectations are clearly stated and understood. They can either be communicated orally or in a written form. Implicit expectations are unwritten, unspoken requirements, agreements or understanding between people.

In this case, critical thinking skills are related to the implicit expectations that are mostly vague until one feels the consequence of lack of them or not having them. Very often when expectations are not met, it is due to the lack of clarity and people are likely to feel a range of emotions that may include disappointment, anger and betrayal. Another dimension to the unrealistic expectations new graduates have about their first job could be related to the fact that they had never been in a workplace in the real sense. It is also possible that when they work as student assistants in various divisions at universities like the program as introduced by

¹⁷⁹Ku Kelly YL. 2009. Assessing students' critical thinking performance: Urging for measurement using multi-purpose format. *Thinking Skills and Creativity* 4: 70-76.

¹⁸⁰ *South African Concise Oxford Dictionary* 2002. Oxford University Press.

¹⁸¹ Reina DS & Reina ML. 1999. *Trust and betrayal in the work place: Building effective relationships in your organization*. Berrett-Koehler Publishers.

TUT, they could be there for other reasons than the reasons that may have been envisaged by the university.

For an organization to maintain and enhance its competitive advantage there is a need to manage the expectations on both sides. There is empirical evidence of a relationship between expectation and performance.¹⁸² As such, to manage both the students and employers expectations, universities and colleges need to have a good understanding of both sides.

In order to understand the existing gap between students and industry managers, critical thinking key factors will be unpacked below for better understanding. It is also important to mention that the key factors of critical thinking to be unpacked below are inter-related. In some cases the line of differentiation is very fine.

5.3 THE SKILLS GAP FINDINGS

5.3.1 Statistical Overview

As indicated in chapter 4, the distinction between the various key factors of critical thinking that is language, argument; logic and problem solving are very fine and in some cases almost non-existent. The fine line is indicative of the close relationship that these concepts have in the sense that the one may influence the other.

Below are the correlations in statistical terms.

Critical Thinking: Key aspect	Students			Industry Managers		
	Item test correlation	Item rest correlation	Average inter-item correlation	Item test correlation	Item rest correlation	Average inter-item correlation
Language	0.2900	0.2309	0.2653	0.5047	0.4734	0.3277
	0.4766	0.4258	0.2580	0.6205	0.5945	0.3243
	0.4865	0.4363	0.2576	0.6365	0.6113	0.3238
Logic	0.6602	0.6224	0.2508	0.6365	0.6113	0.3238
	0.3707	0.3145	0.2622	0.3362	0.2993	0.3328

¹⁸² Hall DT & Berlew DE 1966. The socialization of managers: Effects of expectations on performance. *Administrative Science Quarterly* 11 (2): 207-223.

	0.5250	0.4771	0.2561	0.7296	0.7097	0.3210
	0.6122	0.5705	0.2527	0.6599	0.6360	0.3231
	0.6686	0.6316	0.2505	0.5003	0.4688	0.3279
	0.5341	0.4868	0.2558	0.2558	0.3995	0.3309
Argument	0.4766	0.4258	0.2580	0.6365	0.6113	0.3238
	0.6539	0.6156	0.2561	0.3362	0.2993	0.3328
	0.6122	0.5705	0.2527	0.7296	0.7097	0.3210
	0.6111	0.5693	0.2527	0.8343	0.8214	0.3179
	0.6384	0.5988	0.2517	0.5003	0.4688	0.3279
Problem solving	0.6238	0.5831	0.2522	0.7374	0.7180	0.3208
	0.5341	0.4868	0.2588	0.7474	0.7286	0.3205
Perception	0.6270	0.5865	0.2521	0.3995	0.3644	0.3309
	0.4622	0.4106	0.2586	0.3452	0.3085	0.3325
	0.4090	0.3546	0.2607	0.5803	0.5523	0.3255

Table 7. Average test scale results

The table above is the results of the test scale on the items. The pattern displayed in the table is that of average scores. It is clear that the industry managers have higher expectations than the students on all the variables tested.

This confirms the existence of a skills gap as alluded to by Wicramasinghe and Perera¹⁸³, Bridgstock¹⁸⁴ and Warhurst¹⁸⁵. The average scores on all key aspects of critical thinking,

¹⁸³ Wicramasinghe V & Perera L. 2010. Graduates', university lecturers' perception towards employability skills. *Education and Training* 52 (3): 226-244.

¹⁸⁴ Bridgstock R. 2009. The graduate's attributes we've overlooked: Enhancing graduate employability through career management skill. *Higher Education Research Development* 28 (1): 31-44.

namely language, argument, problem solving and logic that were tested, are more tilted on the upper scale on the industry managers site. This is interpreted to mean that the industry managers expect more than what the students expect to present when they venture into the job market for the first time.

5.3.2 Implications of the TUT transit programme

The intervention program as introduced by the TUT has been introduced to prepare students so that they transit seamlessly into the world of work. The intention is to instil ways of working and provide an opportunity to experience the feel of a workplace environment. However, whilst the intent can be applauded, the study shows that the program falls short in terms of addressing the existing skills gap with particular reference to critical thinking skills as it may be required by managers in industry. Ku¹⁸⁶ reports that the Association of American colleges and Universities' report states that only 6% of college seniors were considered proficient in critical thinking skills. Proficiency in critical thinking skills means to apply logical processes or to be rational in making decisions by conscious thinking which would be expressed in words or by symbols.¹⁸⁷ The table above confirms the existence of the gap regarding critical thinking skills among young graduates who are about to venture into the job market

Also according to Ennis¹⁸⁸ extends the definition to reasonable reflective thinking that is focused on deciding what to believe and do. When proficient critical thinkers are confronted with a challenge or a situation that require their mental activities, they acquire information, process by evaluating the information they have to be able to reach a well thought and justified conclusion.

The skills intervention program that was introduced by the TUT is geared towards enhancing employability skills but not towards a particular set of skills but to experience in general the sense the world of work. This set-up is largely un-guided in terms of the skills to be enhanced therefore students pick up whatever skills they want to learn or those that they may be

¹⁸⁵ Warhurst C. 2008. The knowledge economy, skills and government labour market intervention. *Policy Studies* 29 (1): 71-76.

¹⁸⁶ Ku Kelly YL. 2009. Assessing students' critical thinking performance: Urging for measurement using a multi-purpose format. *Thinking Skills and Creativity* 4: 70-76.

¹⁸⁷ Simon HA. 1987. Making management decisions: the role of intuition and emotion. *The Academy of Management Executive* 1 (1): 57-64.

¹⁸⁸ Ennis RH. 1962. A concept of critical thinking. *Harvard Education Review* 32: 81-111.

comfortable with.

This is likely to yield the result where students overrate themselves in terms of the skills they think they have whereas in reality and as displayed in the follow-up interviews that they have minimal understanding of the critical thinking skills concept.

This can be attributed to the fact that students may feel they have adequate high order skills because they were selected for positions ahead of their fellow students. Facione¹⁸⁹ warns that professionals who overrate their abilities are likely to act with inadequate caution. This may be true to the student participants of this study or it could be related to their minimal understanding of what critical thinking is. However, with all these being said and done, is this the best way to respond to the skills gap challenge in order to address the need?

For organizations to achieve on its strategic objectives they depends on how quickly and effective they can transcend the barriers that may hinder their productivity and competitiveness.¹⁹⁰ These pressures, of sustaining the competitive advantage and increased innovation put the company or organizations creative thinking and problem solving skills on the spotlight. Therefore companies are forever looking to recruit individuals with skills that include the ability to recognize and define problems, be creative, invent and implement solutions and also follow-up and evaluate the results. This thesis reveals that students do not know what critical thinking skills are let alone the expectation and how important are these skills in a working environment. These are the critical skills that are central to the company's sustenance of its competitive edge.

5.3.3 Confusing Problem Solving with Troubleshooting

Based on the results above on critical thinking skills 51% of the student participants defined critical thinking skills as to think fast and to do more than three tasks at the same time. Evidently, emanating from the face-to-face interviews the students were not able to distinguish between troubleshooting, critical thinking, problem solving and logic, because at colleges and universities the focus on educational endeavours in relation to critical thinking skills encompasses skills such as evaluating sources of information, challenging assumptions,

¹⁸⁹ Facione PA *et al.* 1995. The disposition towards critical thinking. *Journal of General Education* 44 (1): 1-25.

¹⁹⁰ Carneval AP *et al.* 1988. Workplace basics: The skills employers want. American Society for Training and Development. Washington DC.: 1-42.

understanding context, analyzing arguments and using metacognition¹⁹¹ This, could also have been a result of hasty generalizations or false comparison in the sense of assuming that the concepts are alike in one or more respects and that they are not necessarily alike in all respects. These concepts require that an individual should engage in particular steps to arrive at a best possible outcome of the situation at hand. These processes can take place simultaneously in the brain and in the end depending on the actions taken, depict the manner in which an individual reason. Based on 4.7.2 in chapter 4, the students think that they can solve problems, yet in reality what they advance as reasons of their ability to solve problems are very simple technical functions such as

- Clearing a paper jam from a photocopier
- Teaching students how to make photocopies.
- Showing a student how to PDF a document

In reality, what is referred to above is troubleshooting, though they may have solved a problem by troubleshooting, because if a photocopier has a paper jam, it will not function anymore and it will be a “problem” to the users of that machine because it will not be functional at that time. Also of significance, when students were asked whether their working in the library and ERC enhanced their problem solving skills, 68% of the students responded that because the work they are doing is mostly routine, they do not think it has enhanced their problem solving skills and they feel bored and that they are only doing it for financial gain because the experience they are gaining is irrelevant to their field of study. Again, the students are not aware that in any work environment, they can benefit by acquiring problem solving skills amongst others that may be applicable in any work environment including work within their field of study.

However with regards to the depth of the concept, problem solving for the purpose of this study has been missed, as it was geared to university students who are three months away from beginning to search for jobs in the labour market. Also demonstrating to a student how to use the Microsoft applications such as how to PDF a document, can be superficially be viewed as problem solving because the user has a “problem” if the they cannot PDF a document that requires such a function. These students are expected to have a deeper understanding of the meaning of the concept problem solving according to the South African

¹⁹¹ Cotter EM & Tally CS. 2009. Do critical thinking exercises improve critical thinking skills? *Educational Research Quarterly* 33 (2): 3-14.

Qualifications Framework level descriptors. At this level, the students are expected to be able to evaluate and solve problems in unfamiliar context by gathering evidence and applying solutions based on the evidence.¹⁹² This is also backed by Piaget stages of development where it attests to the fact that around the onset of puberty, children are able to reason in an abstract way and to set the hypotheses using systematic logic.¹⁹³

Based on the above, In this case, 51% is a sizeable amount that dictates a need for serious intervention. Problem solving is a fundamental component of critical thinking skills and the cognitive processes are best displayed when a problem is solved.

5.3.4 Interpretation, Analysis and Inference Skills are under Par

The outcomes of the face-to-face interviews show that these students will not be in a position to or have the ability to or are significantly deficient in terms of the following mental skills that seem to be habitually displayed by critical thinkers when they use a pattern of knowledge that is stored in the brain to assist in understanding new information called schema.¹⁹⁴

Interpretation. This is to comprehend and express the meaning of a variety of a situation data and events.¹⁹⁵ In this phase the student should be able to apply their mental skills for better interpretation and ask questions such as

- What is happening?
- What does this mean?
- How best can I classify this?
- How can I make sense of this?

This kind of interpretation takes place in the mind and will only be displayed by the action taken and it is likely to be supported by tacit knowledge already in the mind.

Analysis. This is to identify the intended and actual inferential relationship among statements and descriptions or other forms of representations with the intention to express a belief,

¹⁹² SAQA 2010. Level descriptors for the South African National Qualifications Framework. www.saqa.org.za accessed 19/09/2011.

¹⁹³ [Http://www.usefulcharts.com/health-and-psychology/developmental/stage](http://www.usefulcharts.com/health-and-psychology/developmental/stage). Accessed 2011/06/04.

¹⁹⁴ Thomas A & Thorne G .2011. How to increase higher order thinking. Centre for Development and Learning. <http://www.cdl.org/resource-library/articles/HOT.php=recent&id=yes> . Accessed 11/11/2011.

¹⁹⁵ Facione PA. 2011. Critical thinking: What it is and why it counts. *Insight Assessments*: 1-28.

information, opinion or experience. This involves taking an argument apart into their structural elements for better understanding¹⁹⁶ and asking questions such as:

- Why do you think that?
- What are the disadvantages and advantages of the argument?
- What is the basis for saying that?

Inference. This means to identify and secure elements needed to draw reasonable conclusions.¹⁹⁷ This is a step that is taken in the mind from the premises to the conclusion and it prompts questions such as these:

- From what is known, what conclusions can be drawn?
- From what is known what can be ruled out?
- What is the implication of the evidence?
- What additional information is needed?
- What are the consequences of acting in this manner?
- Are there any available alternatives?
- Are there any un-desirable consequences?

Following this step, Critical thinkers are able to explain how they have arrived at a particular judgement, and hence the inference step is followed by explanation. Explanation can be defined as being able to present in a coherent manner the results of one's reasoning.¹⁹⁸ A good explanation will clarify the following questions

- What are the specific findings?
- How the analysis was conducted?
- How the reasoning process unfolded?
- Justify the answer to the problem
- Justify the actions or the particular decision made.

¹⁹⁶ Rudinow J & Barry VE. 2004. *Invitation to critical thinking*. Thomson Wadsworth.

¹⁹⁷ Facione PA. 2011 Critical thinking: What it is and why it counts. *Insight Assessments*: 1-28.

¹⁹⁸ Facione PA. 2011 Critical thinking: What it is and why it counts. *Insight Assessments*: 1-28.

Evidently the problem solving concept responses above are indicative of the fact that, due to the level of understanding there is a huge likelihood that in a working environment a given task may negatively impact the employer's perceptions of the outcomes because of limited skills regarding the applications of logical interpretations, and may lead to:

- The approach to the task may be different than expected
- The level of accuracy and precision may be distorted
- The integration of thoughts may not be according to expectation
- The main idea of the given task may be lost
- Identification of pitfalls may be limited or over-estimated
- The basic ideas of the task may be limited or over-estimated

It is also imperative to acknowledge that the selected sample use English as a second language and it is claimed that critical thinking is also important in the acquisition of language skills particularly reading and writing¹⁹⁹, therefore elevating the importance of language skills in this regard.

5.3.4 The Students' notions of 'Logic' and 'Critical Thinking'

As per this study, these are senior students who are within a few months of seeking employment in various organizations and institutions. These students would have academically qualified and ordinarily feel best positioned and justified that they are ready for employment. The question is how ready are they?

Logical thinking ability is seen as one of the most important cognitive ability which influences and has been proven to be a good predictor of academic success of students.²⁰⁰

This refers to an individual's ability to solve problems by using mental operations by making certain generalizations or abstraction²⁰¹ Furthermore, the needed physical or virtual information and problem solving capabilities need to be brought together to facilitate this

¹⁹⁹ Rashid Rosyati Abdul & Hashim Rosna Awang. 2008. The relationship between critical thinking and language proficiency of Malaysian undergraduates. EDU-COM 2008 International Conference 19-21 November.

²⁰⁰ Rashid Rosyati Abdul & Hashim Rosna Awang. 2008. The relationship between critical thinking and language proficiency of Malaysian undergraduates. EDU-COM 2008 International Conference 19-21 November.

²⁰¹ Sezen N & Bulbul A. 2011. A scale on logical thinking abilities. *Procedia Social and Behavioral Sciences* 15: 2476-2480.

process at a single locus.²⁰²

This also means getting ideas, facts and results of a problem and put them in a successive order. Logic examines the structure of knowledge and distinguishes correct and wrong reasoning because it provides the criteria by which validity of reasoning may be evaluated.²⁰³ Logic is informed by the thought processes that take place in the mind. Conze²⁰⁴ argues that there is a connection between the structure of logical thinking and social life, and also that man is primarily a thinking and reasonable being and that from the outset due to nature human beings are logical thinkers. In their response to logical, critical thinking and problem solving questions in chapter 4 the students responded in a manner which is in line with Henle's²⁰⁵ assertion that a person is likely to accept a conclusion which expresses his convictions with little regard for correctness or incorrectness of the inferences involved.

It must be acknowledged that the samples are university students who have developed formal operational thought that should enable them abstract thinking and hypothetical deductive reasoning because according to Piaget's conceptualization that formal operational thought develops in early adolescence²⁰⁶ and that both formal operational thought and critical thinking involve abstract and deductive reasoning it is then logical to conclude that formal operational thought may be a prerequisite for critical thinking.²⁰⁷ The sample students displayed a significant weakness in terms of utilizing the building blocks of thinking which are the pre-requisites skills upon which thought processes are based. These logical forms are not meant to describe the actual thinking but are just concerned with the ideal on how we as human beings are ought to think.²⁰⁸

Based on chapter 4 51% of the students responded that critical thinking is to

— Think fast and do more than three tasks at the same time.

²⁰² Von Hippel E. 1994. "Sticky information" and the locus of problem solving: Implications and innovations. *Management Science* 40 (4): 429-439.

²⁰³ Henle M. 1962. On the relation between logic and thinking. *Psychological Review* 69 (4): 366-378.

²⁰⁴ Conze E. 1934. Social implications of logical thinking. *Proceedings of the Aristotelian Society* 35: 23-44.

²⁰⁵ Henle M. 1962. On the relation between logic and thinking. *Psychological Review* 69 (4): 366-378.

²⁰⁶ Cotter EM & Tally CS. 2009. Do critical thinking exercises improve critical thinking skills? *Educational Research Quarterly* 33 (2): 3-14.

²⁰⁷ Cotter Ellen M & Tally Carrie Sacco. 2009. Do critical thinking exercises improve critical thinking skills? *Educational Research Quarterly* 33 (2): 3-14.

²⁰⁸ Henle M. 1962. On the relation between logic and thinking. *Psychological Review* 69 (4): 366-378.

The response above clearly demonstrates the minimal understanding of the concept, critical thinking. The ability to think fast does not culminate in an individual being a critical thinker because according to Fischer²⁰⁹ critical thinking is the ability to engage in that mode of thinking, about any subject, content or problem in which the thinker improves the quality of his or her thinking by skilfully taking charge of the structures inherent in thinking and imposing intellectual standards upon them. Also various other authors were consulted and for the purpose of this study, the applicable definition of critical thinking is

- Critical thinking is a way of thinking about any content, subject or a given problem in a skilful manner of analyzing, assessing, evaluating gathered information, observing, reflection, and reasoning, communicating, check for clarity, accuracy, precision, relevance, depth, breadth, significance logic and fairness as a guide to a belief or an action and the determination of whether there is adequate justification to accept the conclusion as true.

Based on the literature review in chapter 2 concerning the definition of critical thinking none of the following authors' Dewey, Glaser, Ennis, Paul²¹⁰, Rudinow and Barry²¹¹ and Cotrell²¹² ever referred to the ability to think fast when defining critical thinking skills. Instead, what appears to be of outmost importance is according to Dewey and Glaser in Fischer²¹³ is that they share the notion that critical thinking is a careful consideration or to consider in a thoughtful way to examine any belief or action. Ennis and Paul put their emphasis on the skilful manner of taking charge of structures inherent in thinking. In view of the above definition and looking at the superficial sounding response by students, thinking fast may be necessary in one context or another but is not really fundamental in describing and defining critical thinking skills. 47% responded that critical thinking skills is

- To think out of the box and be able to read into a given situation which others cannot read.

The statement “think out of the box” is a buzz word nowadays. However, it carries the notion that brings a temptation to give a benefit of a doubt that the students may have an

²⁰⁹ Fischer A. 2001. *Critical thinking: An introduction*. Cambridge University Press.

²¹⁰ Fischer A. 2001. *Critical thinking: An introduction*. Cambridge University Press.

²¹¹ Rudinow J & Barry VE. 2004. *Invitation to critical thinking*. Thomson Wadsworth.

²¹² Cotrell S. 2005. *Critical thinking skills: Developing effective analysis and argument*. 2nd edition. Palgrave Macmillan.

²¹³ Fischer A. 2001. *Critical thinking: An introduction*. Cambridge University Press.

understanding to some point that critical thinking is not ordinary and that certain skills should be employed when displaying the ability to be a critical thinker.

The second part of the response

— “Be able to read into a given situation”

According to this statement, what has to be read remains hidden and it suits well to be referred to as an assumption and it calls for the thinker to be alert for hidden assumptions. The degree of the vagueness of the statement also compounds to the issue of the level of understanding of what it means. Provided one is to make an assumption on this claim, which can be true without further arguments it is possible to “read into a given situation” but to what level. It is possible to read into a situation and interpret it but not analyze, and evaluate it. It is acknowledged that the cognitive process is not hierarchical, but does not indicate the depth of how far the cognitive process will unfold. The process can end only with interpretation and thereby falling short of displaying the ability to think critically as may be displayed by habitual critical thinkers.

The students were asked if they had enhanced their logical thinking skills by working and why? 51% responded that

— They can now think a little bit faster

As indicated above with regards to critical thinking, thinking fast has no place in literature for critical thinking. This means that 51% of the students fell through the cracks throughout their university studies with regards to gaining the basic understanding of what critical thinking skills are.

47% responded that they are not sure if they can define logical thinking.

Logical thinking is seen as the key to the processes of mental reservation and complex problem solving. Logical thinking constitutes one part of problem solving. In other words, logical thinking is one of the sub-stages of problem solving.²¹⁴ The results based on the question on logical thinking presents a very bleak situation for the students regarding the skills they will be bringing to the labour market. Thinking fast seem to have been ‘thee’ response to the question on critical thinking and logical thinking. A disturbing fact that may be indicative of the fact that the students are unable to differentiate between the two. The

²¹⁴ Sezen N & Bulbul A. 2011. A scale of logical thinking abilities. *Procedia Social and Behavioural Sciences* 15: 2476-2480.

47% who were not sure what logical thinking means can safely be classified with the 51% who think that logical thinking is to think a little bit faster. Only 2% responded that they were not sure that their logical thinking skills have been enhanced by the routine work they were doing.

These responses indicate that only 2% of the students understand what logical thinking means as from the response it can be deduced that doing routine work does not involve a logical thinking that much, as a routine is a sequence of actions that are followed on a regular basis²¹⁵ and with time in a routine job set-up there is a likelihood that the worker will perform such duties without really thinking of what they are doing.

On problem solving skills, this is the most critical part of decision making because it informs the action to be taken. Though the work done by student assistants in the Library and ERC's did not really require high level problem solving skills as such but require the skill at an intermediate phase, it was imperative to engage the students on problem solving skills, as the sample was drawn from senior students who are about to venture into the labour market, where not only industry managers expect them to have those skills, but an expected ability upon completion of an academic qualification level 6, as per South African Qualification Authority level descriptors, a category in which these students belong. These required skills must demonstrate that the student's level of thinking is a level that is higher than that of memorizing facts. This level calls for understanding, and the ability to analyze, draw an inference and explain in a cogent and coherent manner the reasons for a particular decision and action taken.

When students were asked on their expectations upon receiving information that they had been appointed in the library and ERC respectively, 71% responded that they were excited at the prospects of earning a salary. This clearly demonstrates that the primary objective of the program falls by the wayside as the greatest number of students is in the job for financial gain. 9% responded that they wanted experience in the work environment whilst 8% said they thought the work was challenging but were disappointed because the work is not challenging at all. 5% responded that they knew all about the kind of work they were going to do because their friends worked in these positions the previous year and they felt good and happy at the prospects of earning a salary.

On being asked to mention the skills that they did not have before that they feel has been

²¹⁵ *Concise Oxford Dictionary*. 2002. Oxford University Press.

enhanced by their employment in the library and ERC? The responses were as follows

- 64% enhanced their computer skills
- 26% enhanced their communication skills
- 3% enhanced their time management skills
- 7% enhanced their human relations skills

On being asked what they learned from professional staff employed the Library and ERC

- 31% responded that they learned to be professional
- 16% said human relations
- 53% responded that because they mostly work after hours, and they did not interact with permanent staff and as such they have not learned anything from them.

Notable to the responses above is that there is no mention of critical thinking, Logical thinking, and problem solving and language skills. Ku²¹⁶ points out that teaching critical thinking is not a simple task although it is an important goal of modern education, as it equips students with competency necessary to reason about affairs in the rapidly changing world. These skills are vital for students to perform well in school and also needed in future workplaces, social and interpersonal contexts where sound decisions are to be made independently on a daily basis for they will guide on what to do and what to believe. To teach students to think critically teachers must develop a pedagogy that aims to promote critical thinking skills.

5.4 DEVELOPING STUDENTS TO FUNCTION IN A KNOWLEDGE ECONOMY

The analysis is indicative of a gap that requires a holistic intervention from strategic and operational perspectives by all relevant stakeholders. What the university has embarked on, is a step in the right direction, that is, the provision of environment and to make resources available to appoint students in these positions. However, even with enhancing generic soft skills that is requisite skills for any other employment there is a need to structure the intervention program in order to ensure the optimal utilization and subsequent benefits of the allocated resources. A structured program for performance based assessment that is inclusive of monitoring and evaluation will be an excellent tool to the managers and to provide

²¹⁶Ku Kelly YL 2008. Assessing students' critical thinking performance: Urging for measurement using multi response format. *Thinking Skills and Creativity* 4 (1): 70-76.

feedback to the participants in terms of getting to know the kind of skills they have and the level they can operate on.

In order to develop the students for a seamless transition from school to the world of work the current intervention program as is indicative of a number of shortfalls and needs to be structured in a manner that the benefits are maximised. The need is there and the need has to be addressed.

Whilst the expectations by managers in industry seem justified, owing to their experience and the fact that student's expectations needs realignment, the challenge remains as to whose responsibility it is to ensure the nurturing and the best ways to cultivate critical thinking skills among prospective employees for sustainable competitive advantage in a knowledge economy?

Should it be:

- Lecturers in class as part of the curriculum?
- Part of programmess such as the TUT programme?
- Prospective employers?

While we grapple with the issue of whom is maybe likely to take up the bigger portion of the responsibility to equip the students, it is good to know that critical thinking can be taught. Based upon the above discussion, Ku²¹⁷ Chartrand²¹⁸ agrees that teaching for critical thinking is an important goal in modern education. Despite the fact that it is not a simple task, it has to be done to equip students with the necessary competency to reason in social affairs and in the rapidly changing working world.

The outcomes should ensure that the following components of critical thinking skills are addressed and achieved.

- Recognize Assumptions: This is the ability to separate fact from fiction. This also calls for an individual to be able to investigate an issue using relevant information.
- Evaluate arguments: Information has to be analysed, evaluated in an accurate and objective manner for complete understanding. The sources of information must also

²¹⁷ Ku Kelly YL. 2008. Assessing students' critical thinking performance: Urging for measurement using multi response format. *Thinking Skills and Creativity* 4 (1): 70-76.

²¹⁸ Chartrand J, Ishaikawa H & Flander S. 2009. Critical thinking means business. Learn to Apply and Develop new # 1 workplace skill.

be assessed.

- Draw Conclusions: This means the ability to bring together information that is diverse to be able to arrive at a justified conclusion that shows a good judgement.
- Must be able to recognize the strength and weaknesses of their chosen methodology
- Make an Inference: Evaluate and analyse the evidence that will be presented.²¹⁹

5.5 ENHANCING CRITICAL THINKING SKILLS

Industry managers, are aware of their needs based on their experience, however students do not know what is expected of them hence the unrealistic expectations. It is also evident that the impact of the program as introduced by TUT in its current form will not yield any positive results towards addressing the skills gap with particular reference to critical thinking skills. The results of the self-evaluation questionnaire demonstrates that 91% of the respondents strongly agree that should, they be appointed and enter the formal job market, they will be able to demonstrate the expected attributes related to critical thinking skills. The 91% forms part of the students who are unable to distinguish between problem solving and troubleshooting. They also do not know what critical thinking and logical thinking skills are. The triangulation method of data collection in this study was extremely useful as it revealed facts that would have remained unexplored regarding the understanding of concepts pertaining to this study.

However, Facione²²⁰ warns that professionals who over-rate their abilities are likely to act with inadequate caution. This may be true to the students who responded to the questionnaire or it could be related to their minimal understanding of what critical thinking is. The results of the self evaluation questionnaire are in actual fact misleading regarding the skills levels and the understanding of the concepts by the students. The follow-up interviews opened up other perspective depicting that what the university is producing to supply the demand of skills in the labour market is of a substandard level when weighed against the South African National Qualifications Framework level descriptors in relation to the key facets of critical thinking skills. It is acknowledged that skills enhancement is not a one dimension aspect and cannot be treated as such. The university through this program is responding to the call made

²¹⁹Castle A. 2009. Defining and assessing critical thinking skills for student radiographers. *Radio-graphy* 15 (1):70-76.

²²⁰ Facione PA *et al.* 1995. The disposition towards critical thinking. *Journal of General Education* 44 (1): 1-25.

by industry managers regarding the lack of skills. However, this study un-covered that the intervention program, as introduced by the university falls short in many ways of adequately addressing the skills gap in general and also regarding critical thinking skills owing to:

- The intervention program being unstructured
- Critical thinking being a very abstract concept that cannot be tested – ordinarily
- The use of academic performance as the only yardstick for appointment
- Critical thinking abilities are not taken in cognizance nor tested during the recruitment process
- Students expected to learn most work related traits unguided and unsupervised
- Students are placed to work in environments where staff members are not trainers of critical thinking skills and they themselves may not be critical thinkers and they may not be conversant with critical thinking attributes.
- No clear cut objectives as to the kind of skills are to be enhanced
- In addition to the above challenges, there are other challenges that can be linked to the meta-cognition of the students themselves. Meta-cognition, in this instance refers to thinking about thinking. The problems that students are likely to have in relation to problem solving are:
 - Poor comprehension of the concept
 - Understanding the concept in a shallow manner
 - Poor subject specific to a concept
 - Poor abstract conceptualization
 - Inability to make inferences
 - Inability to make the correct assumptions
 - Inability to identify a problem
 - Inability to formulate a good strategy towards addressing the problem
 - Poor presentation of the problem

- Inability to select the best solution to the problem at hand.²²¹

The value of our lives in its totality depend on the kind of decision we make all the time. Based on the facts above it is evident that schooling of all levels must prepare students for participation in society in a broader sense.²²² For a properly developed critical thinking skills enhancement program, it will be best to first

- Diagnose the levels of the student's critical thinking, as this will be beneficial by showing specific areas and strength.²²³
- Provide the students feedback of their critical thinking prowess. This tend to enhance attempts towards improvement of skills
- Motivate students to be better critical thinkers.

5.6 RECOMMENDATION

The undertaking of the study was aimed at the outcomes of developing a best practice intervention method on how to equip new graduates with relevant skills to function in the knowledge economy with particular reference to critical thinking skills.

In introducing best practice, it is recommended that

- The roles and responsibilities of the role players, the university management, staff, students and lecturers be clearly defined in a logical manner. This will ensure that at the point of implementation the different role players are well positioned.
- The objectives and outcomes of such a program should be clearly set. This is for guidance as what is to be achieved at the end of the program
- There should be clear guidelines pertaining to the nature and level of skills to be enhanced. This is will ensure that the participants of the program will take part fully aware of exact kind of skill they will be enhancing.
- Identify the linkages of certain clusters of skills to guide development and

²²¹ Thomas A. 2011. How to increase higher-order thinking. Centre for development and learning. [http:// www.cdl.org/resource-library/articles/HOT.php=recent&id=yes](http://www.cdl.org/resource-library/articles/HOT.php=recent&id=yes)

²²² Ten Dam Geert & Volman Monique 2004. Critical thinking as a citizenship competence: Teaching strategies. *Learning Instructions* 14: 359-379.

²²³ Ennis RH. 1993. Critical thinking assessment. *Theory in Practice*32 (3): 179-186.

enhancement.²²⁴

- Explore the integration of soft skills into the curricula taking into consideration the pros and cons of such an intervention.. This will ensure that employers requirements are addressed in the learning process of the learner and it should proceed in a well organized manner for increased competence in the soft skills for potential employment prospects.
- Psychometric testing to be introduced to identify strengths and weaknesses of student’s interest, learning styles and aptitudes.

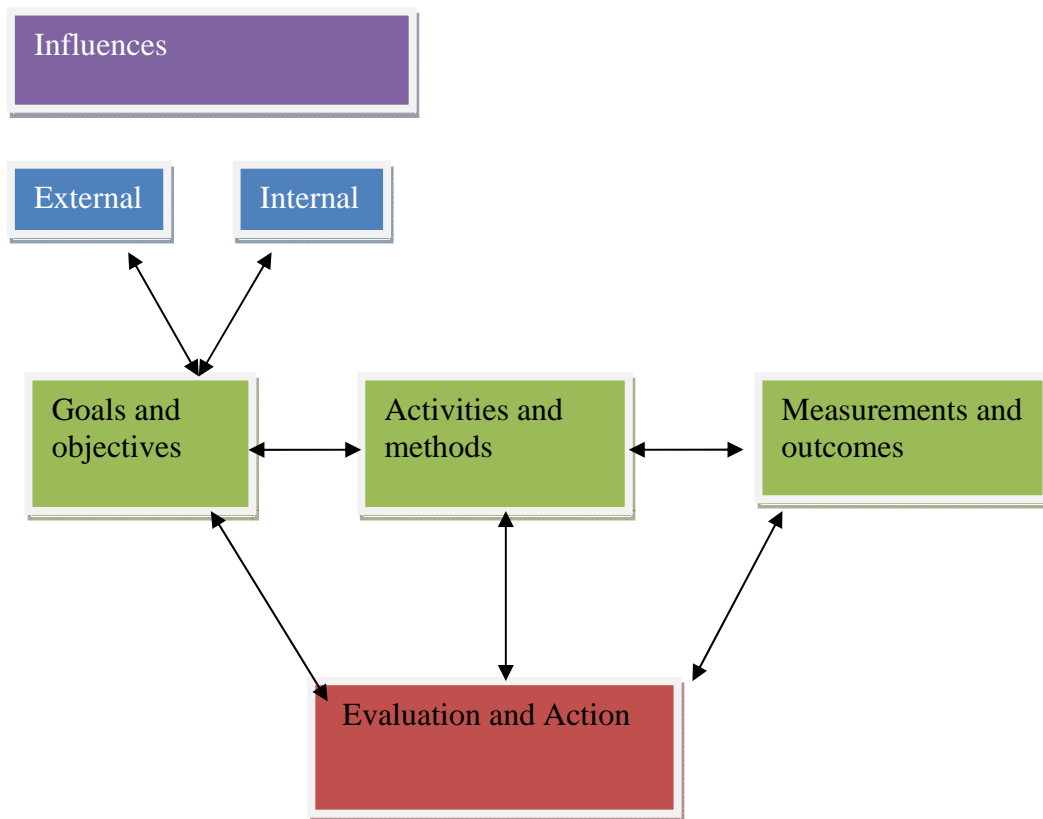


Figure 21. Integration of soft skills model

Students need to be taught how to seek, find, evaluate and synthesize information.²²⁵

²²⁴ Facione PA *et al.* 1995. The disposition towards critical thinking. *Journal of General Education* 44 (1): 1-25.

²²⁵ Dagget Willard R. Jobs and the skills gap. International Centre for Leadership in Education. Rigor, relevance, and relationship for all students.

They must learn the specific rules of logic.

The guidance and training to be conducted in class or a formal setup.

First level of skill implementation should be in such programs as introduced by TUT.

Mentors in the various service departments should be trained

They should be awareness of parameters on how to mentor the students

Periodic performance based assessment be conducted before and after the employment. To ensure that skills have been enhanced in some way or the other, a formal assessment plan needs to be developed and implemented for the program.²²⁶

The assessment should be an ongoing process that flows from the mission and vision of the institution focuses on the specific skills as per the set objectives

Assessment procedures should be evaluated regularly for continuous program improvements.

To add to the list above it is imperative for students to be taught how to apply their knowledge in real life situations and solve problems. Halpern²²⁷ agrees that critical thinking instruction will continue to be an important component in college curricula, but cautions of the problem in learning thinking skills because they are needed in multiple contexts and that there are no obvious cues in the novel that can recall of the thinking skill because with structure training, students are taught to create retrieval cues from the structural aspects of an argument or a problem.

A number of critical thinking tests that are available in the market (in case researchers do not want to create their own tests) and can be useful in the assessment of student's level of critical thinking and are categorized into two. There are tests covering more than one aspect of critical thinking and those that are covering only one aspect of critical thinking²²⁸ and they are as follows:

The California Critical Thinking skills Test: College level by P Facione (1990)

Cornell Critical Thinking Skills Test Level X. By RH Ennis and J Millman (1985)

²²⁶ Beard D, Schwieger D & Surendran K. 2008. Integrating soft skills through university college and programmatic efforts at an AACSB accredited Institution. *Journal of Information Systems Education* 19 (2): 229-240.

²²⁷ Halpern F. 1999. Teaching for critical thinking: Helping college students develop the skills and dispositions of a critical thinker. *New Directions for Teaching and Learning* (80): 69-74.

²²⁸ Ennis RH. 1993. Critical thinking assessment. *Theory into Practice* 32 (3): 179-186.

Cornell Critical Thinking Test Level Z By RH Ennis and J Millman (1985)

The Ennis-Wier Critical Thinking Essay Test By RH Ennis E Wier (1985)

Judgement: Deductive Logic and assumption Recognition By E Shaffer and J Steiger (1971)

New Jersey Test of Reasoning Skill By V Shipman(1983)

Ross Test of Higher Cognitive Processes By JD Ross and CM Ross (1976)

Test of Enquiry skills By BJ Fraser (1979)

Test of Inference Ability in Reading Comprehension By LM Phillips and C Patterson (1987)

Watson-Glaser critical thinking Appraisal By g Watson and EM Glaser (1980)

Cornell Class Reasoning Test By RH Ennis et al (1964)

Cornell conditional Reasoning Test By RH Ennis et al (1964)

Logical Reasoning by A Hetzka (1955)

Test on appraising Observation by SP Norris and R king (1983)

Critical thinking skills will be demonstrated by the ability to draw a mental box around the problem to be solved or issue at hand by reasonably reflecting about what to do or believe.

- Judge the credibility of the sources and to make a good judgement
- Identify conclusions, reasons and assumptions
- Judge the quality of an argument
- Develop and defend a position on an issue or problem
- Ask relevant questions for clarification
- Define term in away appropriate for the context
- Be open minded
- Keep well informed
- The ability to evaluate the quality of the presented information

— Draw conclusions with the necessary caution.²²⁹

The researcher acknowledges that during the course of the activities taking place when students are appointed to work in the Libraries, it is an environment where transfer of skills can take place. However, this does not nullify the beckoning need for a meaningful structured intervention. It remains vital to re-direct the perceptions of these young graduates regarding programs by stressing the need for skills transfer and acquisition.

5.7 CONCLUSION

The need to address the skills gap is a reality that cannot be wished away. The recommendations' above cannot be viewed as cast-in-stone in terms of addressing the existing skills gap. It should be borne in mind that addressing this issue should be an ongoing process of learning in organizations that requires a multi-pronged approach.

It is acknowledged that even with unstructured skill enhancement programs, skills transfer still takes place. According to data presented in this study and with reference to enhancing critical thinking skills, there is a beckoning need for a meaningful structured intervention that will encompass the recommendations as set out in 5.5. The students' perception regarding critical thinking skills needs to be redirected and that whenever students apply for these jobs at service units of institutions they are fully aware of the kind of skills they will enhance and they will be informed as to the level of their skills based on the performance management system that will be in place.

The transition to the workplace from higher education institution requires the individual's ability to be reflective.²³⁰ The poor performance of the students as per this study above, leads to the conclusion that systematic thinking should be more emphasized in formal education. There is a great need to develop metacognitive skills within the curricula.²³¹ There is a number of research works that have been done on the working experiences of graduates during the immediate years of employment after graduation including the one by Wacramasinghe and Perera²³² in Jusoh²³³ et al that many of these studies concluded that the

²²⁹ Ennis RH. 1993. Critical thinking assessment. *Theory into Practice* 32 (3): 179-186.

²³⁰ Heyler R. 2011. Aligning higher education with the world of work. *Higher Education Skills and Work-based Learning* 1 (2): 95-105.

²³¹ Holvikivi J. 2007. Logical reasoning ability in engineering students: A case study. 50 (4) IEEE Transactions on Education.

²³² Wicramasinghe V & Perera L. 2010. Graduates', university lecturers' and employers' perception towards employability skills. *Education and Training* 52 (3): 226-244.

graduates experiences at work do not live up to expectations and that the transition to the world of work is very often traumatic and stressful which tend to create inefficiencies for the organization.

Facione²³⁴ argues that any college or institution that trains people for entry level jobs and not train them in valid general education and provide no grounding on how to learn to think does a grave disservice to those graduates and its nation. There is no nation that can afford to develop only a few elite who can think who will then be trusted to make all decisions while the rest are trained to perform mindless jobs.

The advent of the knowledge economy dictates that societies must organize themselves for thinking. This is an issue for providers of graduate education lecturers, curriculum developers, and also an issue for those who are the prime beneficiaries, the graduates and the secondary beneficiary the employers²³⁵. This should be an inclusive partnership of all relevant stakeholders. This should be coupled with the individual's ability to be reflective upon transition from a higher education institution to the world of work²³⁶. It is evident that as the knowledge gap between skills and jobs becomes more and more understood,

Education, business and government will have to beef-up their relationship and work together to eliminate the level of skill variance²³⁷. Work-based learning programs will have to be constructed to further advance this cause. The practical implication here, is that in a knowledge economy, is that the knowledge worker is forced to function in an environment that is characterised by high level of complexity, increased exposure to a variety of information sources, time and emotional pressure, problem solving and multitasking and all this leading to cognitive overload.²³⁸ The only ramification is when workers have been

²³³ Jusoh M, Simun M & Choy Chong S. 2011. Expectation gaps, job satisfaction and organizational commitment of fresh graduates: Roles of graduates, higher learning institutions and employers. *Education and Training* 53 (60): 515-530.

²³⁴ Facione PA *et al.* 1995. The disposition of critical thinking. *Journal of General Education* 44 (1): 1-25.

²³⁵ Cox S & King D. 2006. Skills sets: An approach to embed employability in course design. *Education and Training* 48 (4): 262-274.

²³⁶ Heyler R. 2011. Aligning higher education with the world of work. *Higher Education Skills and Work-based Learning* 1 (2): 95-105.

²³⁷ Smith S. 2002. The skill building challenge: Preparing a bridge for workforce skills gap. Meeting the demand teaching soft skills.

²³⁸ Amadi-Echendu JE. 2007. Thinking styles of technical knowledge workers in the systems of innovation paradigm. *Technological Forecasting and Social Change* 74 (8): 1204-1214.

trained well and they should have an excellent understanding to adapt better in an environment that requires immense information processing.

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