THE QUALITY OF GRADUATES FROM THE DEPARTMENT OF OPERATIONS AND QUALITY MANAGEMENT AT DURBAN UNIVERSITY OF TECHNOLOGY

By

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Submitted in fulfilment of the requirement for the degree of

Masters of Technology: Quality

In the Faculty of Management Sciences at the Durban University of Technology

September 2012

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DECLARATION

I declare that this dissertation titled “The Quality of Graduates from the Department of Operations and Quality Management at Durban University of Technology” is the result of my own independent work and this work has not been previously submitted for any other degree or examination to any other university (and other sources are acknowledged giving it explicit reference).

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ACKNOWLEDGEMENTS

I could not have successfully completed this study without the assistance and contribution of a number of people who deserve special mention.

- I express my special and sincere gratitude and appreciation to Mr R.Naidoo, Head of Department of Operations and Quality Management, for his guidance and encouragement towards this task and my personal growth and development.
- My supervisors, Dr S.S.Pilllay and Dr S.Singh for their time, patience, understanding and constructive criticism, during the preparation of this project.
- To my parents, dearest mother E.Dweba and my sisters for their sacrifice and support so that I can have a better education. Special thanks to my beautiful daughter for being on my side.
- My second family, the staff of the Operations and Quality Management Department Mr. Inderlal, Mr. R.Ramlagan, Mr. R.Moodaliyar, Miss. P.N.Biyela, Miss V.Naidoo and Mrs N. Sukdeo for their moral support, encouragement and belief in my ability to complete this study.
- Finally, the Lord almighty for granting me the strength to complete this study, He is worthy of praise.

DEDICATION

This study is dedicated to my grandfather (utata) M. N. Dweba (sukude ,mkhondwane) for the value system he instilled in me. I wish you were here to see my success.

ABSTRACT

This study examined the quality, employability and the competencies of graduates from the Department of Operations and Quality Management at Durban University of Technology (DUT). The objectives of the study included determining the relevance of the curriculum to the workplace; evaluating the views of graduates regarding employability; and assessing the views of organisations regarding graduate performance in the workplace. The study also proposes that with the knowledge and skills acquired in the field of Operations Management, graduates should be able to reach their full personal and professional potential. However, these graduates still experience difficulties in adjusting and coping with the realities of the labour market.

Combinations of qualitative and quantitative research methods were used. The study was exploratory in nature. The study made use of questionnaires to obtain the respondent's view. The pilot study composed a sample of ten graduates. For the main study, forty of the sixty graduates and employers completed and returned the questionnaires that were administered. The response rate was 67%. The Cronbach's Alpha Reliability Analysis was used to measure the reliability of the questionnaires. Face validity was verified by the statistician for pre-administering of questionnaires.

The results revealed that obtaining a qualification in operations management at DUT increases the employability of graduates. The study also showed that employers are content with the way in which these graduates are able to translate their theoretical knowledge into practice, and to identify and solve problems within organisations. However, the study shows that some employers did not provide adequate support and guidance in relation to their development.

LIST OF ACRONYMS

AsgiSA	Acceleration and Shared Growth Initiative for South Africa
CHE	Council of Higher Education (SA)
CQPA	Centre for Quality Promotion and Assurance at DUT
DHET	Department of Higher Education and Training
DUT	Durban University of Technology
EFQM	European Foundation for Quality Management
ETQA	Education and Training Quality Assurance
HEA	Higher Education Act of 101 1997 (SA)
HESA	Higher Education South Africa
HEQC	Higher Education Quality Committee (SA)
JIPSA	Joint Initiative on Priority Skills Acquisition (SA)
NCHE	National Commission for Higher Education (SA)
NQF	National Qualifications Framework (SA)
NSDS	National Skills Development Strategy (SA)
NSB	National Standard Bodies (SA)
NSF	National Skills Fund (SA)
SDA	Skills Development Act 97 of 1998 (SA)
SDL	Skills Development Levies
SETA	Sector Education and Training Authority (SA)
SABEM	South African Business Excellence Model
SAQA	South African Qualification Authority
SASQ	South African Society for Quality

SAQI	South African Quality Institute
TQM	Total Quality Management
WIL	Work Integrated Learning

GLOSSARY OF TERMS

Accreditation	The certification, usually for a particular period of time of a body or an institution as having the capacity to fulfil a particular function within the quality assurance system set up by HEQC
Comprehensive University	A higher education institution that offers both The National Diploma and Bachelor's Degree programmes.
Competencies	The ability to put into practice in the relevant context of the learning outcomes acquired in obtaining the qualification.
Continuous improvements	Process of on-going improvements that are introduced to add value to customers.
Departmental reviews	A process of reflection and improvement design to ensure that quality is maintained in departments in higher education.
Employability	People's ability to gain access to the workplace, to adjust and be productive, and continuous ability to fulfil, acquire and create work through optimal use of both occupational related and career competencies.

Employee Motivation	The willingness to exert high levels of effort towards organisational goals, conditioned by an effort to satisfy the individual's needs.
Formative Assessment	Refers to assessment that takes place during the process of Teaching and Learning.
Higher Education Quality Committee	An Education and training quality assurance council that has the primary responsibility of higher education.
Learnership	Refers to a learning program where the learner spends some time learning theory and practical skills in the workplace
Quality Assurance	The process of ensuring that the degree of excellence specified is achieved.
Quality Circles	A quality management technique that consists of small groups of people who meet on a regular basis to discuss problems and seek of the solutions regarding quality issues.
SAQA	The body responsible for overseeing the development and implementation of the National Qualification Framework.

Skills	The learned capacity to carry out pre-determined results acquired and developed through training or experience.
Skills development	The learning of knowledge, acquiring new concepts and theories, adapting to technological and industrial changes.
Summative Assessment	Is assessment for making a judgement about achievement. This is carried out when a learner is ready to be assessed at the end of a program.

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CHAPTER ONE: INTRODUCTION

1.1 Background of the Study

The Department of Operations and Quality Management is one of ten departments within the Faculty of Management Sciences at the Durban University of Technology. The programmes offered by this Department are the National Diploma (ND) in Operations Management, the Bachelor's Degree in Technology (BTech) in Operations Management, the Masters Degree in Technology (MTech) in Quality and the Doctorate Degree in Technolgy (DTech) Quality.

The quality of a graduate is defined by the ability of that individual to access relevant information and to solve problems. It also entails the graduate having skills such as computer literacy, team building, networking and social sensitivity (CHE 2007:24). However, the quality of a graduate or "graduateness" cannot be separated from the notion of "employability" (Hodges and Burchell, 2003:21). Yorke and Knight (2006:5) state that employability is influenced by the following concepts: as skilful practices which include communication, management of time, problem solving and lifelong learning; a deep understanding grounded in a disciplinary base which includes specialised expertise in the field of knowledge; as well as self-awareness and the capability to reflect on actions. As such, if a graduate is able to demonstrate these skills and employable capabilities in the workplace, then that individual is deemed to have the necessary basic competencies that are needed in the workplace. The skills sought by the Operations and Quality Management graduates are highlighted in chapter three and form part of a questionnaire for appendix A and B.

According to Villa, Juan, Corominas and Capell (2000:390-391), the employability of graduates is one of the key indicators of an institution's quality. Guidance services such as those offered by the Universities of Technologies are urged to offer programmes that are aimed at developing work skills and competence in order to achieve higher employment rates. From an academic perspective, Sovilla (2004:196) defines a skill as the learned capacity to carry out pre-determines results. Biesma (2006:18) identifies two types of skills namely the workplace skills and generic skills. In addition, the workplace

skill is the combination of learning, analytical and problem solving abilities, while the generic skills include communication skills, business and customer awareness, ethics, problem solving and general administrative skills such as leadership and team work. Stephen (2001:20) and Biesma (2006:18) believe that it is necessary for students to gain a combination of generic and workplace skills to enhance their prospect of employment. Therefore, the student needs to find a balance between the two types of skills. However, Barrie (2004:261) is of the opinion that employers prefer generic skills.

Stephen (2001:20) and Biesma (2006:18) further suggest that students should make use of the available employment skills and training offered by their institutions, to enable them to become more marketable and to present themselves in a professional manner to prospective employers when entering the workforce. Students enrolled for the ND: Operations Management at DUT have a subject called Work Integrated Learning (WIL), which is incorporated into the curriculum in their final year of study. It is envisaged that this will enhance their employability.

1.2 Problem Statement

The National Plan for Higher Education clearly states that as a result of workforce needs, more graduates should be produced by institutions of higher education (Cele and Menon, 2006:24). More graduates can be produced by the relevant institutions but it is uncertain if these graduates are ready to enter the workforce. In order to provide employable and competent graduates, a University of Technology needs to improve learning opportunities where the student can be exposed to industries and given the opportunities to put their theoretical knowledge into practice (Cele and Menon, 2006:24). According to Biesma (2006:18) he is of the opinion that work integrated learning as the key strength of a University of Technology.

The case below indicates the importance of high quality education, the relevance of work integrated learning and an employer's perspective of graduates. This is sourced from an international perspective from the University of Luton; however, these problems are similar to challenges that Universities of Technology in South Africa have to overcome.

According to Stephen (2007:75), a study was conducted by the University of Luton on employability of the graduates. The senior management team of this university adopted a view that, if the students were not equipped with the necessary skills when they graduated, the university was failing its duty. In addition, it was not sufficient for a student to be knowledgeable on academic discipline only. The university, in its mission statement, refers to both education and vocational relevance. The university programme showed that international and local employers were concerned about whether the graduates that they appointed were efficient. Employers recognised certain skills as being essential namely; the need to develop communication skills, transactional skills, problem solving skills and management skills. It can be inferred from the case above that there has been a lack of work preparation for graduates to enter the workforce.

The case of Stephen (2007:75-85) offers confirmation that graduates should have experience as well as a qualification to be able to secure entry level positions. Graduates should be able to attract employers not only in terms of their academic backgrounds, but also in terms of their attitudes, skills, and knowledge. According to the advisory board meeting of the Department of Operation and Quality Management, employers were concerned about the lack of certain soft and hard skills from the graduates. The following soft skills needed to be addressed: language and communication skills, confidence building, report writing and leadership skills, while the following hard skills were of concern namely mathematic techniques, basic science principles and selected production technology (Department of Operations and Quality Management advisory meetings, 2008:3).Therefore, there is a lack of soft skills and personal attributes of the operations management graduates. a key challenge to graduates is that they enter the labour market with theories, principles and information but lack intensive work awareness before they can be useful to organisations (Hodges and Burchell, 2003:18). To address these challenges, the Department of Operations Management offers a three month in-service work-integrated-learning (WIL) training to students. This study will seek to establish whether the duration of WIL is sufficient to facilitate the transition of graduates into the labour market and investigate the

importance of education and vocational relevance. This will assist the Department of Operations and Quality in improving its graduates' work preparedness.

1.3 Research Aim and Objectives

The following section will highlight the aim and objectives undertaken in this study.

1.3.1 Aim

The aim of this study is to determine if the quality of the National Diploma and BTech:Operations Management graduates are adequately prepared to enter the work environment.

1.3.2 Objectives

- To assess the views of employers regarding graduates' performance in the workplace.
- To determine the relevance of the curriculum in the workplace.
- To evaluate the views of graduates regarding the quality of the course content and employment.
- To provide an overview of quality in terms of CHE and SAQA requirements.

1.4 Rationale for the study

According to Pauw, Oosthehuizen and Van Der Westhuizen (2006:16) large South African organisations experience constant problems with the quality of graduates at all levels of the higher education system. These authors maintain that major labour market concerns arise from the shortage of quality skilled individuals. In addition, the authors Pauw *et al* are of the view that the majority of individuals have limited skills while organisations increasingly demand more skills. As a result, the recruitment of many organisations focuses heavily on attracting skills as well as experience.

The area of Operations Management is the core focus of most business functions. This has created a need for personnel with knowledge and skills that are specific to the

Operations Management environment. Limited research has been conducted regarding the quality and employment of graduates in the field of Operations Management.

It is expected that recommendations emanating from this study could assist in addressing the significant skills gap within the fields of Operations Management. The study will assist in providing the current status of employment and the level of satisfaction of employers. This will make a great contribution to the quality of the course content of the programmes at DUT.

1.5 Delimitations of the Study

(i) This study will focus on students who have graduated from the year 2005 to 2008 in the programme National Diploma and BTech: Operations Management. The year 2005 to 2008 is a post-merger period of M.L Sultan Technikon and Natal Technikon. Though the merger took place in 2002 new students that enrolled in that year had graduated from year 2005 to 2008. The National Diploma is a three year programme and has a component of Work Integrated Learning (WIL), which is credit bearing but students from other disciplines do not have the WIL component as part of their diploma are registered for the BTech programme. Work experience is not a pre-requisite for the Btech programme.

(ii) The study will be limited to graduates and employers who are residing within the eThekwini region. This is due to limitations of the geographical location and accessibility to graduates and to their relevant employers.

1.6 Design of the Study

According to Saunders, Lewis and Thornhill (2003:486), quantitative research involves the systematic collection of data, where the values of such data can be numerically measured and thereafter interpreted with the purpose of finding certain results. Welman and Kruger (2005:174) maintain that quantitative research relates to the research methods and techniques that are used to acquire relevant data for investigating such research problems. This study involves the collection of data,

interpretation of data and statistical analysis respective to both the views of industry and graduates on quality and employability.

According to Zikmund (2000:102), exploratory research is research conducted at the beginning of the research process in order to clarify and define what the problem is and define its nature. Therefore, this study can be categorised as exploratory as no intensive investigation has been reported on the quality and suitability of graduates with regard to their employability. Research involving perception of quality and employment on graduates and employers with respect to the Operations Management qualification has not been conducted previously.

1.6.1 Data Collection

Data collection allows a systematic collection of information about the object of the study and setting in which they occur (Welman, 2005:189). Questionnaires were used to gather information concerning the quality and views of employers regarding graduates' performance. The questionnaires consist of two sections, categorised as appendix A, which questionnaires are relating to employers and appendix B, consisting of questionnaire relating to graduates. Each questionnaire consists of three sections:

- Section A deals with variables relating to the skills of the graduates.
- Section B provides information with variables relating to performance of graduates.
- Section C contains characteristics relating to general demographic information.

The type of ordinal scale was a five point Likert Scale. Open-ended questions were also asked. Questionnaires were used as an instrument for data collection. The Statistical Package for Social Science (SPSS) version 18.0 was used to analyse data.

1.6.1.1 Validity and Reliability of the Questionnaires

White (2000:25) describes validity as being concerned with the notion that the research design fully addresses the research objectives of the study. To ensure the validity in this study, a statistican in the field evaluated the questionnaires to identify duplications of questions. In addition, face validity was conducted for the pilot study. The respondents

assessed the questions in terms of its clarity, flow and construction. The questionnaire was then revised accordingly. A Cronbach's Alpha was calculated to determine the reliability and internal consistency of each question.

1.6.2 Pilot Study

In order to test the feasibility of the study, a pilot study was conducted to determine if the methodology adopted would meet the objectives of the study. To ensure validity of the data collected, the supervisor verified the design of the questionnaire and analysis of the data of the research.

The questionnaires were administered to 10 graduates with their immediate managers. A random sampling was used. An employer in this case refers to the graduate's immediate senior such as their current supervisors, training managers or senior managers. Some problem areas were identified by respondents regarding the length of questions. Suggestions for improvement on questions were implemented. The detailed results are presented in chapter three.

1.6.3 Main Study

The main study comprised of 70 graduates and their respective employers who reside within the eThekwini region. Graduates' information was obtained from the Department of Management Information Service (MIS) at DUT. The study used the random sampling method.

1.6.4 The Quality of Graduates

According to Rahman (2002:2) quality of a graduate entails sound knowledge of the fundamentals that is the basic understanding of the core competencies, sufficient level of technical skills and adaptability to the changing environment. The core competencies and skills include intellectual ability, knowledge, ability to work in a modern organisation and communication. Therefore, these skills would be required in developing the quality of graduate in order for them to meet the expectations of prospective employers.

Employers consistently demand universities to produce graduates who are well equipped for employment (Duoc and Metzger, 2006:631). As a result, universities need to address academic expertise and develop a wide range of attributes to graduates. Universities need to offer quality programmes so that graduates are more versatile, flexible and are able to adapt to the needs of modern organisations. Effective quality monitoring of programmes offered by higher education institution is vital in developing a quality graduate. An in-depth discussion of quality in higher education and various concepts of quality that are essential in developing quality graduates is presented in chapter two of the study..

1.7. The Role of experiential learning in enhancing graduate employment Prospects

In order to provide employable and competent graduates, a university of technology needs to provide greater learning opportunities where students can be exposed to industries and given opportunity to put their theoretical knowledge into practice (Cele and Menon, 2006:24). According to Biesma (2006:18), work integrated learning is regarded as the key strength of a University of Technology. Stanley (2006:18) promulgates that the Work Integrated Learning (WIL) is an integrated learning model that consists of academic and learning components. The application of WIL is based on the application of theory and knowledge obtained in the classroom and by the development of practical skills using current technology and techniques in real workplace simulation.

The principal goal of any educational programme is to facilitate student learning. The learning is made up of two components which are the educational institution and the workplace. Higher education institutions are required to facilitate the integration of these two components (Cates and Eames, 2004:35). Garavan and Murphy (2004:281-390) describe the value obtained from WIL as:

- Enhancing graduates' confidence;
- Self perception and improving social skills;
- And greater practical knowledge and more employment.

The integration of the academic component and experiential component empowers students with the necessary skills to fit into the labour market immediately (Eyler 2001:35).

Employers regard the benefits of experiential learning as having the ability to pre-screen future employees and to train better graduates who understand their organisations (Stanley, 2005:108). It can be concluded from the above literature that the competitive edge of a University of Technology is founded on the practice of Work Integrated Learning. The challenge of higher education, in collaboration with industry, is to strive towards the improvement and upliftment of education and skills. This will ensure that the economy is being driven by a workforce that meets the demands of a knowledge and technology driven society.

1.8 Outline of the Study

Chapter two: **Literature Review**

The literature review will be based on relevant information obtained from the secondary data using textbooks, articles and journals. This chapter will be based on literature relating to quality in higher education, the role of a University of Technology and its influence on the quality of graduates. Further in the chapter, the nature and characteristics of Total Quality Management and quality tools and its relevance to the higher education system are discussed.

Chapter Three: **Research Methodology**

In this chapter, the methodology illustrates the procedures, methods and research techniques used. The qualitative and quantitative data analysis methodologies are described. The design of the questionnaire is explained. Furthermore, the Cronbach's Value is used to test the reliability and validity of the data obtained from the final questionnaire. The pilot study results are reported.

Chapter Four: **Analysis of Results and Discussion of Findings**

This Chapter will report and discuss the results obtained from the main study in accordance with the theory discussed in the literature review. The major findings of the study are presented and conclusions are drawn.

Chapter Five: **Conclusions and Recommendations**

The chapter presents the conclusions from the literature review, followed by the conclusions from the research investigation. The chapter then shows how the research problem, purpose and objectives have been satisfactorily addressed. The chapter finally makes recommendations for future research.

1.9 Summary

This chapter sets the conceptual and contextual background that underpins the importance of the study. It also highlights the problem statement for the research, the aims and objectives of the study, the rationale for the study and delimitations of the study.

The next chapter reviews related literature on the quality of graduates, quality in higher education and the role of a University of Technology. Graduate motivation and skills requirement of graduates will also be examined.

CHAPTER TWO: LITERATURE REVIEW

2.1. Preamble

This chapter outlines the theoretical background of the study and content relating to the quality of graduates. Sources of information are selected from books, academic journals, relevant documents, and policies and websites. It begins by presenting the concept of quality in higher education and total quality management. The chapter also explains theories of motivation, the skills requirement for graduates and the national skills development strategies.

According to Strydom and Strydom (2004:101), since 1994, the drafters of education policies in South Africa are strongly influenced by the fact that education and training offered by the higher education institution should respond to the needs and expectations of the industry. Higher education, therefore, has to increase access to programmes they offer and have to ensure that their programmes are relevant. These demands place a burden on higher education institutions to expand access to their programmes and to ensure that their programmes are relevant and responsive to the needs of society and make a significant contribution to the economic growth of the country. The development of a highly educated workforce will result in the building of a knowledge based economy in South Africa and the provision of education and training for a large number of citizens. The highly skilled labour force should be able to employ new technologies and add value to addressing social needs. However, Venter and Beizuidenhout (2008:115) contend that the skills gap in the South African labour market continues to widen, increasing the pressure on institutions and programmes that they offer, to produce greater numbers of high quality graduates who can ensure active economic participation.

The compound effect of these demands and expectations are important to government and other stakeholders such as students, parents, professional bodies and communities to increasingly demand greater accountability and transparency from the higher education sector (Murdoc, 2005:135).

According to Strydom and Strydom (2004:101), higher education systems adopted by the South African government in the late 1990's, had the task of setting up a national quality assurance system to address the challenges relating to global growth in the education sector, increased diversity, the effect of technology and changes that have taken place in academic employment.

2.2 The Operations Management Programme at DUT

The Operations Management Department at DUT has responded to the changes in higher education and the requirements from the South African Qualification Authority (SAQA). The adoption of the learner- centred approach such as Work Integrated Learning (WIL) is a compulsory component of the programme where learners spend a period of three months in industry. Individual and group assignments, where students are compelled to engage with industry to complete these tasks (Operations and Quality Management Self Evaluation Report, 2008:6). This further enhances their work experience and prepares the student for the world of work and is aligned with the fulfilment of the SAQA's requirements.

The mission of the Operations Management programme at DUT was developed in an attempt to equip the Operations Management students with the necessary generic graduate skills. It consists of the following:

- To offer quality service to both undergraduate and postgraduate students through formerly accredited programmes in the field of Operations Management.
- To produce self motivated, independent thinking and professional graduates in the field of Operations Management (Operations and Quality Management Self Evaluation Report 2008:6).

2.2.1 The effect of the merger at DUT

A desire to merge the Natal Technikon and ML Sultan Technikon was first stated by the executive management of both the institutions in 1989. Merger discussions began in 1990 and this resulted in the creation of the Durban Institute of Technology on the 1st April 2002. This was the first merger between two higher education institutions in South Africa. In April 2006, the institution was renamed the Durban University of Technology, thereby keeping in line with the terminology used by all other University of Technologies (Department of Operations and Quality Management Self Evaluation report, 2008:3).

The Programme ND: Production Management was offered on a full and part time basis by the Department of Economics and Quantitative Methods which was part of the ML Sultan Technikon while Natal Technikon offered this programme on a part time basis by the Department of Management housed in the Faculty of Commerce. In 2007, the Faculty of Commerce was divided into new faculties namely, the Management Sciences and Accounting and Informatics. The Department of Operations Management was then housed in the Faculty of Management Sciences (Department of Operations and Quality Management Self Evaluation Report, 2008:3).

2.2.2 History of the Operations Management Program

In 2004, the National Diploma: Operations Management previously known as ND: Production Management underwent a re-curriculation process. Changes were made at a national level and are listed below:

- A compulsory component of Work integrated Learning (WIL) was incorporated into the subject known as Operations Management Practice1 and;
- Restructuring of the credit value for the ancillary subjects.

Changes that were made at Departmental level lead to the replacement of the Financial Principles subject with Manufacturing Technology and the key content of Financial Principles were incorporated into the Operations Management 3 subject. All academic institutions within South Africa that offered similar qualifications convened regularly to formulate programs and subject outcomes. Based on the consensus, collective

decisions were made and tasks and responsibilities were shared among institutions. Excluding DUT, universities that offer the Operations Management programs are: Vaal University of Technology (VUT), Tshwane University of Technology (TUT), Cape Peninsula University of Technology (CPUT), University of Johannesburg (UJ), Nelson Mandela Metropolitan University (NMMU) and the University of South Africa (UNISA).

At DUT, WIL is a compulsory component of the ND: Operations Management and students spend a period of three months in industry in the final year of their study. Assignments and projects are given to students and they are compelled to engage with industry to complete the task (Department of Operations and Quality Management Self Evaluation Report, 2008:21).

2.2.3 Current Status of the program

This section provides a brief overview of the graduation rates from the Department of Operations Management. The graduation rates serve as indicators of performance and progress of the Department. Graduation rates refer to the number of graduates divided by the total student headcount enrolled in the same year, expressed as a percentage (Pillay and Wallis, 2009:54). This means that if 1000 students graduate in a given period, and the total enrolment is 10000, the graduate rate is 10%. The graduation rates for the Department of Operations and Quality Management for ND: Operations Management programme are as follows:

Year	Graduation rates
2003	23.71%
2004	26.09%
2005	39.2%
2006	38.02%
2007	37.5%
2008	39.23%

Table: 2.1 Graduation Rates for ND: Operations Management Programme

The table shows that the overall graduation rates have steadily increased from 23.71% in 2003 to 39.23 in 2008. The consistence in graduate rates for the Department of Operations management could have contributed by the factors such as, the change of the curriculum for the programme in 2004.

2.2.4 The Curriculum of the Program

The access criteria of this program are that a student must have senior certificate prior to 2008 or the national senior certificate with a diploma endorsement, with the exception of adult learners who can access the qualification “via” an alternative route known as the Recognition of Prior Learning (RPL). This is in line with national norms. First level subjects are basic production principles and are introductory in nature, but in successive years, the complexity of the subjects increase with more applications and laboratory work. Group work assignments are given to students to develop them with the necessary skills to work as a team (Department of Operations and Quality Management Self Evaluation Report, 2008:21)

Different teaching practices such as tutorials, case study analysis, presentations and manufacturing projects are introduced, in the subject content, to improve learning styles and subject content. Several mechanisms are used to identify, assess and improve the quality of teaching, such as advisory boards meetings, student feedback and departmental meetings. A number of assessment methods are used to evaluate students’ learning these include tests and examinations, group projects and continuous assessment. These forms of assessment are compliant with DUT’s assessment policy (Department of Operations and Quality Management Self Evaluation Report, 2008:23)

2.3 Quality in Higher Education

Stevenson (2007: 397) broadly defines quality as the capability of a product or service to meet or exceed customers’ requirements or expectations on a regular basis. Mammen (2006:88) states that as an operational definition, quality in higher education

is defined as the capacity to respond to the needs of local contexts within South Africa, making effective use of the available resources to achieve pre-defined goals and purposes for which students are enrolled and to enable students to acquire qualifications that conform to comparable national and international standards. Maila (2005:697) reiterates this view and argues that knowledge should be receptive to the needs of local communities before engaging communities in international discourse. Reeves (2002:34) suggests that to achieve good quality, all partners in higher education should be expected to analyse a number of factors relating to student achievement, systematically including the role of leaders, lecturers and policymakers and add that such a process of analysis will force relevant stakeholders in the system to take greater responsibility for quality accountability and provision.

Gbadamosi and De Jager (2009:880) suggest that quality in higher education is judged from a marketing perspective which is to understand customers' needs "via" their perception of quality. The key focus of these authors was on parents, students and employers. They found that each group understands the concept of quality with regards to higher education, differently. Parents view quality as the ranking of the university's reputation and its employability of graduates and academic placement. Students perceive quality relating to educational process that includes course content and the level of teaching. Employers looked at quality as primarily relating to the skills that students or graduates bring to the workplace. However, Ivy (2001:273) states that various factors influence the quality of higher education, including location, reputation of academic quality, course specifics and career opportunities.

According to Maila (2007:694), quality education empowers individuals, unlocks their potential and broadens perspectives to open minds. Ivy (2001:273) defines quality as on effective means to fight poverty. These statements reaffirm the fact that worldwide, higher education is expected to provide a country's citizens with high quality education.

2.3.1 Quality Assurance at Higher Education

In this section, various quality management systems relating to higher education are presented.

In 1995, Higher Education South Africa (HESA) was founded by the Quality Assurance Council in Higher Education. The HESA served as a quality promotion unit that would help universities to carry out productive institutional self evaluation at various levels and provide a framework in the higher education system for accreditation of programmes (Gouws, 2006:751). The Higher Education Act (101 of 1997) founded a constitutional body known as the Higher Education Quality Committee(HEQC) that operates as a division of the Council on Higher Education(CHE) which is responsible for conducting institutional audits and accredit academic programmes (Stephenson, 2004:62).

The Higher Education (HE) system in South Africa has regulatory framework of legislation that includes the South African Qualification Authority SAQA Act (58 of 1995), the Higher Education Act HEA (Act 101 of 1997), the National Qualification Framework (NQF) and various Council on Higher Education (CHE) and Higher Education Quality Committee, (HEQC) (White Paper 3, no.30353). The HEA assigned the responsibility of quality assurance to the CHE which discharges the function through its sub-committee HEQC (Stephenson, 2004:63). The HEQC is an education and training quality assurer that has the primary responsibility of Higher Education training band of the NQF and function within the requirements of SAQA and the regulations and polices of the Department of Higher Education and Training.

The stated objectives of the NQF are:

- To ease the entry to education and training.
- To facilitate mobility and development within education, training and career paths.

- To promote quality of education, training and employment prospects and to add value to full personal progression of each learner and the social and economic development of the nation at large (Allais 2003:305).

The NQF is considered as a transformative tool that would increase the manner in which people would be able to obtain learning and qualification of high quality (Department of Education and Labour 2002:77). According to Dew (2009:4), there are five key issues regarding quality in higher education and they are summarised as follows:

- **Quality as endurance**: if an institution has been operating for a long time, then it is regarded as having consistent quality.
- **Quality as luxury and prestige**: the view of quality in higher education is seen where institutions invest in impressive campuses that are convenient for students from affluent backgrounds.
- **Quality as conformance**: most accreditations are based on frameworks. The accreditation body stipulates a set of conditions that a university or a precise programme is expected to meet. Performance reviews are conducted to ensure conformance to the specific requirement. Educational institutions can create a prerequisite for the learning outcomes, support services and financial well-being.
- **Quality as continuous improvement**: quality leaders in Japan regard the need conformance as a requirement, they also broaden their framework on minimising the variation in repeatable processes that would result in continuous improvement and support innovation through application of new technology. This concept is relevant in higher education, as defined requirements need to keep pace with organisational learning and technology. So quality should mean achieving the fastest rate of innovation and improvement in all aspects of the institution.
- **Quality as value added**: from an educational perspective, it is recommended that students should know more after they complete an academic programme, than before they started. Completing a degree or diploma should mean measurable improvement in student learning, social skills, critical thinking and other attributes that are in line with the institution's mission.

2.3.2 Council on Higher Education (CHE)

The CHE was established in terms of the HE Act, 1997 (Act of 101 of 1997) and is responsible for (RSA 2008/9):

- Advising the minister on all policy issues relating to HE;
- Carrying out the duties in respect of quality and assurance in HE and Training;
- Observing and assessing the attainment of policy goals and objectives , including; reporting on the state of the south African HE;
- Enhancing student access and to HE;
- Publishing an annual report on the state of HE for submission to parliament and
- Certification of private providers and programmes for quality assurance

According to the HEQC report (2003:1), the HEQC is a permanent committee of the CHE and undertakes accreditations of learning programmes of public and private higher education institutions, institutional audits of all higher education providers and promotes quality. Higher education institutions are compelled to adhere to the requirements of the CHE through the HEQC as it is clearly defined in the Higher Education Act of 2001. The main contribution to the higher institutions is the focus on quality. The CHE has stimulated the Higher Education Quality assurance to promote quality and conduct institutional audits.

2.3.3 The role of the Higher Education quality Committee (HEQC)

The Higher Education Act no.101 of 1997 (RSA 2009:165) sets out clearly the function and responsibilities of the Council on Higher Education and its permanent subcommittee, the HEQC. In terms of the respective mandates, the CHE counsels the minister of education on issues relating to higher education. In performing its duties in terms of a quality regulatory framework (RSA 2009:165) the HEQC has a supportive role in developing, maintaining and promoting the quality of higher education to the advantage of stakeholders. In addition, it provides an education and training quality assurance body for higher education and is, therefore, responsible to the South African public for the quality assurance systems of institutions and their learning programmes

(HEQC 2004). In order to certify the higher education institutions as suppliers of quality education, the HEQC has established the accreditation and co-ordination as part of its structure with the main objective to ensure that learning programmes offered at higher education meet the minimum set of quality requirements (CHE 2007). In terms of the Quality Assurance Framework, the approach to quality is reinforced by the concept of fitness for purpose, value for money, and transformation (HEQC 2001:9):

a) Fitness for purpose, in relation to the national framework that includes diversity that is relative to the stated mission;
b) Value for money, based not in terms of labour market responsiveness or cost recovery, but in relation to the full range of higher education purposes set out in the white paper ,and
c) Transformation, in the terms of promoting the personal attributes of individual learners, as well as improving the agenda of social change.

It is evident from the above that the HEQC determinants of quality will contribute to the institution's ability to offer qualifications and programmes that are responsive to the needs and development of learners and economic sustainability of the country. The criteria document (HEQC 2004:3) states that the fitness of purpose approach, the fitness of purpose of the mission, goals and objectives of an institution is determined in relation to institutional responsiveness to the local, national and international context. The main importance in the national higher education programme is the transformational role that institutions are obliged to show. With regards to the above statement, Bitzer, Botha and Menkveld (2008:1175) suggest that the aims of the transformational quality cannot be isolated from the goals of the national plan for higher education (Ministry of Education 2001).

In response to the HEQC (2004), the Durban University of Technology (DUT) has developed a quality policy that is aligned with the requirements of the HEQC. The university's quality policy, CQPA (2006:2) stipulates the following:

- The DUT, in its approach to quality assurance and providing value for money, is committed to monitoring , evaluating and tracking the extent to which it is :

a) Achieving the mission and stated objectives within the context of national imperative to ensure fitness for and of purpose.
b) Ensuring quality service with a minimum wastage and the optimal use of all available resources. All department, sectors and units will thus be accountable for their use of resources.
c) Empowering students through enhancement of their knowledge, skills, attitudes and values, thus promoting transformation.
d) Providing effective and efficient support service across the institution through the high quality of service within and between all members of the university community to ensure that educational provision is enhanced.
e) Establishing an organisational culture of quality that encourages systematic evaluation and peer evaluation.

With the above pledge for quality, the university's strategic missions are able to meet the criteria set out by the HEQC.

2.4 Centre for Quality Promotion and Assurance and the role of quality at DUT

In terms of a South African Qualifications Framework, the approach to quality is broadly underpinned by the notions of:

- Fitness for purpose, which relates specified mission with a national framework, that include differentiation and diversity;
- Value for money, in relation to the full range of higher education purposes and judgements about effectiveness and efficiency of provisions that relate to labour market responsiveness and cost recovery.

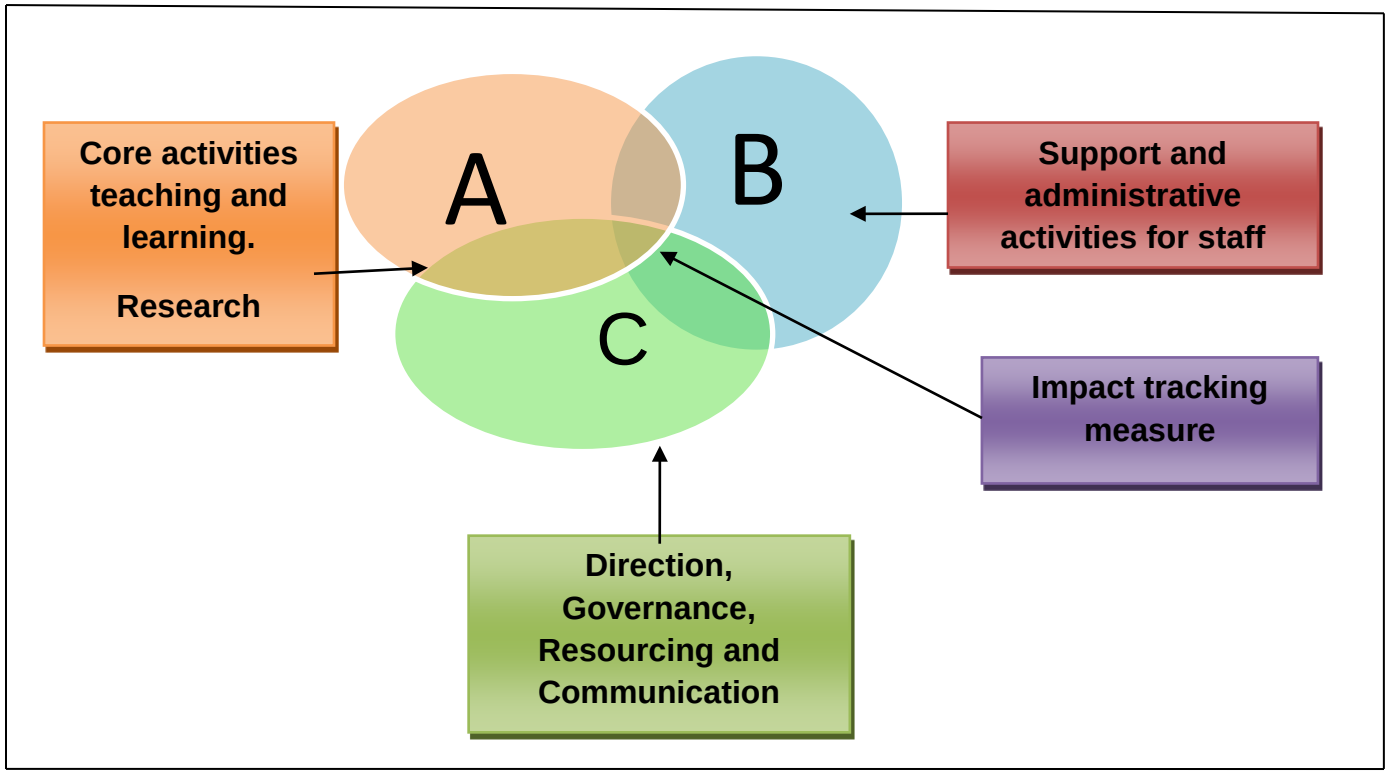
- Transformation is concerned with the development of capabilities of individual learners for both personal achievement and social development and economic growth (CQPA policy and procedure for programme review: 11).

This means that the quality approach of higher education institutions should be aligned with the South African Quality Framework. In relation to the notion of fitness for

purpose, DUT quality mission incorporates issues regarding differentiation and diversity among its students, shareholders and its community. The DUT should ensure that it meets the needs and requirements of the labour market, in terms of the quality of graduates it offers to the labour market, and the transfer of knowledge from higher education in relation to the needs of the labour market. By doing so, DUT is able to fulfil the notion of value for money. The knowledge and skills gained by these graduate should meet the skills requirement of the labour market, hence making a meaningful contribution towards social and economic development of the country.

Bitzer (2010:19) suggests that the aims of promoting quality in any institution cannot be separated from the goals of the National Plan for Higher Education. The Centre for Quality Promotion and Assurance (CQPA) is responsible for promoting quality, and is involved in quality initiatives at DUT. The CQPA designs and develops policies for the institutions that are aligned with the National Plan for Higher Education as well as the HEQC criteria. To fulfil the notion of fitness for purpose, DUT quality policy focuses on the alignment of strategic direction, planning, governance, activities with the institutional mission, vision and marketing slogans that are making informed judgements about the extent to which all levels of the institutions are attaining institutional benchmarks (CQPA policy and procedure for programme review:11). Therefore, the alignment of institutional strategic directions, planning, governance, activities and practice with the national goals, priorities and targets will fulfil the notion of value for money and transformation. The diagram that follows provides an overview of the elements to be addressed in a comprehensive quality management system in higher education and indicates how the elements are aligned and interrelated at DUT

Figure 2.1: Mutual reinforcement between activities



Source: CQPA Policy and Procedure for Program Review: (2009:6)

Figure 2.1 shows that there are three different types of activities in a higher education institution (CPQA policy and procedure for programme review, 2010:6);

- The core activities are providing learning and teaching programmes, research, community engagement, and a range of entrepreneurial activities, represented in circle A.
- A series of administrative and support activities for staff and students which supports the core activities such as human resource support, financial service, and planning, and student administration, as represented in circle B.
- Range of directional settings, to make ensure that external obligations are fulfilled by the institution and that it is accountable. It must also achieve its mission and be well positioned in a consistently changing world, as presented in circle C.

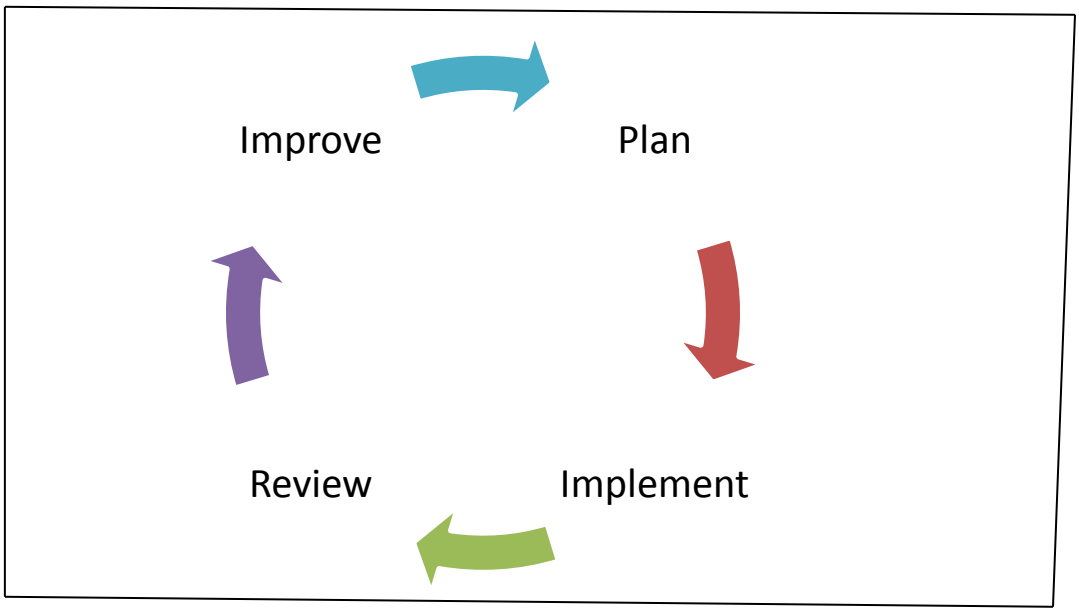
- The impact measures of these three activities would include trends such as graduation rates, throughput rates, retention rates and the employability of graduates. The importance of the alignment of the circles is emphasised together with the comprehensive institution-wide quality management systems.

2.4.1 Quality Circles at DUT

One of the ways in which organisations have tapped employees for ideas concerning quality improvements is through quality circles (Stevenson, 2009:444). Quality circles, a management technique borrowed from Japanese industry, is now being considered in higher education (Freid, Klugman, Fife, 2000:85). A quality circle is made up of a small group of people who meet on a frequent basis to discuss problems, find solutions and involve management in the implementation of those solutions (Ventkatraman, 2007:95). Hence, higher education quality circles monitor and identify particular areas which affect the quality of teaching. Higher education institutions have a quality assurance department which consist of group of people striving to achieve educational quality.

The following diagram describes the activities that need to be performed to incorporate continuous improvement in the operation; there are four basic steps in the cycle.

Figure 2. 2: Quality cycle



Source: CQPA Policy and Procedure for Programme Review: (2009:2)

Plan: Planning the current process is the first duty of the managers so as to devise such plans based on the problems they find (Reid and Sanders, 2005:148). They need to record such procedure so as to collect data and identify problems. Such information will be used to create a plan for improvement and also to set specific measures to evaluate performance. In relation to DUT, the plan phase will include policies and procedures relating to the department as well as planning documents such as SWOT (strengths, weaknesses, opportunities and threats) analysis. The Department of Operations and Quality Management identifies problems in relation to student performance, through-put rates and overall pass rate within the department.

Implement: During the start-up process of the cycle, managers should document all changes made and collect data for evaluation (Reid and Sanders, 2005:148). The implement (do) phase in relation to higher education will include reporting structures,

minutes of meetings such as departmental and subject meetings and staff student meetings.

Review: The data is assessed to determine whether the plan is achieving the goals that were set up in the "plan" phase (Reid and Sanders, 2005:148). This will include feedback, reports, monitoring and supervision. The Department makes use of subject and lecturer evaluation reports.

Improve: The last phase of the cycle is to "act" on the basis of the results that are obtained from the previous three phases of the cycle. Thereafter, managers must communicate the results and then implement the new procedure if it is successful (Reid and Sanders, 2005:148). This phase will include improvement and action plans. The Department monitors the implementation of recommendations derived from the subject and lecturer evaluation reports. Stevenson (2009:434) recommends that by adopting a series of steps, it gives an organised approach to continuous problem solving.

2.4.2 Departmental Reviews at DUT

The policy and procedure for departmental reviews at DUT are set out in a revised document produced by the CQPA. The document indicates the purpose of departmental reviews as:

- To promote, develop and sustain a culture of quality in the review and evaluation of learning programmes.
- Encourage all academic staff to take responsibility on a day to day basis, for the quality of provision and for quality assurance processes.
- Promote self evaluation at all levels of provision to foster continuous improvement.
- Enhance accountability in the management of programme review and evaluation procedure.
- Promotes and enhances the quality of teaching and learning (CQPA Policy and Program Review 2010:10).

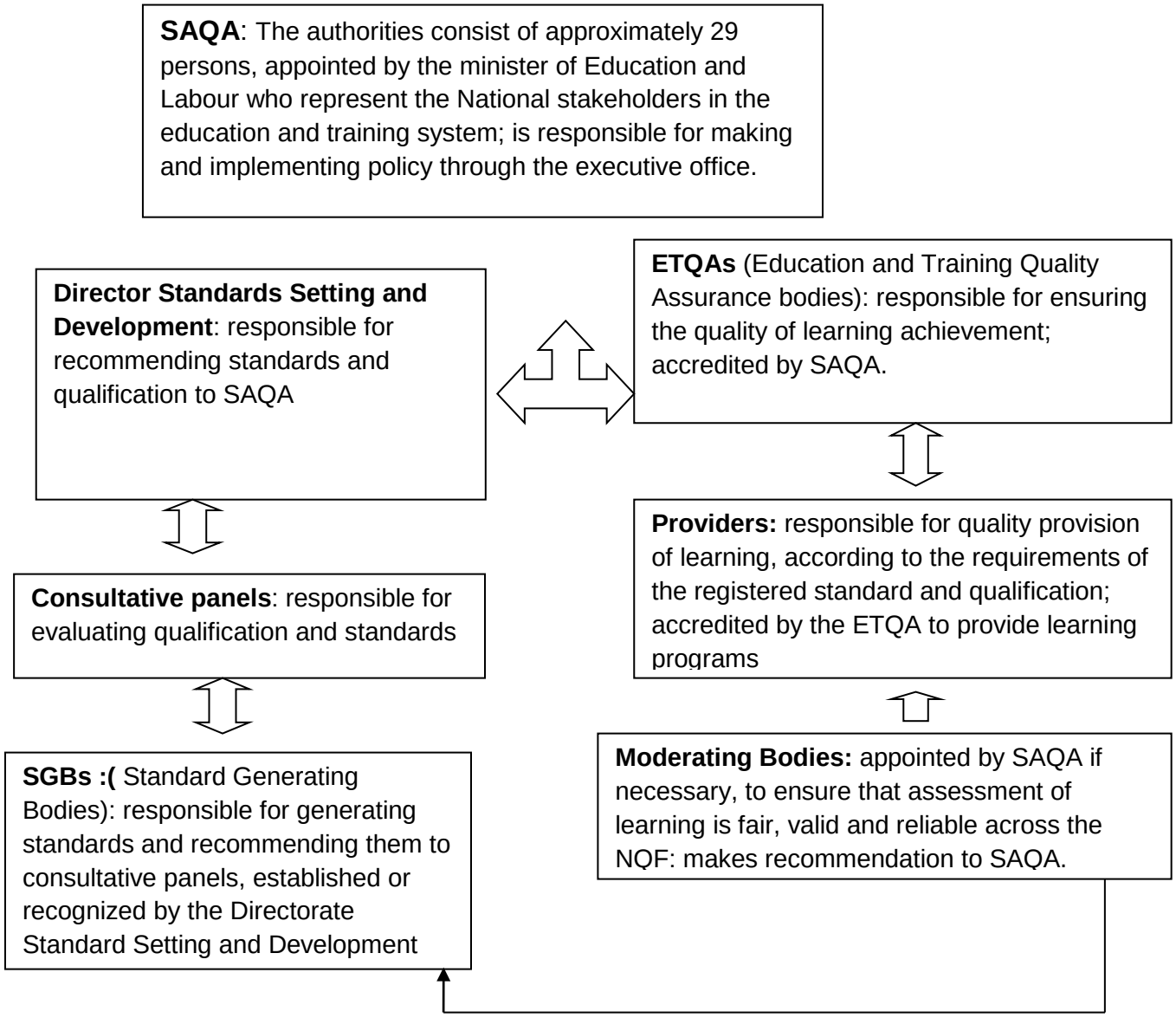
At DUT, the continuous process of reflection, improvement, design and delivery is based on a five year review and evaluation cycle to ensure that quality is maintained and enhanced.

2.4.3 South African Qualifications Authority (SAQA)

SAQA is a constitutional body that consist of 29 members appointed by the Ministers of labour and of education (RSA 2009:166). SAQA, through the NQF, has to make certain that South African qualifications are of exceptional quality and internationally comparable. The authority is responsible for:

- Developing the NQF, formulating and publishing policies and criteria for the registration of bodies responsible for establishing education and training standards of qualification;
- Certifying bodies that are accountable for monitoring and auditing of such standards and qualifications;
- Setting up the NQF by ensuring the registration, accreditation and assignments of functions to the referral bodies and
- Registering national standards and qualifications on the NQF.

Figure 2.3: The SAQA Structure (SAQA 2000:9)



In 1998, SAQA announced the National Standards Bodies' (NSB) regulations that provide registration of National Standard Bodies and Standards Generating Bodies (SAQA 2001:14). These bodies were developed to generate and to recommend for the registration on the NQF, the unit standard generated in any Specific field (Alias 2003:315). According to (RSA 2009:167), SAQA has reviewed the state of quality assurance , ensured that all the quality assurance bodies reveal non-compliance related to quality and has moved away from compliance to performance auditing. These

performance audits are responsible for making sure that all accredited providers of registered qualifications are monitored and audited by accredited Education and Training Quality Assurance ETQAs. For SAQA, training providers are subsidiary to the ETQAs and focus on the management and development of learning programmes and services for which they are accredited. The Department of Education and the Department of Labour (2003:30) suggest that the parity of esteem between education and training is noted but more focus is on the parity between workplace-based and institution-based learning.

According to Pityana (2005:416) the HE environment is similar to the workplace that is regulated and protected by the labour laws. Cele (2005:597) notes that the legislative framework is quite comprehensive because HEQC is responsible for closely connected mandates such as accrediting programmes, auditing, promoting quality and developing capacity which are dealt with by separate national bodies. Institutional audits are a form of quality assurance associated with quality improvement.

2.5 Dimensions of quality

Various theories have defined quality. Another approach to quality is offered by Stevenson (2007:413) and he lists eight quality dimensions that relate to service quality. These quality dimensions include the following:

- Convenience: The obtainability and the ease of service.
- Reliability: The capability to perform a service dependably, consistently, and accurately.
- Responsiveness: the ability of service providers to assist customers in unfamiliar circumstances and to deal with problems.
- Time: the speed of service delivery.
- Assurance: the knowledge displayed by personnel who come into contact with a customer and their ability to convey trust and confidence.
- Courtesy: the way customers are treated by employees who come into contact with them.

- Tangibles: the general appearance of facilities, equipment, personnel and communication materials.
- Consistency: The ability to provide the same level of good quality repetitively.

In relation to higher education at DUT, students are perceived as customers. The quality of the institution can be measured using the eight dimensions of quality. The institution offers service to students such as the transfer of knowledge. This is inclusive of teaching and learning, which are the main functions of higher education. The Durban University of Technology is located in Durban and Pietermaritzburg and it is conveniently located to serve the whole of the KZN region. In relation to reliability, time, assurance and courtesy, DUT has administrative departments that deal with student issues such as academic registration, student governance and development. In relation to tangibles, this will include the physical appearance of lecture venues, laboratories and the library resources. According to Stevenson (2009:413), the dimensions of quality establish a conceptual framework for quality, but they can be too abstract to be applied operationally; therefore, they must be stated in terms of precise measurable characteristics.

A definition of quality presented by Basu (2004:7) refers to quality of a product or service and the level to which it fulfils customers' needs, and is usually affected by the design quality. Stevenson (2007:413) cautions that some quality dimensions are more significant than the other, therefore, it is extremely important to identify customer priorities.

2.6 The Effect of Quality Theories in Higher Education

The main element of quality pioneers has contributed to the modern thinking and practices with respect to the attainment of superior quality in higher education. The following section describes some of their key contributions to the quality field.

Walter Shewhart was a pioneer in the field of quality control and he became known as the “father of statistical quality control”. He established techniques for analysing the output of industrial processes to determine when corrective action was necessary (Stevenson 2007:409). Walter Shewart also developed the Plan-Do-Study-Act (PDSA) cycle for learning and improvement (Keleman, 2003:4).

The following quality theories are applicable to higher education and by adopting these quality theories, DUT can enhance the quality of its graduates. Juran views quality as fitness for use. He refers to quality management in terms of a trilogy that includes quality planning, quality control, and quality improvement. (Stevenson, 2007:410). In addition, Stevenson (2007:410) states that quality planning is essential to determine procedures that are able to meet quality standards; that quality control is essential to know when corrective action is necessary; and that quality improvement will assist in finding better ways of doing things.

Besterfield *et al* (2003:4) state that Juran emphasises that, the importance of a management, at all levels of the organisation to be committed to quality effort and be involved with such quality issues from the outset. In addition, in order to achieve the desired result, it is recommended that project development should be based on return on investment. In relation to DUT, quality implementation is addressed by the CQPA which is responsible for monitoring quality throughout the institution. The quality processes and policies of DUT should be capable of meeting the quality standards set out by the HEQC.

According to the Feinganbaum method, it is the customer who defines quality. He believed in “the cost of no-conformance” approach as a reason for management to commit to quality (Stevenson, 2007:411). Besterfield *et al* (2003:4) suggest that identification of customer requirement must be the initial start up of quality effort and end with a product or service in the hands of a satisfied customer. In relation to higher education, institutions identify the needs of the labour market, and then the institution

equips graduates with the necessary skills, capabilities and knowledge to fulfil the requirements of the labour market.

According to Kelemen (2003:37), Philip Crosby's, (an American consultant whose name is associated with "do it right first time" and "zero defects"). A strong point of Crosby's technique to quality includes motivational styles, simplicity of methods and the value is emphasised on employee involvement and accountability. Stevenson (2007:411) states that in relation to the concept of zero defects, Crosby believes that any level of defect is too high and that management must implement programmes that assist the organisation in achieving that goal. Crosby presented the following key points of quality management:

- Top management must show its pledge to quality and be enthusiastic to give support to achieve good quality.
- Management must be persistent in efforts to achieve good quality.
- Management must set out clearly what it wants in terms of quality and what workers must do to maintain that.
- Make it (or do it) right the first time.

The Department's quality processes and programs need to be aligned with its institutional quality mission and policies so as to satisfy the requirements of the HEQC.

Kouru Ishikawa showed the Japanese how to incorporate a range of quality improvement tools such as analysis and problem solving tools (Gryna, 2001:2). Among his key contributions were the development of the cause-and-effect diagram, also known as the fishbone diagram, for problem solving and implementation of quality circles that involves employees in quality improvement. By adopting and implementing the necessary quality tools, higher education institutions will be able to enhance quality.

Taiichi Ohno and Shiego Shingo both establish a principal and method of kaizen, a Japanese term for continuous improvement. Continuous improvement is one of the characteristics of successful quality management (Stevenson, 2007:412). In DUT, monitoring of continuous improvement is achieved through programme review activities.

2.7 Total Quality Management in Higher Education

Stevenson (2009:427) defines Total Quality Management (TQM) as a concept that involves everyone in the organisation and the quest to enhance quality and maintain customer satisfaction on a regular basis. Brit (2005:1033) reiterates this statement and defines total quality management as a procedure planned to monitor continuous improvement of all processes in an organisation in order to meet the expectations of the customers, and states that TQM symbolises a quality management system that is concerned with system, people and culture, leadership and continuous improvement in order to meet the needs of existing and potential customers. According to Eagle and Brennan (2007:46), TQM originated in manufacturing; however, the standardised production was also adopted by the education sector and its approach was made to be relevant to education.

The table below provides a stakeholders' perspective of quality in higher education:

Table 2.2: Stakeholders perspective on quality in higher education

Stakeholders Group	**Quality perspective**
Funding bodies and society at large	Value for money and return on investment
Current and prospective student	High standard in order to gain an advantage in future employment
Employers	Competencies of graduates should match the functions required in employment.
Academics and administrators within universities	Consistency, recognition, respect and the challenges of educating a diverse student body

Table adapted from Srinkanthan and Dalrymple (2003:128)

The adoption of the TQM philosophy to higher education was seen as a means of making the sector more applicable and responsive to the needs of employers and other segments of society (Eagle and Brennan, 2007:46). The TQM philosophy places

emphasis on the involvement of staff, students, and external customers in the quality assurance system. Venkatraman (2007:94) is of the opinion that students are ordinary human beings who have a variety of experiences, emotions and characteristics and hence, treating students as products misses the concept of the learning process. However, Srinkanthan and Darlymple (2003:128) maintain that, although industry and education differ as far as business process is concerned, they both have similar outcomes in terms of placing emphasis on building flexibility and enhancing customer satisfaction in a changing environment. From the views of the above authors and the theories of TQM, one can conclude that it focuses on teamwork, finding better ways to do things, sharing values and improving institutional cultures. These values are parallel with the values set by higher education. Venkatraman (2007:96) provides six main elements of TQM relative to education as:

- **Leadership:** Developing leadership systems and strategy that incorporates internal partnership with industry that would have an effect on staff, students, and society. The strategic planning of this element would evaluate how the institution sets strategic directions and how it develops its principal planning requirement, with special emphasis on customer satisfaction.
- **Educational Management**: This element evaluates the main aspect of process management, including student-focused education design, education delivery, services and business operations. The overall results of this element would evaluate student performance and improvement using key measures and indicators.
- **Human Resource Management**: This element examines how the institution's staff development and training are linked with the objectives and mission of the institution. Some of the strategic drivers of this element would relate to labour development, such as staff recruitment, training and career development, acknowledgement of staff performance and quality of the work environment.
- **Information Management**: The information management elements include monitoring the use of data, as well as access and sharing of information, and determine its effectiveness in order to support the general mission that is related to the outstanding performance. It should provide a consistent accessibility of

information that is essential in the efficient running of the daily operational management.

- **Customer focus and satisfaction**: These elements evaluate how the institution is able to identify the needs and expectations of students and stakeholders. This would include evaluation of various performance measures and determine ways in which targets can best be achieved. Some of the performance measures could be based on student satisfaction surveys, industry needs and satisfaction surveys and evaluation of teaching and learning effectiveness.
- **Partnership Development and Management**: This element would evaluate the establishment of different levels of both internal and external partnerships. In setting up a good dynamic relationship with internal and external stakeholders' effective leadership, good education management and efficient human resources must be maintained. Lagrosen (2004:61) observes that all six core elements of TQM have an obvious customer focus with an emphasis on customer satisfaction and continuous improvement. Hence, it is important to focus on the TQM issues regarding teaching and how continuous improvement provides the necessary basis for quality in higher education.

2.8 Higher Education and the Role of University of Technology

Changes in new global demands have significant effects on the South African education system. The education and training provided by higher education should be more receptive to the needs and expectations of industry and society, to sustain economic growth and prosperity (Kruss, 2004:673). However, analysts such as Jacob and Hellstrom (2000:247) warn that placing emphasis on higher education could result in a different skill requirement in the workplace and this might pose a danger. In addition, it is suggested that focus should be on production and distribution of knowledge. Kraak (2001:88) suggests that the highly skilled labour force should be able to employ new technology and add value. Eldik and Fowler (2004:138) are of the opinion that a country's progress and ability to create wealth is closely related to the quality of its people and its ability to deliver the required graduates.

According to Imenda (2005:1413), the universities of technology primarily focus on the applied value of knowledge and cultivation of job related skills. Previously, a University of Technology in South Africa was referred to as a Technikon. This was a uniquely South African term but the institutions were similar to other higher education institutions in the world. It emphasised career-focused education and aimed at producing highly employable graduates, as Technikons were founded to address the shortage of technically skilled personnel to meet the needs of commerce and industry (Winberg, 2005:197). Technikons were renamed Universities of Technology to blend the name with other higher institutions in the world (RSA 2003:257).

Tertiary institutions play a major role in providing relevant education that meets the needs of various stakeholders that will satisfy the quality of education required. Perceptions of quality are likely to determine stakeholders interest, at higher education institutions (Gbadamosi and Jager 2009:877). Melt, Kotze, and Van Der Merwe (2008:26) note that ensuring quality content delivery is important as the educational value in education is embedded in the rigour and image of the programmes of tertiary institutions.

Meltz *et al* (2008:29) are of the view that the changed systems of higher education institutions have resulted in universities and technikons being named as traditional universities, comprehensive universities and universities of technologies. According to Du Pre' (2009:15), a university is a social system that is structured in a coherent disclosed reality with a view to that which qualifies it; this include scientifically oriented research and teaching and learning. It is also an academic institution where research is conducted and teaching and learning are provided within the structured contact between lecturer and student, and supported by networking, cooperation and collaboration with external academic partners to create, develop and transmit knowledge.

A University of Technology's difference from any other university is the interweaving focus and interrelation between the technology and the nature of the university. At a technological university, emphasis is placed on the study of technology from the viewpoint of various fields of study. With 'technology' it means the human arrangement of nature with the help of tools for human purposes. According to Du Pre' (2009:15) technology refers to the effective and successful application of knowledge, skills, and expertise that will result in the outcomes that will add value to the product, processes and service when applied. In addition, technology is the qualifying factor for a University of Technology and adds that its mission is to make knowledge useful.

These definitions correspond with the recommendations of the National Commission on Higher Education (NCHE) (1996), and the White Paper on Education and Training, (Department of Education, 1997: 112) which set the parameters for establishing national education policy by describing the role of institutions as:

- **Human resource development**: the utilisation of human capabilities and potential through lifelong learning to add value to the social, economic, cultural, and changing society.

- **High level skill training**: the training and provision of a person's ability to strengthen this country's enterprises, services, and infrastructure. This requires the upliftment of professionals and knowledge workers with globally related skills, but who are socially responsible and aware of their role in contributing to the national development and social transformation.

- **Production, acquisition and application of new knowledge**: Technological improvement and innovation, guided by a well structured, vibrant research and development procedures, have a significant impact on the national growth and competitiveness.

Du Pre' (2009:17) states that teaching technology at a University of Technology means an understanding of the application of the subject in the real world. Universities of

Technology aim at reality, which also happens to have a financial return to society. Kraak (2006:145) argues that the process which gave rise to the classification of a "University of Technology" derived from a political intervention with less focus on policy formulation to explain the new classification and its role. Kraak's argument is supported by Winberg (2005:193-195) who points out that the major factor is the assertion that a University of Technology , in the South African context, is imitating the traditional university types that have a unique approach to science .

Table 2.3: Difference between Traditional University and University of Technology

University of Technology	**Traditional University**
Research informed	Research Driven
Curriculum developed around the graduates defined by industry and the profession.	Curriculum developed around academics construct of the disciplines.
Focus on strategic research, applied research into professional practice.	Focus on pure or basic research and knowledge is more subject specific and without any near expectation of commercial application.
Multi-level entry and exit points for students.	Focus predominately on degree and postgraduate level study.
Concerned primarily with the development of vocational/ professional practice.	Concerned to some extent with higher education as an end itself.
Technological capabilities as important as cognitive skills.	Cognitive skills are more important than technological capabilities.

Table adapted from Lategan (2008:3).

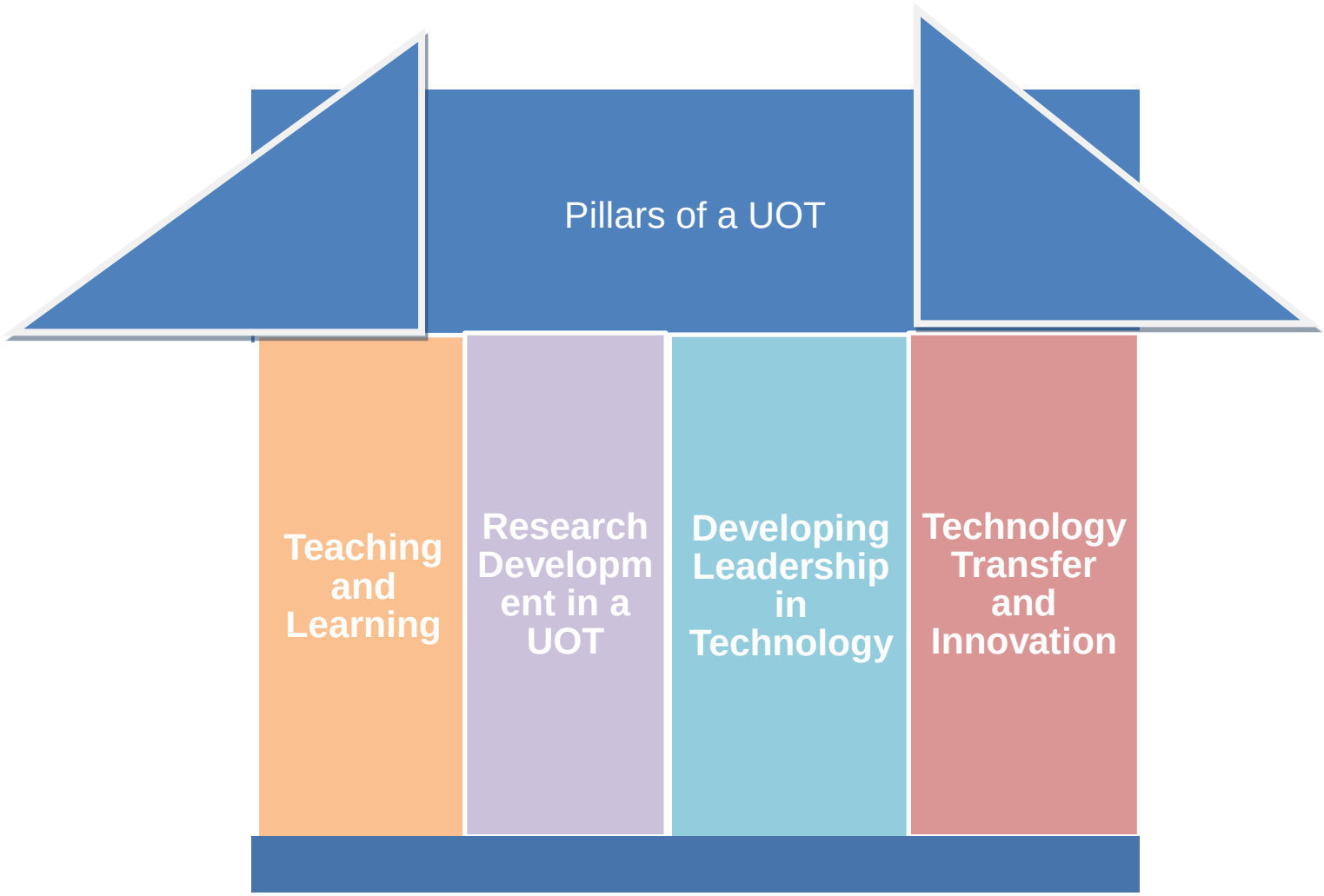
Brook (2000:29) states that each university has a unique approach to science. The table above illustrates the differences between a Traditional University and a University of Technology. Contrary to the views of the above authors, Kraak (2006:7), Winberg

(2005193-195) and Thathiah (2007:756) point out that a problem with imitation, in the South African sense, is that there has to be a sense of tangibility about what is being imitated. Stated differently, the University of Technology may be imitating only the tangible. The intangible would be those aspects that speak directly to the concept that keeps a university dynamic and responsive. Lategan (2008:1) observes that the core functions of a University and University of Technology are the same, which entail teaching and learning, research and service. However, he is of the view that the functions are constant but have taken a new direction such as contract research, commercialisation, innovation and applied research. Therefore, the dynamics are different.

It can be summarised from the above table that universities of technologies promote diversity. In addition, the UOT may be regarded as a modern option for the serving of higher educational needs, society and industrial collaboration. The research problems of a UOT are more informed by the challenges in society and industry rather than theory.

The following illustration shows the pillars of a University of Technology.

Figure: 2.4 Pillars of a University of Technology



Source: Du Pre' (2009:20)

2.8.1 Teaching and Learning

A University of Technology must provide qualified graduates to the labour market and be closely linked to the business environment to ensure relevant curricula. This must also include the review of educational programmes on a continual basis at undergraduate and post graduate levels to improve and address the needs of industry, business and communities. Carr (2002:6) refers to a universal movement and urges that education invest in learning with technology for the improvement of the quality of teaching and learning. In addition, the author states that the effective use of new technologies can increase academic productivity and enhance both teaching and learning.

Teaching has many facets, including planning of materials, learning activities, the designing of challenging assessment activities, a commitment to students as learners and individuals, and continual reflection on the teaching and learning process (Du Plessis 2005:1381). Carr (2002:1-8) argues that teaching is one of the ways in which education is transferred and education is a common purpose of teaching. However, it can be inferred from the above statements that globally, changes in the environment such as policies and technology in which higher education institutions operate, have resulted in a demand to change and learning the methods of teaching and ways in which these are monitored

2.8.2 Research Development in a University of Technology

According to Lategan (2008:65), basic research refers to the primary aim of developing more complete knowledge or understanding the problem under investigation while applied research makes contribution to a better understanding of a subject. Du Pre' (2009:31) accentuates that the emphasis in a University of Technology is mainly on applied research and innovation, as well as on ways and means of solving specific problems that exist within commerce and industry. In a UOT, research mandate is extended to include activities such as technology transfer and approaches such as

innovation and entrepreneurship (Lategan 2008:67). Du Pre' (2009:33) states that besides establishing a relationship with industry, UOT's need to be responsive to other societal needs such as solving the problems of society and the real implementation thereof. Based on the views from Lategan (2008:67) and Du Pre' (2009:33), the conclusion is that a university of technology research deals with the application of knowledge to an identified problem. This transfer of knowledge will give employment, and improve the quality of life. It is therefore understandable that UOT's make a meaningful contribution to industry and societal needs.

2.8.3 Developing leadership in Technology

A University of Technology specialises in technological science. Technological science has to do with the development of knowledge (Lategan 2008:65). UOT's not only make contributions to technological innovation but also make a contribution to the ability of society to control and manage the development of technology (Van Eldik and Fowler 2004:137). Du Pre' (2009:38) is of the view that while technology has brought unparallel benefits, students must acknowledge the effects of technology on society, and understand the broader societal and economic implications of a particular technological solution. From the above statement, technology can be viewed as an application of knowledge. It is also important for UOT's to widen the educational approach, to reveal a series of disciplines and enable students to make wise decisions and options about a range of issues involving technology.

2.8.4 Technology Transfer and Innovation

One of the strongest demands of the new education policy of South Africa, reflecting global trends, is that higher education institutions, as sites of knowledge production and technological innovation, become more responsive to social needs and economic needs and contribute to development (Jansen 2004:240) . Kruss (2006:1) states that strategic alliance, networks, partnership, linkage and collaboration between higher education institutions and industry have been identified as primary means of addressing

higher education's role in economic development. The call for higher education to become more responsive to societal and economic needs, globally and in South Africa, is largely premised on the desirability of a more direct and closer relationship between higher education and economic development (Kruss 2004:674). The link between UOT and industry is through an experiential learning component, also known as work integrated learning, through the use of industry representation and Advisory Board to reflect on and advise in curriculum issues.

According to Du Pre' (2009:23), higher institutions have realised the significant need for cooperation, partnership and joint ventures with industry and business and this has a link to entrepreneurial approach. The corporate client specifies the learning needs for its employees, and in many cases, employers are involved in parts of the education (Eldik and Fowler 2004:142). Harvey (2000:6) is of the view that employers are becoming less concerned about the field of study and more in the raft of skills complementing a first degree, implying subject-specific knowledge is no longer the primary determinant of suitability for employment. In addition, the author notes that emphasis should be placed on the need for the development of a critical, flexible, and empowered student and the relationship between higher education and the world of work.

The above literature shows that higher education and industry interface have become complex and that there is a need to address organisational structures and missions as well as the graduate's attributes. Higher education institutions therefore need to be well informed of expectations from the outside world, in order to define its own role with regard to the employment patterns of graduates.

2.9 Graduate Employability

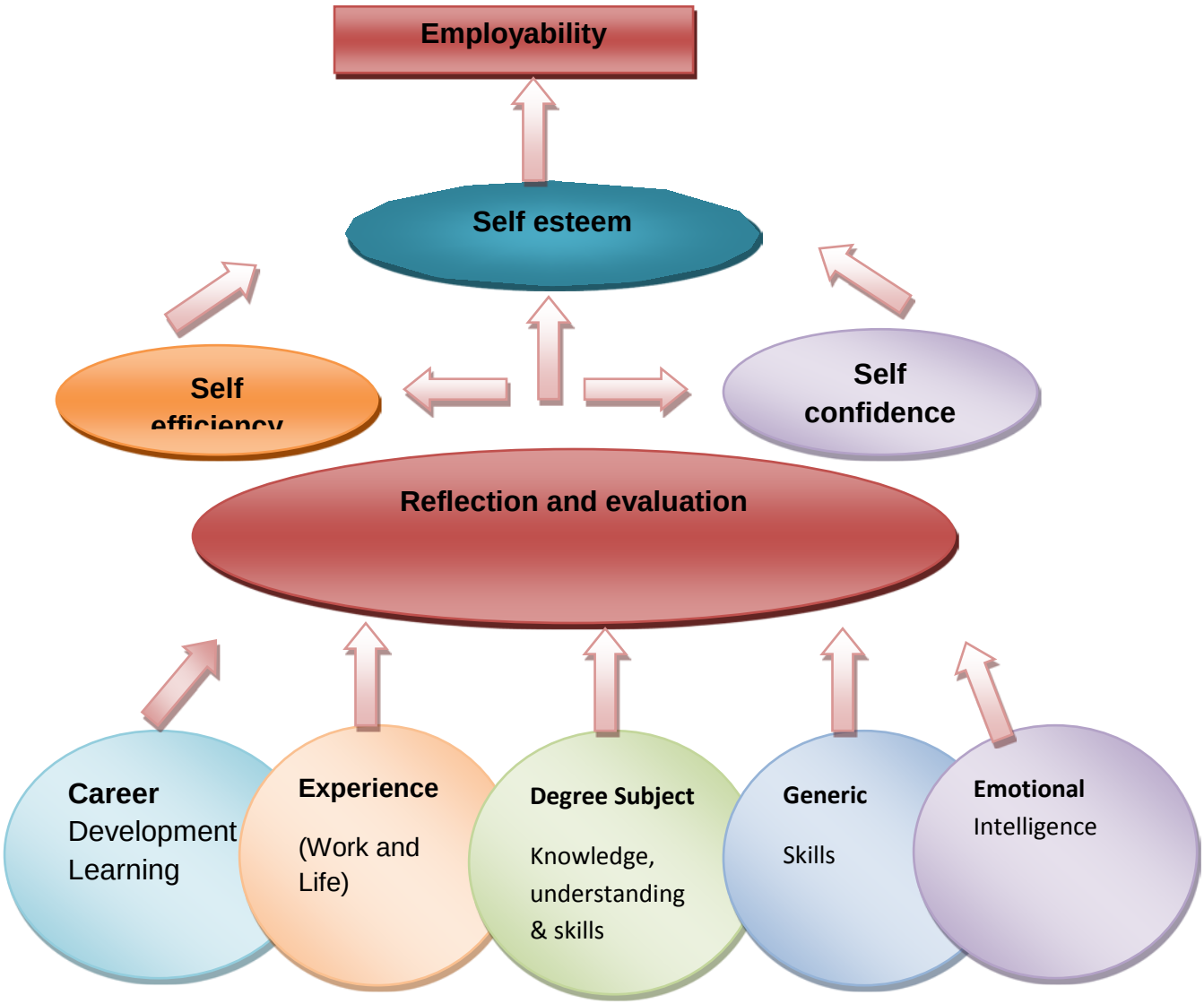
According to Acquah (2009:2), employability is not restricted to people's capability to gain access to the workplace, to adapt to the workplace, and to be productive in the workplace but also to their ongoing ability to complete, gain and create work through the maximum use of both work related and career competencies. However, Smith and

Kruger (2008:121) define employability as much more than just obtaining a job and point out that it actually relates to the actions that will improve the student's capability to function appropriately within the labour market. Graduate employability and chronic skills shortages in the South African labour market have become prominent subjects in the current labour market debate (Acquah 2009:1). Acquah cites Dais and Posel (2007) who conducted a research in the area of employability. Their findings show that factors such as the skills mismatch between the supply and demand of labour in the economy, the quality of education at higher education institutions and the field of education chosen by graduates are some of the factors contributing to the employability paradox. Another research study conducted by Oosthuizen and Westhuizen (2008:45) indicates that upon the graduation, labour market entrants still struggle to obtain employment. Njoku (2008:263) is of the belief that education attainment is a separate issue from the right preparation for the world of work.

Nel, Gerber, Van Dyk, Haarsbroek, Schultz, Sono and Werner (2001:34) state that when people enter the workplace environment, they have a range of expectations that include promotion, salary, status, and the amount of challenging work they expect to be given. They also have expectations about the skills, time and energy they expect to offer. Employers also have certain expectations of what they will receive from their employee. This is referred to as a psychological contract between the employer and employee (Smith and Kruger 2005:23). Job function refers to that which the incumbent in a job is required to do. It is often used synonymously with the term job description which is defined by Inovic and Collin (2003:147) as a description of what a job consists of and what skills are required.

Pool and Sewell (2007:280) provide a model that illustrates the essential components of employability and suggest the direction and interaction between various elements.

Figure 2.5: The essential components of employability



Source: Pool and Sewell (2007:280)

It is recommended that giving students with the opportunity to access and progress on the lower level is important. These experiences will result in development of higher levels of efficiency, self confidence and self esteem and these are essential links to employability (Pool and Sewell 2007:281).

2.10 International Business Excellence Models

This Section will discuss the most important features of international quality models such as the Deming Prize, Malcolm Baldrige award, and the European Quality award. The key strength of each model is also highlighted.

2.10.1 The Deming Prize

The Deming prize was established in 1951 in honour of W. Edwards Deming, whose work on product and service quality had a significant impact on the Japanese economy (Stevenson, 2009:424). The prize was intended to recognise excellence in the implementation of quality control. The Deming prize is divided into three categories namely; the Deming prize for individual, the quality control award for organisations which is restricted to Japanese only and the Deming Application Prize which is open to non-Japanese organisations(William, 2009:19). The main strength of the Deming Prize criteria is the focus on top management leadership, process control and Kaizen improvement activities.

2.10.2 The Malcolm Baldrige Award

The Malcolm Baldrige award was established in 1987 in the USA for organisations to improve the quality of their products and service (Stevenson, 2009:422). The Purpose of the award was to stimulate efforts to improve quality, to recognise organisations for exceptional quality management and achievement and to publicize successful quality strategies (Jacob, Madu, and Tong, 2004: 897). The Baldrige award focuses more on management leadership and customer satisfaction.

2.10.3 The European Foundation for Quality Management (EFQM)

The European award was established in 1991, by 14 leading European corporations, to support and encourage the development of effective TQM by European organisations (William, 2009:26). According to Stevenson, (2009:423), the European award is Europe's most prestigious award for organisational excellence. The purpose of the EFQM is to accelerate the acceptance of quality improvement as a strategy for

achieving global competitive advantage and to encourage the development of quality improvement activities.

2.11 History of Business Excellence in South Africa

The merger of the former South African Society for Quality Control (SASQC) and the Quality Assurance Specialist Division of the South African Institute for Production Engineers lead to the establishment of the South African Society for Quality (SASQ) in 1989 (SASQ, 2011). The purpose of SASQ was to assist in the development of a national quality culture by encouraging organisations to participate in quality projects, recognise individuals through national and regional awards for quality promote the value of SASQ membership in the business community and encourage professionalism in quality.

A group of South African Organisations who was concerned about quality challenges in South African formed the South African Quality Institute (SAQI) in 1993. The SAQI facilitate business connections for South Africa and promote quality events (SAQI, 2011).

2.12 Business Excellence Model in Higher Education

The success of the international quality models such as the Deming prize, the Baldrige awards and the EFQM lead to the formation of the South African Business Excellence Model (SABEM) in 1997. The objective of SABEM is to support management in accelerating decisive quality practices. The key strength of the SABEM is to identify good management practices (William, 2009:40).

Hides (2004:197) states that the meaning of excellence in higher education involves the following; achieving the mission and vision, community engagement and achieving internal measures. Umashankar and Dutta are of the view that business and higher education use different variables to measure excellence. In business organisation, excellence is measured according to financial performance of the organisation while in higher education excellence is measured according to variables

such as; graduation rate pass rates, student numbers and percentage of graduates employed. This means that by adopting excellence models higher education institutions can provide world class quality and maintain stakeholders' satisfaction.

2.13 National Skills Development Programme

This section presents the National Skills Development Programme. The section explains various ways whereby employers can contribute and assist in the development of graduates' skills.

The idea of skills development refers to the process of acquiring new knowledge, adopting new concepts and theories, adapting to technological and industrial changes and taking responsibility of skills received (SAQA 2000:29). For training providers to be effective, they are required to offer nationally accredited learning programmes (Govender and Bisshoff: 2007:55). SAQA (2000:28) defines a training provider as a body that delivers a learning programme that meets the specified NQF standards or qualification and manages assessments.

The Joint Initiative for Priority Skills Acquisition (JIPSA) is part of the Accelerated Shared Growth Initiative for SA (ASGISA), launched by the SA presidential office to develop a second economy in the country (Achiever 2006). Launched by the department of labour "via" the Skill Development Act (SDA) in 1998 and the Skills Development Levies (SDL) in 1999, the SA skills revolution is financed by employers who pay a percentage of a monthly payroll towards skills tax. The state incentive to employers who participate in the skills revolution is that they recover 50% of the 1% of skills levies paid "via" Sector Education and Training Authority (SETA) skills grant. Furthermore, employers must partner with training providers who adhere to best practices and national unit standards and deliver training interventions that are aligned to SAQA/NQF accredited qualification, learnership and skills programmes (Govender and Boisshoff, 2007:55).

In November 2009, the Minister of Higher Education and Training, Dr Blade Nzimande, announced that the responsibility for skills development will be taken by the Higher

Education and Training Department from the Department of Labour. In the media statement, the minister announced that public institutions of learning and institution of the skills development sector will be in one department, with the Department of Higher Education and Training (DHET) while the National Skills Fund (NSF) can now easily complement that of public institutions, the Colleges, University of Technology, Comprehensive University and Universities. The Minister of Higher Education and training proclaimed that universities are not producing enough appropriately skilled and qualified people in the disciplines central to social and economic development. In addition, the Minister states that it is important for higher education institutions to recognise the changing nature of work, in what is becoming a global knowledge economy within which the South African enterprises are operating. The extent to which employers and workers benefit from the knowledge economy will be determined by the capacity to conduct innovative research and apply new knowledge in the workplace (NSDSIII:14). To address the critical needs for economic growth and social development, there must be an improved access to post learning, the world of work, and quality learning in the world of work.

According to the statement made by the minister, it is crucial for higher education institutions to ensure that they produce graduates who can contribute to the development of the economy. It is crucial for these institutions to offer relevant programmes and ensure greater employer participation during the training stage.

2.14 The Skills Requirements for Graduates

The South African higher education system has been greatly affected by global changes, including concerns about the nature of the skills required for the knowledge economy, the employability of graduates and greater accountability by higher education systems (De Jager and Nassimbeni, 2005:33). The NQF has created opportunity for the development of a new higher education policy and facilitates the establishment of the SAQA. Higher education systems respond to these pressures by claiming to develop in students sets of generic skills or SAQA's critical cross-field outcomes in the South African context.

According to SAQA, a training provider is defined as a body that offers a learning programmes that culminate in specified NQF standards or qualification and manages assessment thereof (SAQA 2000:28). The notion of skills development refers to learning new knowledge, acquiring new concepts and theories and adapting to technological and industrial changes. Training providers are required to deliver nationally credited learning programmes so that learners are motivated to gain new skills and competencies relevant to their jobs (Govender and Bisschoff 2007:55).

Smith and Kruger (2008:122) define a skill as an ability acquired by training. Depending on the skills shortages the country faces, certain fields of education are rewarded more highly in the labour market than others through an increase in earning potential and better employment opportunities designed to attract new labour market recruits into the scarce areas. Kruss (2004:675) promulgates that there is an extreme need for a highly skilled labour force that is able to develop new technologies and add value to the existing goods and services. Critically, these skills are developed through general education.

Smith and Kruger (2008:124) extensively reviewed lists of generic skills and identified seven categories. These categories are basic skills such as literacy, which is the ability to read and write and numeracy, which is the ability to use numbers and to calculate. Kelly (2006:5) is of the opinion that beyond the basic skill of reading, writing and arithmetic, the citizen worker of the new millennium needs to be skilled in the technological tools of the computer networks, telecommunication as well as the telecommunication system. Smith and Kruger (2008:126) state that basic skills are associated with personal development and are elements of competitiveness. The second category is the communication skill such as the ability to send and receive messages. This skill is more useful during negotiations, presentation and resolving conflict. Robbins and Deconcezo (2004:262) agree that this skill entails the transference and understanding of meaning. The third category is the management skills that include competencies, knowledge, behaviours and attitudes that a manager needs in a variety of managerial jobs and organisational settings. Nieman and Bennet (2004:119) refer to

this skill as the ability of making a choice between a series of options in order to select the most appropriate option to solve a problem.

The fourth category is the environmental awareness skill which involves business awareness skills that include appreciation for an organisation‘s objectives, culture and customers as well as ethical awareness and social responsibility. The fifth category is the intellectual skills: the ability to analyse, think critically and creatively evaluate information and disseminate information. The sixth category is the Self and career management skill such as personal drive, resilience and self awareness. Lastly, the interpersonal skill includes teamwork, networking as well as recognising the interest and achievement of others. Smith and Kruger (2008:127) reviews a skill as a set for making up employability of individuals and suggested that it is unrealistic to expect everyone to posses all the generic skills. This does, however, highlight the importance of a broad range of transferable skills that facilitate the employment of individuals.

2.15 Summary

It is evident from the above literature that there are differing views regarding the skills required by graduates. It can also be inferred that in order for the graduate to be considered competent he needs to posses a combination of the required skills. Without adequate workplace skills, values and attitudes, an individual may not be able to acquire theoretical knowledge without practical experience. However, due to limited career development potential, unrealistic expectations can be created. In the working environment, graduates need to be knowledgeable to survive in the market. However, graduates have certain expectations regarding the workplace and if these expectations are not met, it can have a negative influence on the performance and career development of a graduate.

CHAPTER THREE: RESEARCH METHODOLOGY AND RESEARCH DESIGN

3.1 Introduction

This chapter focuses on the research methodology and research design used to acquire the data. It will highlight the tools selected and present the preliminary work.

3.2. Types of Research Methods

There are two main approaches to research, that is quantitative and qualitative (Trochim, 2006:30). Quantitative research is an enquiry into an identified problem based on testing a theory, measured with numbers and analysed using statistical techniques (Creswell, 2004:14).

The objective of quantitative methods is to establish whether the predictive generalisations of theory are accurate. Mason (2003:30) states that qualitative research is a process of inquiry with the objective of understanding a social or human problem from multiple perspectives, conducted in a natural setting with a goal of building a compound and holistic picture of the phenomenon of interest. Trochim (2006:30) expresses the view that both qualitative and quantitative research can be used to address any type of problem.

A combination of qualitative and quantitative research methods were used in this study. Thus, the study looked at an understanding of graduates' attitudes and how it influences their perception and meets the expectations of employers by way of precise measurement.

3.2.1 Quantitative Research Methods

Quantitative research is used for testing a theory and focuses on describing, explaining and predicting data with the use of statistical and mathematical methods (Cooper and Schindler, 2006:198). Quantitative research involves examining a situation as it is and does not make any modification to the situation under investigation. In addition, this type of research includes observation studies, correlation studies and developmental design.

These types of research are quantitative data that can be summarised through statistical analysis (Leedy and Ormrod, 2005:179). In this study, opinions of employers and graduates are analysed and interpreted by using statistical tools such as communality score and factor analysis.

3.2.2 Qualitative Research Methods

Qualitative research involves the collecting and analysing of information that is non-numeric (Blaxter, Hughes, and Tight, 200l: 64). This type of research is used to answer questions about the complex nature of occurrences, with the purpose of understanding the observable fact from the participants' perspective. According to Locke, Silverman and Spirduso (2004:145) qualitative research includes ethnography, phenomenology study, grounded theory study and case-study. This study uses qualitative research in the form of a case-study, to determine the views of employers regarding graduates' performance and it evaluates the perceptions of graduates in terms of their work experience.

3.3 Population

Fox (2007:52) indicates that population refers to the study of objects that consist of individuals, groups and conditions to which they are exposed. These different objects or individuals belonging to the population are called the elements of that population. Bless (2006:87) accentuates that it is essential to identify the target population. This target population can be obtained by developing a list of all the elements in the population which is referred as the sample frame. Welman and Kruger (2005:52) state that the population is made up the total collection of all units of analysis about which the researcher wants to make specific conclusions.

For the purpose of the study, the target population was made up of the Operations Management graduates from the year 2005 to 2008, who reside in Kwazulu-Natal. These graduates comprised both the ND and B.Tech: Operations Management qualifications. A list of graduates was obtained from the Management Information Department at DUT. The total number of graduates who resided in Kwazulu-Natal from year 2005 to 2008 was 236.

3.4 Sampling

Sampling is the procedure of identifying units from a population of interest so that by studying the sample the researcher can simplify the result back to the population from which they are chosen (Trochim, 2006:55). Before determining a sample of the population, the researcher should be clear about the population. This requires a sampling frame. A sampling frame is a complete list in which each unit of analysis is mentioned only once (Fox, 2007:52).

There are two major categories to which sampling methods belong. They are probability sampling and non-probability methods (Fox, 2007:52). The main difference between the two is that the probability sample satisfies the requirement for the use of probability theory to accurately generalise the population, while the non-probability sample does not. Welman and Kruger (2005:56) are of the view that probability sampling enables the researcher to indicate the probability with which sample results deviate in differing degrees from the related population.

Maree (2007:172) explains that to draw a random sample, it is important to have a complete and current sampling frame available. In addition, the population element has to be numbered sequentially so that such an element can uniquely be identified. Fox (2007:55) promulgates that in random, a sample is drawn from the population in such a way that each element of that population has the same chance of being drawn during each successive draws.

Random sampling is a population that is heterogeneous regarding the group phenomena being studied. It is divided into a number of natural and non overlapping groups or strata that are more homogeneous regarding the phenomena being studied (Fox 2007:55). Maree (2007:175) is in agreement with Fox (2007:55), explaining that the random sampling can be performed based on natural group such as geographical area. He is of the opinion that random sampling represents the population much better.

According to Neuman (2005:224), the principles of a sample size depends on the population size; if a population is small then the sample ratio has to be accurate. He presents the following guidelines regarding the calculation of the sample size: if a

population is small, that is under 1000, a researcher needs a large sample ratio about 30% of the population; for a moderate population that is under 10 000, the researcher needs 10% sampling ratio and for a larger population of over 150 000 a smaller ratio of 1% is acceptable.

In this study, a random sample was used to draw a sample of 70 graduates and their immediate employers. A sample of 10 graduates was used to administer the pilot study. Only graduates with a ND: Operations Management qualification was used for the pilot study. The main study was inclusive of both the ND and B Tech: Operations Management students. Therefore, the sample size was calculated as follows:

Total Population : 236

Sample Size : 236 x 0.30 = 70

An employer in this study refers to a graduate's manager. Managers were used during this study as it was perceived that due to their experience, they would be able to provide pertinent information regarding the suitability of the current performance of the graduates and provide informed input for the improvement of the graduates.

Gray (2009:149) states that for a sample size to be accurate, the researcher needs to decide on the size of the confidence interval. The confidence interval is the range of figures which the population parameters lay. For the purpose of this study, the confidence level is calculates as follows:

$$\text{Sample interval} = \frac{\text{Population size}}{\text{Sample size}}$$

$$= \frac{236}{70}$$

$$= 3{,}37$$

3.5. Research Design

According to Welman and Kruger (2005:2), research is a process that involves obtaining scientific knowledge by means of various objective methods and procedures. These methods and procedures are based on personal feelings, thus, research includes a process of enquiry, investigation, examination and experience. Research design refers to the plan and structure used to obtain information relating to the research question. Walliman (2006:273) argue that the design of the research refers to the plan of how to progress with the investigation.

Murray (2002:31) explains that the research design is a systematic investigations used to obtain evidence to answer research questions. He concludes that the design is a set up of what methods of data collection are used.

The expected results using relevant methods and procedures would be new discoveries that would help to deal with the problem. Trochim (2006:32) is in agreement with Murray (2002:31) and states that the research design provides a framework for the research project together. He explains that a design is used to structure the research to show how all the major parts of the research work together to address the central research questions.

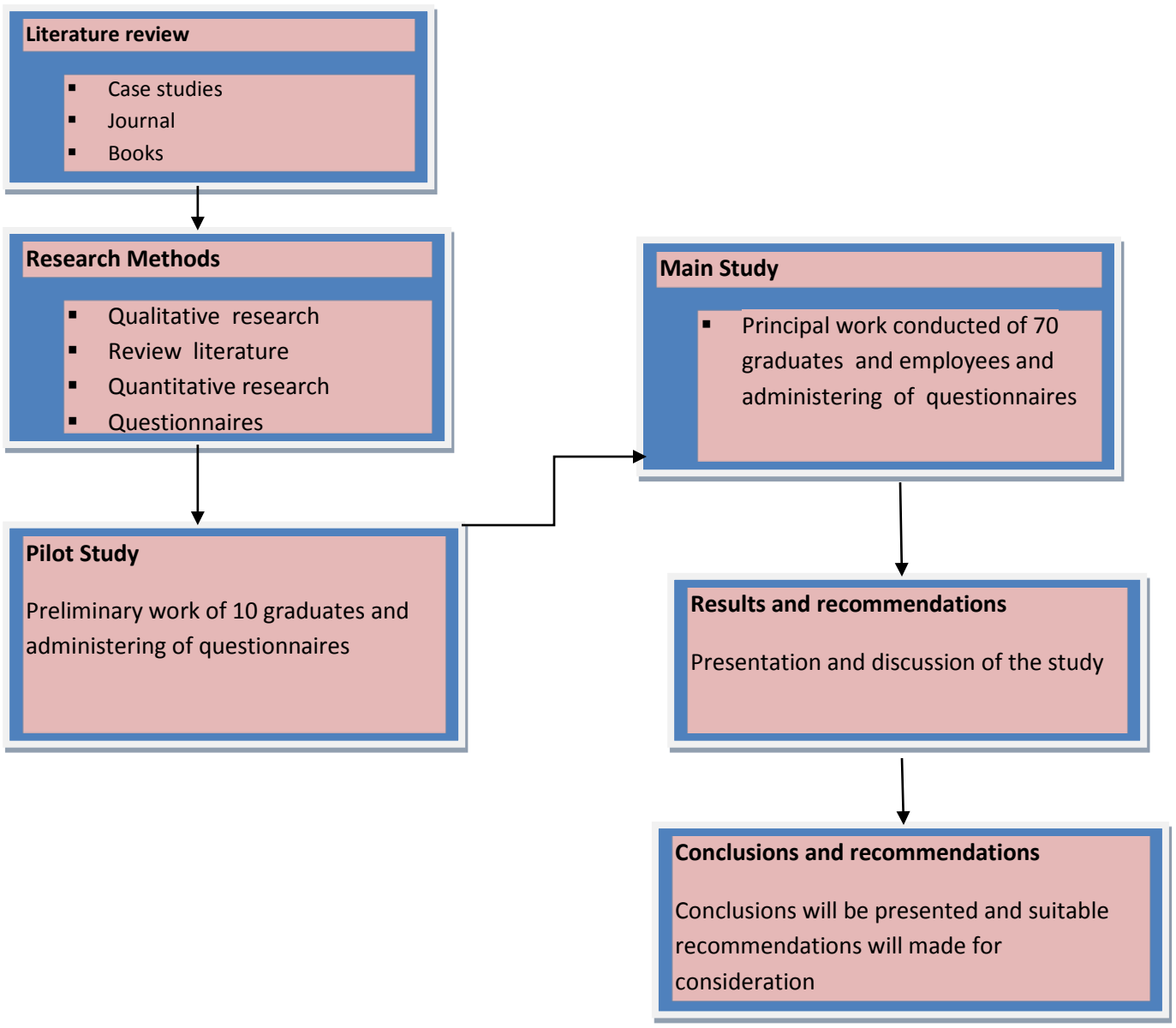
Research questionnaires were used to conduct investigations pertaining to this study. The research design included a pilot study and the main study. The Preliminary study was composed of a sample of 10 graduates. The main study comprised a sample size of 40 graduates who have already entered the labour market.

3.5.1 Flow diagram of the research design

Sources of information such as academic journals, books and case studies were used for this study. Qualitative and quantitative research methods were used in this study. A pilot study on 10 graduates was conducted. A principal work that comprised of 70 graduates was also conducted. Analysis and interpretation of data was presented. Conclusions and suitable recommendations were considered.

The outline of this research is presented in Figure 3.1.

Figure 3.1: Outlines the research process undertaken during the study.



3.6 Data collection

Primary research data is essentially the collection of original specific data to solve a predetermined research problem, as opposed to secondary data, which is defined as existing data usually available to solve problems under study (Martin, Richards, Phillips and Ferguson, 2001:13). Primary research data was employed during this study, by means of questionnaires to graduates and their respective employers. Secondary research data used in the study was in the form of books, journal articles, and the internet data base. These sources of information provided a background to the literature review and highlighted the current policies pertaining to higher education and its influence on graduates' performance. The books and journals that were used contained specific principles relating to operations management disciplines.

3.6.1 Questionnaires

Walliman (2006:281) defines questionnaires as a method of data collection. He states that a questionnaire is a flexible tool that may be used carefully in order to fulfil the requirements of the research being undertaken. Kumar (2005:126) elaborates that a questionnaire contains a list of questions, the answers to which are recorded by the respondent. Maree (2007:158) expresses the opinion that the questionnaire design is an extremely important part of the research process since this is where the data is generated.

Fox (2007:89) states that one of the key reasons for using questionnaires to describe and explain a phenomena to plan and predict behaviour. Questionnaires pertaining to this study were used to determine whether graduates were employed within their relevant profession and whether they posses the necessary employability skills.

The procedure for the data collection was as follows:

- The questionnaires were initially piloted to 10 graduates.
- Questionnaires were hand delivered to individuals, if the respondents could not be reached personally; questionnaires were sent through electronic mail.

- Two sets of questionnaires were administered, one was answered by the graduate, referred to as Appendix (A). The other was answered by the employer which was referred as Appendix (B).
- Each appendix consisted of three parts, section (A) referred the biographical information and consisted of categorical variables. Section (B) referred to the skills requirement and section (C) was based on performance.
- Each item on both appendices used a five point Likert Scale method.
- To reduce the potential of respondents not understanding the questions and the reason behind the research, a detailed consent letter accompanied the questionnaire, containing the introduction and the background of the research.

3.6.2. Likert Scale

According to Oppenheim (2003:195), the Likert Scale is generally used because it provides a less burdensome procedure. The Likert Scale does not need to be evaluated because the sample under investigation is measured on attitude range. This range allows choices from “very important” to “important” to “moderate” to “little importance” and “unimportance”. These choices are weighted from 5, 4, 3, 2 and 1 so they can be scored. Oppenheim (2003:195) sates that this method of scoring is most useful when compared to other methods. In addition, the author states that the reliability of the Likert Scale is preferable to other methods because it allows for a wide range of answers from the respondents. Hence, the Likert Scale was implemented as a tool to design the questionnaires.

3.6.3 The Covering letter

The questionnaire was accompanied by a covering letter which explained the purpose of the research and encouraged graduates to respond. Respondents were encouraged through the following means:

- By the use of the institution’s letterhead to induce a sense of identity with the study.
- By assuring confidentiality.

- By informing that they are free to discuss the project telephonically with the researcher.
- Expressing gratitude to the respondents for their participation.

3.6.4. Structure of the Questionnaires

a) Instructions

The questionnaire contained instructions regarding the rating response to questions. Particular emphasis was placed on noting that the questionnaire required a personal response from the respondents.

Appendix A, contained information relating to the quality of graduates in terms of skills, and performance needed by employers.

Appendix B, indicated the relevance of the curriculum

a) Section A

Classification question section, namely the biographical questions relating specifically to: age, gender, race, length of service, qualification obtained, sector of employment and job title/category.

It also contained questions relating to skills requirement and attempts to identify the respondent's perception.

b) Section B

Contained issues relating to overall performance of the graduates and their attitudes and beliefs.

C) Section C

The main focus of the section was based on general demographics relating to personal and professional achievement.

3.6.5 Open ended and closed ended questions

According to Maree (2007:159), the designing of a questionnaire requires attention to the following: the appearance of the questionnaire, question sequence, wording of questions and response categories.

Fox (2007:91) states that the two basic questionnaire formats generally used are the open ended questions and closed ended questions. The author states that in open ended questions, respondents are encouraged to comment freely on the topics under investigation. Open ended questions are used specifically to find reasons for a particular respondent's opinion or attitudes.

Maree (2007:161) mentions that a closed-ended type question provides for a set of responses from which the respondents have to choose only one response. He is of the opinion that data obtained from the administration of closed- ended type questions is easier to analyse. Open- ended type questions, as well as closed-ended type questions, were used to get more clarification from the respondents involved. The open-ended type questions were used to capture the experiences of graduates.

There are two major criteria for evaluating a questionnaire and these are: Validity and reliability (Cooper and Schindler, 2001:210). They are discussed below.

3.7 Validity of the Questionnaire

Validity refers to an extent to which an instrument evaluates what it supposes to measure (Gay and Diehl 1992:156). White (2000:25) describes validity as being concerned with the notion that the research design fully addresses the research objectives of the study. To ensure that the intended data was collected for this study, the questions were designed to fulfil the objective of the study. Forms of validity are: content validity, construct validity and criterion related validity (Sekaran 2003:206).

3.7.1 Content Validity

According to Sekaran (2003:206), a Content Validity is the extent to which the dimension and elements of a concept has been delineated. The term “face validity” is usually used to describe a Content Validity and it refers to a degree to which a test measures what it is supposed to measure (Gay and Diehl, 1992:157). This statement is supported by Fox (2007:144) who states that face validity refers to the extent to which the instrument looks valid. This is used to test whether something makes sense. Maree (2007:217) stresses that validity cannot be quantified or tested, but the instrument should be scrutinised by an expert in the field to ensure a high degree of face validity.

In this study, a respected academic in the field evaluated the questions to identify duplications of questions. In addition, face validity was conducted for the pilot study. The respondents assessed the questions in terms of its clarity, flow and construction. The questionnaire was then revised accordingly.

3.7.2 Construct Validity

Research studies that involve a construct are either an independent or depended variable, and are only valid to the extent that the measure of the construct is valid (Gay and Diehl, 1992:159). Sekaran (2003:207) states that the Construct Validity testifies to how the result obtained from the measurement is relating to the theories of the designed test. Literature pertaining to the quality of graduates was discussed in chapter two. The review of literature was used in the construction of questionnaires.

3.7.3 Criterion Validity

According to Neuman (2005:168), criterion validity uses some standard or criterion to indicate a construct accurately. In addition, the validity of an indicator is verified by comparing two measurements of the same construct. Barbie (2010:154) accentuates that criterion validity is based on prediction and estimation. Criterion validity was not applicable to this study since it is used for predictions and estimation and this study was not based on predictions and estimations.

3.8 Reliability of the Questionnaire

For a measurement instrument to be standardised, it must be reliable and valid. Maree (2007:215) defines reliability as the extent to which a measuring instrument is repeatable and consistent. Fox (2007:145) elaborates that reliability refers to a situation whereby, if a test, model or instrument is constant then it is reliable. This means that the question is supplying the same answer at different times. When a number of items are formulated to measure a certain construct, there should be a high degree of similarity among them since they are supposed to measure one common construct.

The coefficient that is used to measure consistency is Cronbach's Alpha Coefficient (Welman and Kruger 2005:145). Maree (2007:216) suggests the following guidelines for Cronbach's Alpha Coefficient as: 0.90 being high reliability, 0.80 being moderate reliability and 0.70 being low reliability. For this study, a Cronbach's Alpha is calculated to determine the reliability and internal consistence of each question. The Cronbach"s Alpha obtained in this study is discussed in Table 3.1.

3.9 Elimination of Bias

In any research, bias can distort results in any stage of the research process. These include questionnaire design, data collection and data analysis. The pilot study, validity, use of independent statistician and the nature of the question design were used in an attempt to eliminate bias in the study.

3.10 Pilot study

Pilot work in this study was in the form a small scale pre- tested questionnaire. Welman (2005:51) explains that a pilot study is a small experiment designed to test logistics and to gather information prior to the main study, in order to improve the latter's quality and efficiency. The information obtained in the pilot study should be incorporated into the main study. Lancaster (2005:307) is of the opinion that it is useful to include information on the pilot study arising from the main experiment as this can inform the design of future experiments.

Questionnaires were distributed to ten graduates who completed their qualification from the period of 2005 to 2008. Valuable insight was used to make necessary changes to the questionnaires. These insights include ambiguous questions, vagueness and clarity that may have presented problems for the respondents.

3.10.1 Results of the pilot study

The Content Validity was found to be acceptable by the supervisor and the independent statistician. The pilot study was used to test the reliabilities of the questions of the study. To test the internal consistency of each factor a reliability analysis was employed using the Cronbach's Coefficient Alpha.

The reliabilities for each section were as follows:

Table: 3.1 Reliabilities

	Cronbach's Alpha
Overall	0.837
Overall - Sections A, B, C	0.915
Section A	0.816
Section B	0.809
Section C	0.859

From table 3.1, it can be seen that Cronbach's Alpha for the groups measured were all above 0.7, thus indicating a satisfactory level of internal consistency. The reliability of the questions was acceptable since it reached more than 0.8 of the Cronbach's Coefficient Alpha.

Section A- the skills of graduates

In this section, 80% of graduates expressed the view that a skill is the most important aspect in the workplace. Ninety percent indicated that they easily adapted to the workplace environment. Seventy percent stated that they were able to apply their theoretical knowledge into practice. Sixty percent indicated that they were able to work in teams. However, 80% suggested building a good interpersonal relationship at work takes time.

Section B- Performance of Graduates

Seventy percent of graduates felt that they had gained enough experience and were able to formulate creative ideas, make recommendations and participate in problem solving.

Section C- General Demographic information

Eighty percent of graduates felt that they did receive adequate preparation from DUT, and stated that most of the tasks that they performed at workplace were related to their qualification. Fifty percent indicated that they were improving their qualification and they have registered to further their studies.

The main limitation of this research was the response rate from graduates. Some graduates did not return the questionnaire within the specified time of two weeks and stated that they normally work shifts and there was not enough time to complete the questionnaire.

Suggestions made by the respondents regarding the design of the questionnaire were as follows:

Three respondents felt that there should be consistency with certain words to avoid any misunderstanding. This was rectified in the main study.

Four respondents felt that some questions were vague and needed more clarification. Suggestions were incorporated into the main study.

Three respondents suggested the use of more closed-ended questions as it was easier to answer and less time consuming. All the suggestions had been considered and incorporated into the questionnaire and changes were made where necessary.

3.11 Chi-Square Test

A Chi-Square test is any statistical hypothesis test in which the test statistic has a chi-square distribution when the null hypothesis is true, or any in which the probability distribution of the test statistic (assuming the null hypothesis is true) can be made to approximate a chi-square distribution as closely as desired by making the sample size large enough (Willlemse, 2009:209). The responses to the questionnaire administered in the study were subjected to a Chi-Square testing. In this study, a Chi-Square was used to test the relationship between graduates' and employers' view on various aspects including performance, skills and general demographic information.

3.12 Hypotheses Test: p –values and Statistical Significance

Inferential statistical analysis is concerned with the testing of hypothesis. The independent t-test is the most appropriate parametric test for a comparison of the means (Lind, Douglas, Marchal, Willard, Mason and Robert 2004:348 – 351). In addition, this tests any significant difference between the two variables. Primary data was collated and analysed and comments and concluding discussions thereafter were based on the results obtained. According to Levine, Ramsey and Smidt (2001:427), inferential statistical analysis allows the researcher to draw conclusions about populations from sample data.

The traditional approach to reporting a result requires a statement of statistical significance. A p-value is generated from a test statistic**.** A significant result is indicated with "$p < 0.05$" (Lind *et al* 2004: 347). In addition, the choice of the value 0.05 as the level of significance was totally arbitrary, but has become enshrined as a standard in statistics.

In this study, the data was analysed by examining the frequency with which certain responses occurred. The results were illustrated by means of bar charts, a pie chart and table.

3.13 Summary

This chapter discussed the research methodology and research design. The research used a combination of qualitative and quantitative methods that used a questionnaire for analysing and conducting the investigation. Pilot work was conducted prior to the commencement of the main study. Changes resulting from the pilot work were incorporated in the main study. The results were confirmed to be valid and reliable. The chapter also provided explanations of the analysis adopted in the study such as Cronbach's Alpha, Chi-Square test and Hypotheses test. The next chapter will present the result and discussion for the main study.

CHAPTER 4: ANALYSIS OF RESULTS AND DISCUSSION OF FINDINGS

4.1 Introduction

This chapter will present the data analysis and discuss the findings of the main study. The presentation of results and findings were obtained from the questionnaires that were administered to graduates and employers. For the main study, a total of seventy questionnaires were administered to graduates and employers, forty six questionnaires were returned. The response rate was as calculated as follows:

$$= \frac{47}{70} \times 100$$

$$= 67\%$$

The data from the questionnaires were further analysed using the Chi-Square test. This chapter will commence with statistical presentations that include mean score, gap, communalities and reliabilities.

4.2. Reliability of Questionnaires

The Cronbach's Alpha is a measure of reliability. The questionnaire was tested for reliability using Cronbach's Alpha Coefficient. Reliability refers to the property of a measurement instrument that causes it to give results for similar inputs. More specifically, alpha is a lower bound for the true reliability of the survey. Mathematically, reliability is defined as the proportion of the variability in the responses to the survey that is the result of differences in the respondents. That is, answers to a reliable survey will differ because respondents have different opinions, not because the survey is confusing or has multiple interpretations (http:// www.ats.edu/stat/sas/notes2).

Table 4.1 presents the Cronbach Alpha reliability scores for the various categories of the research. A reliability coefficient of 0.70 or higher is considered as "acceptable" (http://www.ats.ucla.edu/stat/Spss/whatstat/whatstat.htm , 09-11-2010).

Section	Alpha value
Skills	0.657
Performance	0.821
General Demographic Information	0.829
Overall	0.902

Table 4.1 Cronbach's Alpha reliabilities scores

From table 4.1, it is evident that all the categories have high, acceptable reliability values. This means that there is a high degree of consistency for the various sections, as indicated in the table above.

4.3 Descriptive Statistics

Lind, Marchal and Mason (2004:6) describe descriptive statistics as the organising and summarising of quantitative data. Univariate and bivariate analysis are most appropriate for descriptive statistics. Univariate analysis is concerned with measures of central tendency and measures of dispersion. The most appropriate measure of central tendency for interval data is the mean and the most appropriate measure of dispersion for interval data is the standard deviation. Bivariate analysis concerns the measurement of two variables at a time (Lind *et al* 2004:6). Descriptive statistics is useful as it summarises results for an experiment, thereby also allowing for more constructive research after more detailed analysis. Descriptive data analysis aims to describe the data, and investigate the distribution of scores on each variable, by determining whether the scores on different variables are related to each other (Lind *et al* 2004:7).

4.4 Communalities for the questionnaires

This section consolidated the question into three Ceilan themes of the questionnaire. The questionnaires were analysed in terms of communalities. Communalities are the proportion of each variable's variance that can be explained by the factor and can be defined as the sum of squared factor loading for the variables (http://www.ats.ucla.edu/stat/Spss/whatstat/whatstat.htm,09-11-2010).

Lind *et al* (2002:415) explain that the total variance for a particular variable will have two components, the common variance and a unique variance. The proportion of common variance is known as the communality. The term unique variance refers to a variance that can be reliably attributed to only one measure. The result of the assessment that was made of the communalities for each category and the questionnaire is shown below.

	Section	Mean communality score (%)
1.	Skills	60
2.	Performance	58
3.	Personal attitudes and attributes	62
	overall	60

Table 4.2 Mean communality score for each section

The overall communality score of 60% shows a good correlation for the variables in the communality table. A detailed breakdown of individual communalities scores are shown on Appendix D. The ideal for mean individual communality scores would be to obtain values that are above 0.4 .The variable regarding self management has a low score of 0.355. This statement indicates that respondents did not think along the same line. The result indicates that self management has no effect on the quality of the graduate.

The communality for a given variable can be interpreted as the amount of variation in that variable explained by the factors that constitute the variable (http://www.ats.ucla.edu/stat/Spss/whatstat/whatstat.htm , 09-11-2010).

In this instance for example, there are 7 variables that make up personal attitude and attributes (as indicated in the component matrix Table 4.3). The results are analysed similar to that for multiple regressions: signage against the two common factors yields an R^2 = 0.632 (for the last variable regarding university training meeting industry needs), indicating that about 63% of the variation in terms of this statement is explained by the factor model (http://www.ats.ucla.edu/stat/Spss/whatstat/whatstat.htm ,09-11-2010).This argument can then be extended to the rest of the study as the communality values are within acceptable norms.

4.5 Hypothesis Tests: P-Values and Statistical Significance

Inferential statistical analysis is concerned with the testing of hypothesis. The independent t-test is the most appropriate parametric test for a comparison of the means. This tests any significant difference between the two variables. Primary data is collated and analysed and comments and concluding discussions are thereafter based on the results obtained (Lind *et al,* 2002:348 – 351). In addition, inferential statistical analysis allows the researcher to draw conclusions about populations from sample data. For this study, tests were performed to determine whether there was a statistical significance between the variable.

The traditional approach to reporting a result requires a statement of statistical significance. A p-value is generated from a test statistic**.** A significant result is indicated with "p < 0.05" (Lind *et al*, 2002:347).

Measures of association were determined for certain variables. The Chi-square test was performed to determine whether there was a statistically significant relationship between the variables. The results are presented in the appendix E (Chi Square – Crosstabs).

“Age and ability to work independently” for graduates has a p-value of 0.040. This means that there is a significant relationship between age and ability to work independently. Different age groups have similar opinions regarding working independently.

4.5.1 Rotated matrix

The rotation matrix used is the Varimax Method with Kaiser Normalization (http://www.ats.ucla.edu/stat/Spss/.htm , 09-11-2010). This is an orthogonal rotation method that minimizes the number of variables that have high loadings on each factor. It simplifies the interpretation of the factors. The matrix indicates that there is overlapping (splitting) of the variables from each category. This means that the respondents misinterpreted the questions. However, segments of variables do load along common factors, implying that measurements along similar themes do occur. The rotation matrix for this study is shown in table 4.3.

	Component		
	1	2	3
Adapt well to the workplace environment	.209	.288	.649
Ability to apply theoretical knowledge into practice	.445	.185	.628
Capable of working in teams and cooperation	.221	.788	.154
Ability to relate to other people	.303	.567	.009
Ability to acquire new skills	.321	.802	-.190
Ability to formulate creative and original ideas	-.255	.701	.175
Ability to use technology	-.066	.512	.475
Ability to think analytically and logically	.132	.494	.396
Can work under pressure	.724	.206	-.049
Capability in decision making	.760	.178	-.083
Involved in decision making	.699	.059	.131
Ability to work independently	.460	.263	.234
Time management and self confidence	.322	.492	.330
Retrieval and analysis of information	.314	.390	.398
Recognition of different view point	.598	.143	.333
Concern for quality	.166	.407	.497
Task performed is related to my qualification	.000	.049	.782
Undergo professional development	.276	.033	.696
Able to improve my qualification	.657	-.152	.485
Quality teaching meets NQF levels	.566	.315	.306
Content with the level of achievement and progression	.282	.597	.175
Has good working relations with DUT	.698	.177	.253
Work Integrated Learning was beneficial to the profession	.709	.153	.325

Table 4.3: The rotated component matrix

For this study, the matrix values can be interpreted as correlation values. These values indicate the strength of whether a statement belongs to a certain component (Willemse, 2009:28). For example, the variable regarding capability of working in teams and cooperation has a value of 0.88 which shows a high correlation and it is strongly related to component 2 which represent the performance. This means that there is a statistical significance between the graduates' ability to work in teams towards a variable regarding the performance. However, the same variable regarding the capability of working in teams has a low correlation with component 3 which represents personal attitudes and attributes. This means that there is no statistical significance between these two variables.

4.6: Biographical Data of Respondents

The demographic factors such as age, gender, race, and educational qualification were used for this study. The tables and graphs in the proceeding sections present a summary of the biographical data of the respondents.

4.6.1 Question One: Respondents by Gender (Appendix B)

This question was used to determine which gender was more employable. The sample was composed as per the figure 4.1. The findings showed that the employer representatives constitute 75% being male and 25% being female. Within the category of students, 67% of respondents are male and 33 % are female

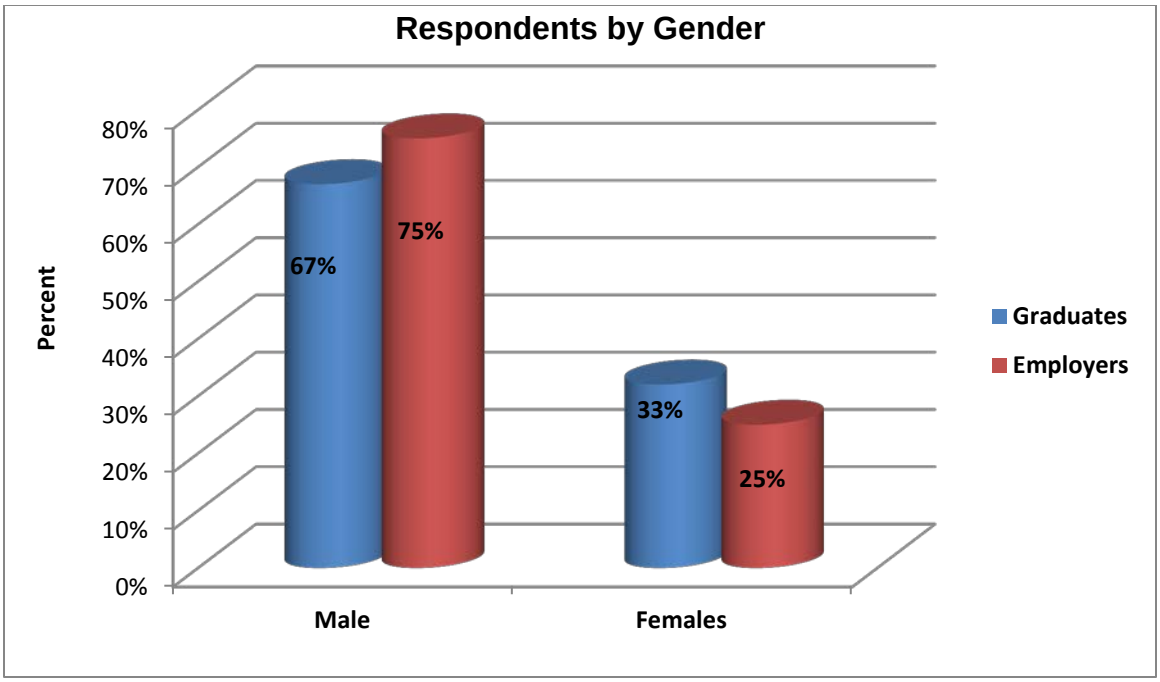


Figure: 4.1 Respondents by Gender (Q1)

4.6.2 Question Two: Age of Respondents

The purpose of this question was to determine which age group constitutes the majority of Operations Management graduates. Nearly 61% of the students were between the ages of 21 to 30 years. The second largest group was between the ages of 31 to 40 years and the age older than 40. The smallest group was between the ages of 17-20. They formed 3.6% of the sample. It is evident from the research that the majority of respondents are from the mature group which constitutes the ages from 21 to 30 years as shown in figure 4.2

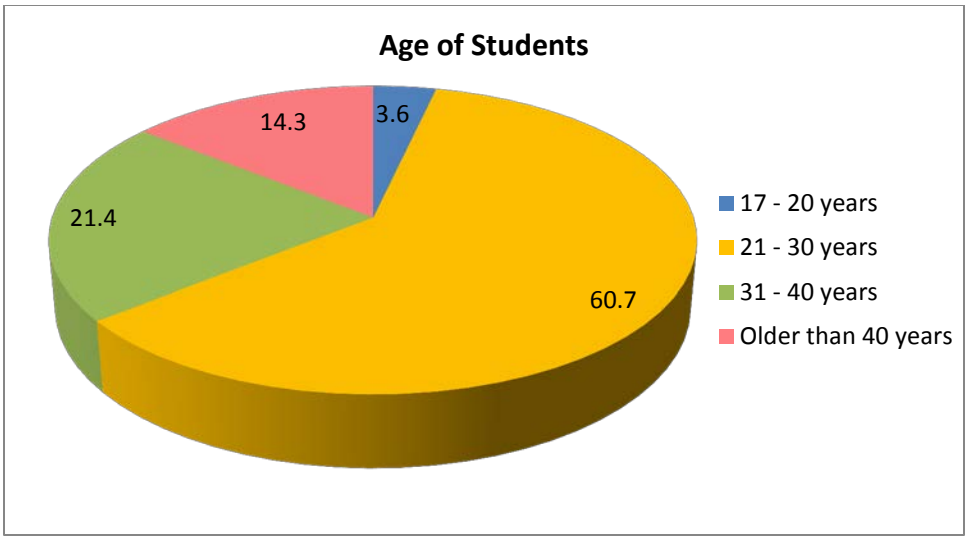


Figure 4.2: Age of the Respondents

4.6.3: Question Three: Race of Students (Appendix B)

Respondents were required to indicate their race group, for statistical purposes. The question was designed to gain an overview of the number of race groups that graduated in Operations Management.

There was approximately a 2:1 ratio of African students to Indian students. A small percentage (3.6%) of the students was Coloured. The majority of respondents were African, comprising (64.3%). This is consistent with the demographic graduation rates that indicated that the majority of graduates from the Department of Operations and Quality Management were mostly African, followed by Indian and then Coloured.

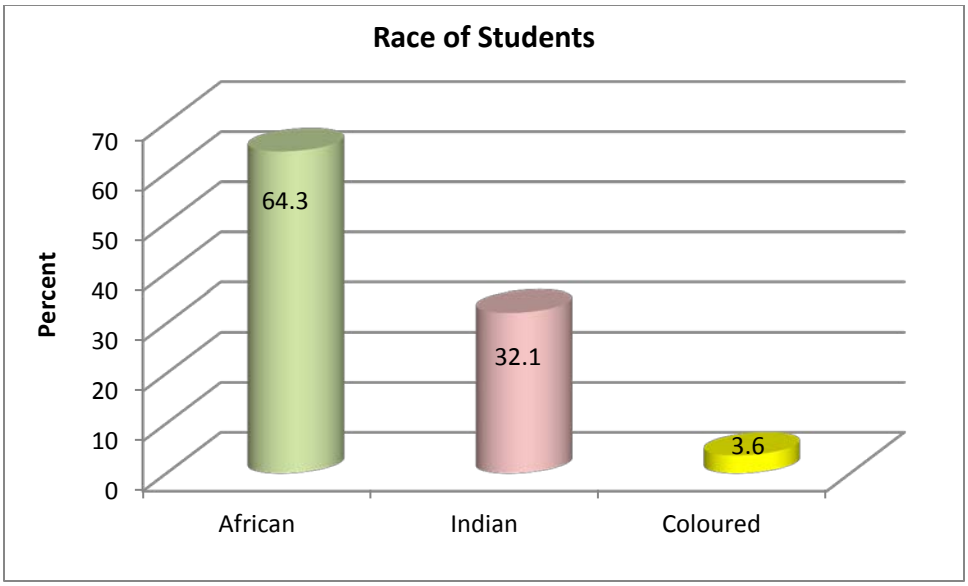


Figure 4.3: Race of Students

4.6.4 Question Four: Qualification of Graduates

The purpose of this question was to establish whether graduates who were in possession of a National Diploma would have a higher chance of employment than graduates who had a BTech Degree. The criterion for the selection of graduates was discussed in chapter three of the study.

The qualification of the graduate respondents is presented in figure 4.4. Respondents were required to indicate the highest level of qualification. Fifty seven percent had a B. Tech Degree whilst 43% had a Diploma. A study conducted by Raju, Rajagopaul, Dlabantu and Ngubane (2006:123) found that University of Technology graduates who had a BTech Degree or a National Diploma stand the same chance of securing position, both professional and support positions. The results of this study reveal little difference in a person presenting a National Diploma from one presenting a BTech degree, the ratio is 2:3. Therefore, this research concludes that having a BTech degree does not determine whether the graduate will have a higher chance of employment than a graduate who has a diploma.

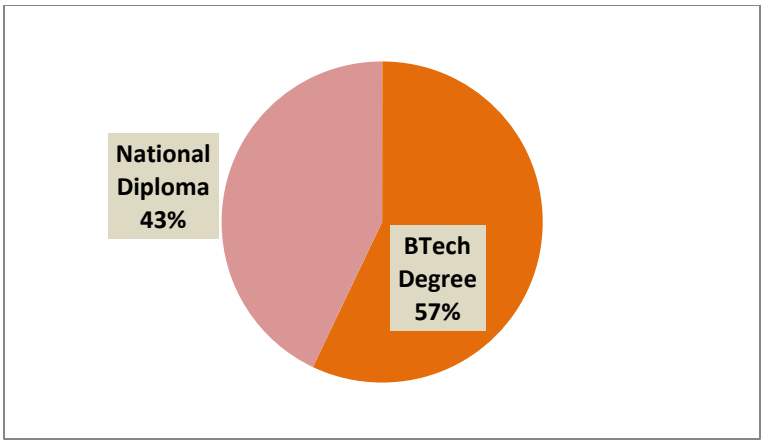


Figure 4.4: Qualification of Graduates

4.6.5 Question Five: The time spent looking for employment after graduation.

The respondents were required to indicate the time it takes to find employment after graduation. As per figure 4.5, the results reveal that nearly 60% of all graduates found employment within the first 6 months. In total, 96.4% of graduates found employment within one year. Only (4%) found employment after 2 to 3 years. The results compare favourable with the national employment rates of 74% in 2009 (www.statssa.gov.za/keyindicators/keyindicators.asp, 11-11-2010). The findings highlight the value of tertiary education in finding employment.

These findings are almost similar to the research done by Moleke (2003:122) who reports that 60% of graduates found employment immediately, a further 28% found employment 1-6 months after graduation, 6 % within 7-12 months after graduation and a further 6% were still unemployed more than one year after graduation. In addition, perhaps these results might be explained by a perception that commerce graduates offer capabilities in respect of the skills and performance that employers require.

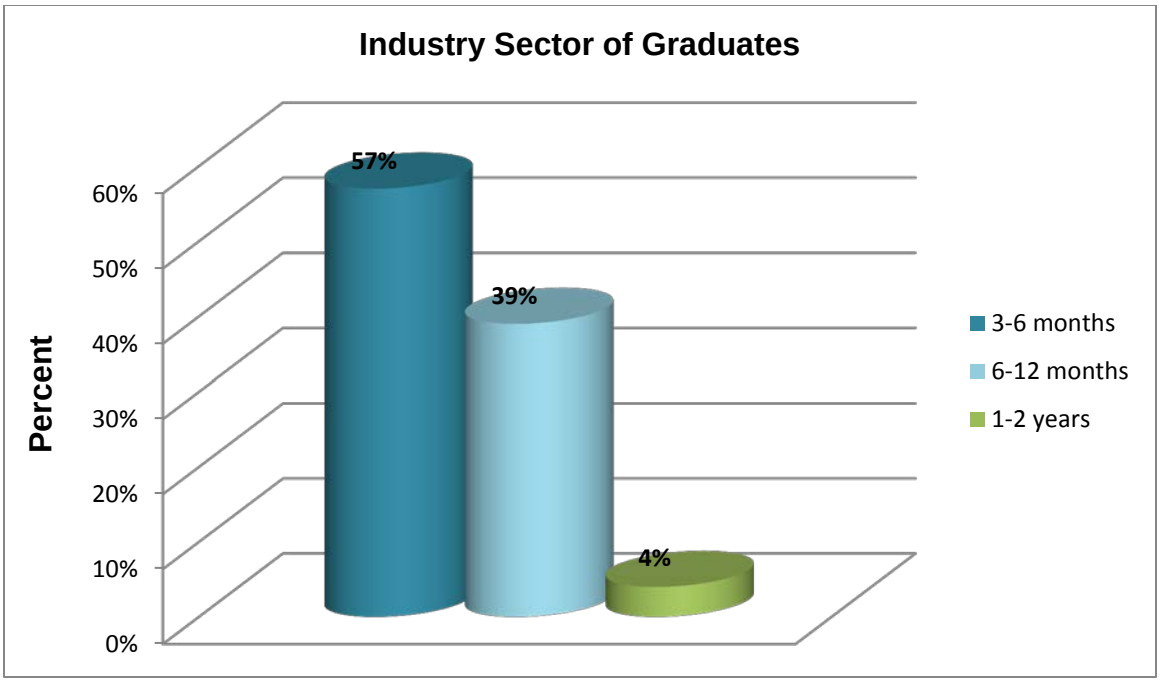


Figure:4.5 The amount of time spent looking for employment after graduation

4.6.6 Question Six: Industry sector of Graduates

The purpose of the question was to determine in which industries Operations Management graduates were more likely to find employment. The Figure 4.6 shows the Sector in which the graduates have found employment.

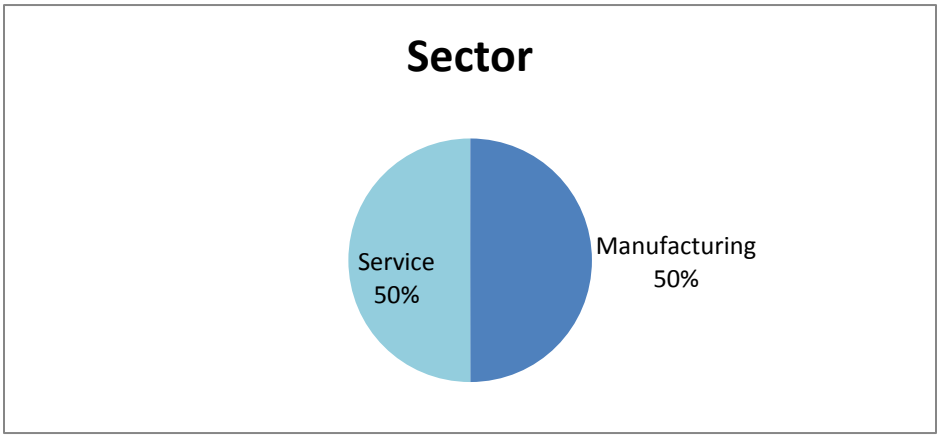


Figure 4.6: Industry of Graduate

The results obtained in this study indicate that Operations Management graduates are more likely to end up working either in the manufacturing or in the service sector. The

findings indicate that graduates are not selective about the sector of industries; therefore, it can be inferred that the sector is not a determining factor in the employment of graduates.

4.6.6.1 Type of Industry

The purpose of the question was to identify the type of industry in which Operations Management graduates are likely to be employed. The results reveal a wide variety in terms of the industry that employs graduates.

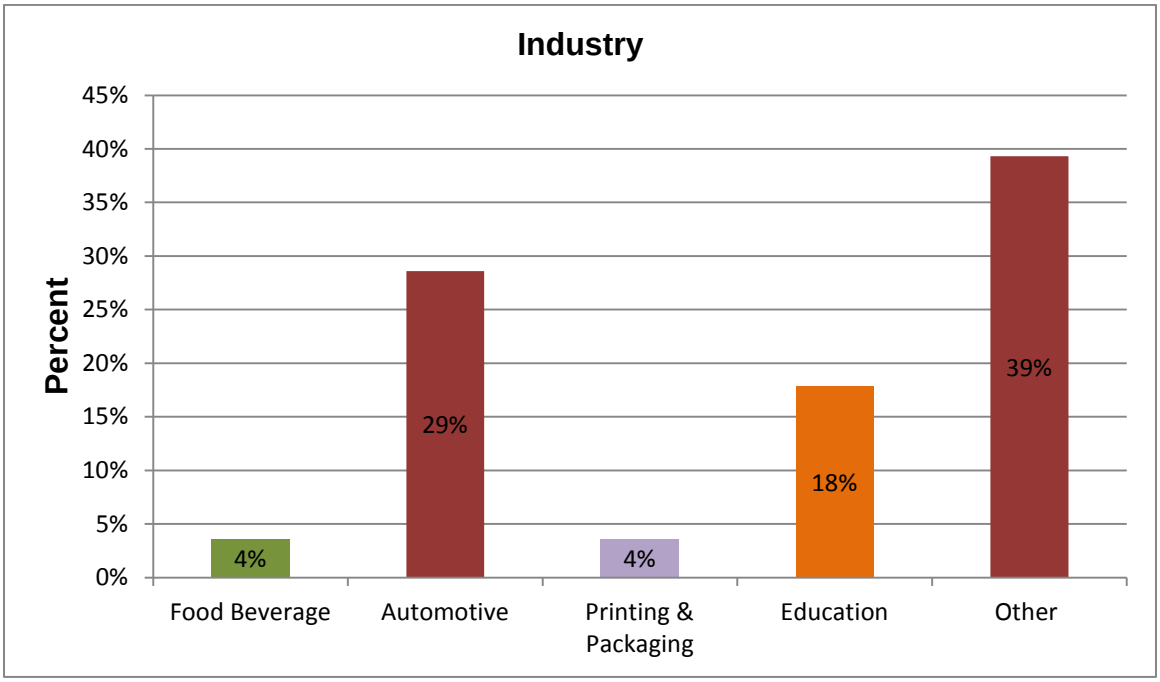


Figure 4.7 Type of Industry

Thirty nine percent of respondents are in the automotive industry, while the majority of respondents are classified as “other” industry (39%). For this study, “Other industry” refers to industries that are not categorized in figure 4.7, for example industries such as textile and pharmaceutical. Only 4% of respondents are in the food and beverage as well as printing and packaging industries. These findings indicate that graduates are more likely to find employment in the automotive, education or other industrial sectors. The results also suggest that a small percentage of graduates are able to secure employment either in food and beverages or in printing and packaging. The scope of

operations management ranges across different types of organizations. Operations management professionals are involved in a variety of activities within the organization (Stevenson 2009:11). It can be concluded that a qualification in operations management does not restrict a graduate to a particular type of industry, and graduates are able to secure employment in a variety of industries. It can be inferred that having an operations management qualification is not restricting a graduate to find employment in a specific type of industry.

4.6.6.2 Question Two: The length of service for employers' representatives

The purpose of this question was to determine whether the employer representative has adequate managerial experience to assess the quality of graduates. From figure 4.9, the following findings were made. A total of 53% of respondents had between ten to fifteen years of experience, while 13% of respondents had two to five years of experience. Thirteen percent of respondents had between five to ten years of service. Only 20% had more than fifteen years of experience. The findings show that the majority of employers' representatives had 10 to 15 years of service. It can be assumed that these employers' representatives have enough experience to assess the quality of graduates.

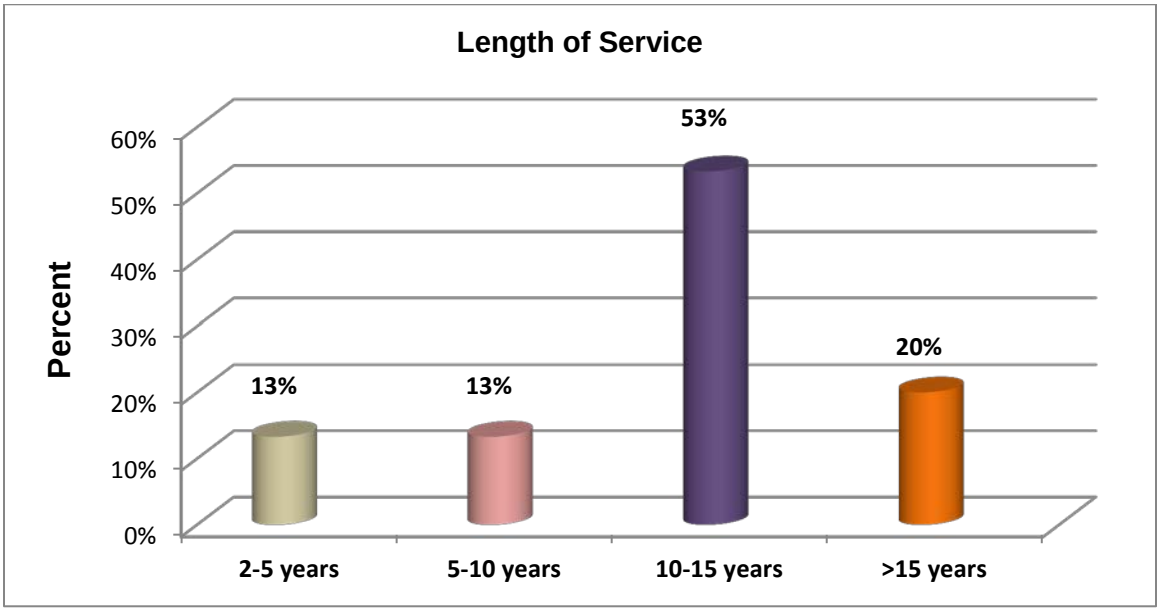


Figure 4.8: Length of Service

4.7 Analysis and discussion of findings per section

The findings of each section of the questionnaires are shown on section 4.9. The graphs proceeding indicate the mean scores in addition to the gap for each question within each category. The gap is used to determine whether the employer and the graduates have the same views regarding the question. A gap was determined for each variable by finding the difference between the mean variable score for maximum agreement.

4.8 Measurement of questionnaire responses

The Likert Scale is the most popular because as it was easier to compile. The Likert Scale, unlike other scales may be used for multi-dimensional attitudes. It consists of statements whereby respondents have to indicate the degree to which they agree or disagree with its content. Some statements will present a positive attitude, whereas others will represent a negative attitude (Welman and kruger 2005:156-157).

The questionnaire that was administered in this study used the Likert Scale and required respondents to score the variables being investigated on a scale of one to five. A score of five indicated maximum agreement and a score of one indicated strong disagreement with the statement presented in the questionnaire.

4.9 Section A: Skills

This section presents the results of the questionnaire on graduates' and employers' perception in terms of skills being important for employment. By identifying the important skills in the workplace, the Department of Operations Management will be able to produce graduates who have the necessary skills needed by the organisations and graduates will be able to meet the expectations of employers, thereby becoming more employable and thus contributing to the economy of the country.

		Student		Employer	
		Mean	Gap	Mean	Gap
Adapt well to the workplace environment	A1	4.14	-.86	4.27	-.73
Ability to apply theoretical knowledge into practice	A2	4.04	-.96	4.13	-.87
Capable to work in teams and cooperation	A3	4.21	-.79	4.27	-.73
Ability to relate to other people (interpersonal skills)	A4	4.11	-.89	4.20	-.80
Ability to acquire new skills	A5	4.32	-.68	4.33	-.67
Graduates have good basic knowledge of Operations Management	A6			4.20	-.80
Good leadership potential and skills	A7			4.20	-.80

Table: 4.4 mean individual score for the importance of encompassing skills in the workplace environment

The overall score shown in table 4.9 with respect to the important skills in the workplace environment has an average of 4.4 and a gap less than 1, indicating overall agreement for this section. In addition, in a case where the gap is more than 1, suggest that the respondents did not think along the same lines. The significance of the gap shows the difference between the mean of a student and that of an employer. These findings indicate that graduates and employers have similar views with regard to work skills needed in the workplace.

For question A1: the result mean score (4.14) for the graduates and (4.27) for the employer with respect to adaptation in the workplace indicates that more respondents "agree" with the statement than those who "disagree". Harvey (2000:7) mentions that adaptability and flexibility are generic attributes for graduates and these are influenced by technological and organisational changes.

For question A2: the result mean scores (4.04) for the graduate and (4.13) for the employer suggests that graduates were capable of blending their theoretical knowledge into the workplace. The results indicate that graduates are able to utilise the operations

management techniques in real life scenarios. Pool and Sewell (2007:284) state that employers value people who have undertaken work experience and are able to reflect upon that experience and then articulate and apply what they have learnt.

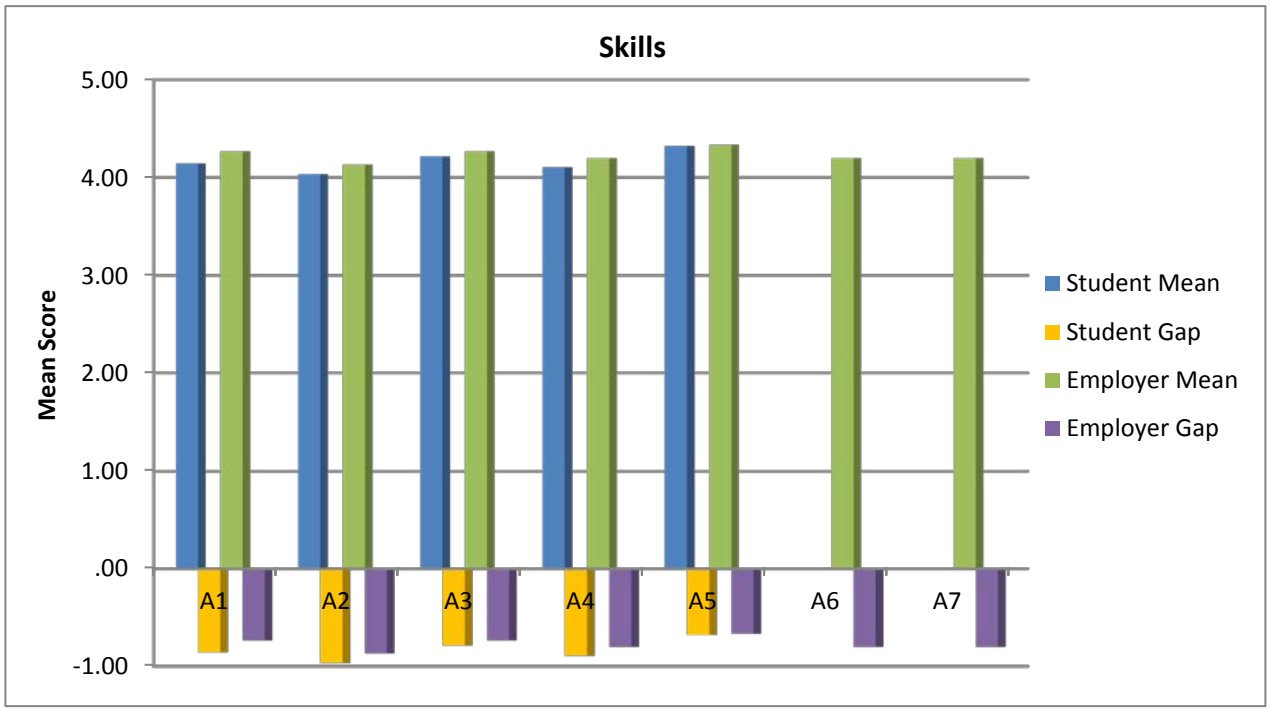


Figure 4.9: Mean scores for skills requirement in the workplace

For question A3: the result mean scores (4.21) for the graduate and (4.27) for the employer indicate a common agreement with regard to capability to work in teams. From figure 4.9 and 4.10 it can be inferred that employers expect graduates who are equipped and knowledgeable on the following: skills adaptability to workplace, basic knowledge of operations management and be able to work in teams. These results are similar to Smith and Kruger (2008:12) who review a list of generic skills and identify interpersonal skills as one of the crucial skills that a graduate needs to acquire; other skills include teamwork, network as well recognising interest and achievement. Hodges and Burchell (2003:17) cite the work of Maes, Weldy,and Icenogle (1997) and consider

oral communication , problem solving skills and self motivation to be the three most important competencies required of a graduate.

For question A6 and A7: a positive response with mean scores of (4.20) for both the questions indicates that the respondents agreed with the statement. Employers indicate a level of satisfaction with regards to good leadership skills and are comfortable with the knowledge attained by the graduates at their respective higher education institutions. Employers want graduates with relevant subject specific skills, knowledge and understanding. In addition to this, employers are looking for well developed generic skills in a number of areas (Pool and Sewell, 2007:282). Hodges and Burchell (2003:17) cite Joseph and Joseph (1997) who state that employers believe that educational institutions need to provide relevant employment experience and generic skills to be developed prior to employment. Therefore, graduates need to have the skills that are required by employers so that they become more employable, thus enhancing the quality of graduates.

4.10 Section B: Performance

Respondents were asked to give ratings based on graduate performance. The ratings were taken as an indication of the relative importance of items for employers as well as the graduates. The mean scores for the employers' rating for graduates are shown in Table 4.5. The mean score for performance was mostly above four, suggesting that employers were satisfied with the performance of graduates.

		Student		Employer	
		Mean	Gap	Mean	Gap
Ability to formulate creative and original ideas	B1	4.25	-.75	4.13	-.87
Ability to use technology	B2	4.14	-.86	4.20	-.80
Ability to think analytically and logically	B3	4.18	-.82	4.20	-.80
Can work under pressure	B4	4.25	-.75	4.07	-.93
Capability in decision making	B5	4.36	-.64	4.13	-.87
Involved in problem solving	B6	4.32	-.68	4.33	-.67
Ability to work independently	B7	4.29	-.71	4.20	-.80
Self management(time management & self confidence)	B8	4.21	-.79	4.20	-.80
Retrieval and analysis of information	B9	4.21	-.79	4.20	-.80
Recognition of different view points	B10	4.11	-.89	4.27	-.73
Concern for quality(wanting to succeed)	B11	4.29	-.71	4.33	-.67

Table 4.5 Performance

For question B1: graduates indicated a higher mean score (4.25) than that of an employer who indicated (4.13) in terms of the ability of a graduate to create original and creative ideas. This gives an indication that employers regard the skill as being less important.

The mean scores showed that the performance skills such as ability to work under pressure (4.25), capability in decision making (4.36), involvement in problem solving (4.32), ability to work independently (4.29) and concern for quality (4.29) were rated highly by graduates. Graduates also rated the skills for self management and retrieval and analysis of information highly for future careers.

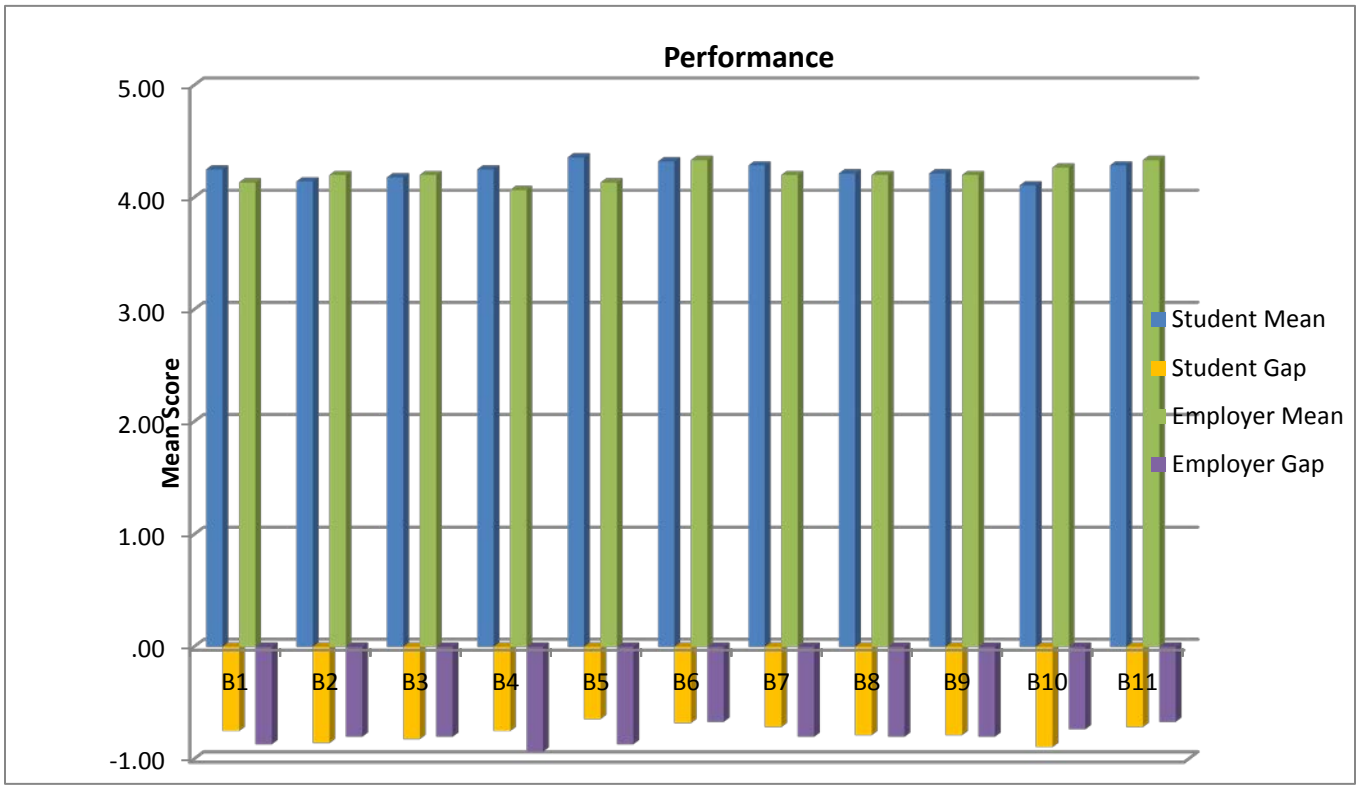


Figure 4.10 Performance

Employers' mean scores were ranked higher for the skills related to ability to use technology (4.20), ability to think analytically and logically (4.20), involvement in problem solving (4.33), recognition of different view points (4.27) and concern for quality (4.33). These results showed that employers regard these skills as most important.

Employers view the skills to work under pressure (4.07) and ability to formulate ideas (4.13) as the least important skills of all, while graduates regard the skills for recognition of different view points (4.11) and ability to use technology (4.14) as least important. In a workplace context, competency is a combination of cognitive skills such as technical knowledge, expertise and abilities or personal and behavioural characteristics such as principles, attitudes, values and motives which are functions of individual personalities (Hodges and Burchell 2003:17). Spencer and Spencer (1993:85) suggest that if people with the right personal characteristics are recruited initially, then they should have the

capacity to acquire the relevant knowledge and skills in order to attain their employer's performance objectives. These results reveal that employers are generally satisfied with the performance of graduates; however, there is a performance disparity on graduate levels between what employers find important and what they experience. These findings suggest that graduates have a different focus on what is important in the workplace.

4.11 Section C: General Demographic information

The purpose of this question was to ascertain the level of satisfaction in terms of graduate professional development and to find out whether employers assist graduates with their career development. This question will determine whether teaching and learning received from the institution has made a contribution to the quality of graduates.There is a similar level of scoring with regard to Table 4.6 in this category as well. However, the graduates' scores are not as high as compared to those of the employer.

		Student		Employer	
		Mean	Gap	Mean	Gap
The task performed is related to the qualification	C1	3.89	-1.11	4.27	-0.73
Undergo ongoing professional development	C2	3.82	-1.18	4.07	-0.93
Able to improve my qualification	C3	4.11	-0.89	4.33	-0.67
Quality of teaching meets NQF levels	C4	3.89	-1.11	4.27	-0.73
Content with the level of achievement and progression	C5	3.89	-1.11	3.67	-1.33
Work Integrated Learning was beneficial to the profession	C6	4.11	-0.89	4.20	-0.80
University training meets industry needs	C7	4.11	-0.89	4.27	-0.73

Table 4.6 General Demographic information

For question C1, C4 and C6: the mean score was (4.27). This score indicates that employers "agreed" with the statements and are of the view that the tasks performed by

the graduates are related to their qualification. Branine (2008:49) states that higher education institutions have prominent roles to play in preparing students for employment. However, he also argues that higher education institutions are not employment and training agencies and that their role is to enhance knowledge and learning regardless of what the employer requires. Raybould and Sheedy (2005:65) promulgate that the difference in the relationship between higher education and employability is that higher education does not cater for just one type of employer size or employer sector. The research findings indicate that work integrated learning does play a role in securing employment. For question C2: the mean score is (3.82) for the graduates. This score indicates that the respondents are in disagreement with the statement. The results give an indication that graduates are not satisfied with the employer's support in terms of professional development.

Question C3 and C6: the mean score is (4.11). This score indicates that the graduates regard the ability to improve qualification and view work integrated learning as beneficiall to their profession and consider these the most important factors in the workplace. These results give an indication that graduates who have completed their work integrated learning have a distinct advantage in the labour market. These findings are similar to the study by Surujlal and Singh (2009:206) citing the work of Parks (1991) and Taylor (1988), who also found that internship, played an important role for students in obtaining their first job. However, there has been limited research regarding the issue of work integrated learning. In addition, through adopting a work integrated learning approach, students in higher education are offered the opportunity of putting theoretical knowledge concepts into practice. It can be concluded that through the process of work integrated learning, higher education institutions can significantly improve the quality of graduates thereby providing employers with graduates who are ready to enter the job market.

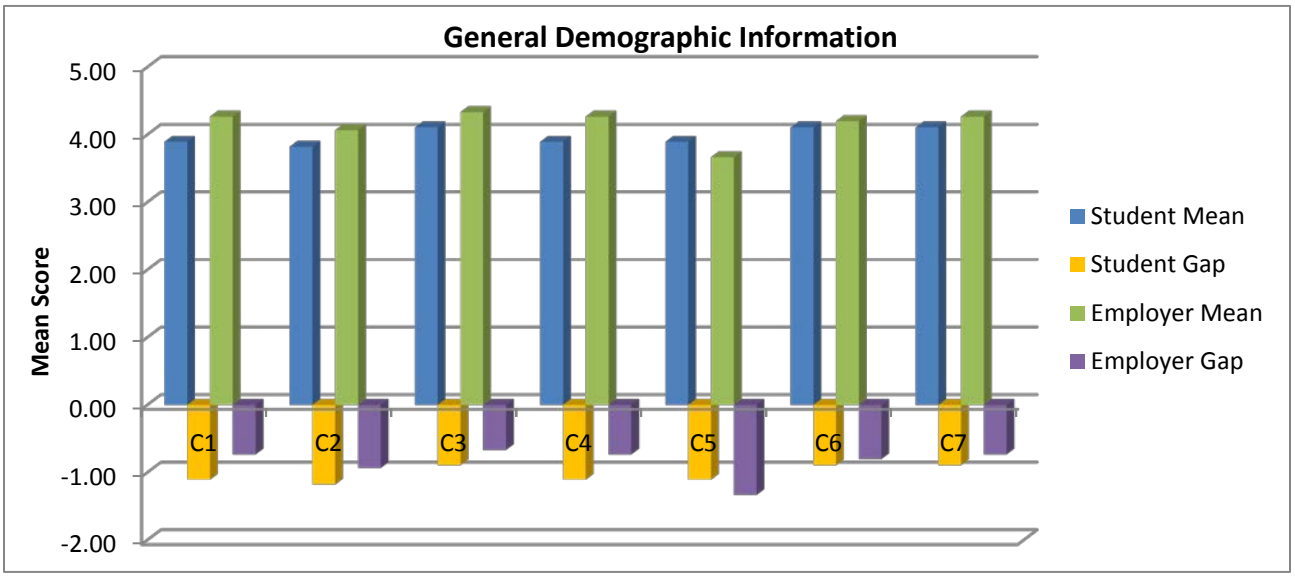


Figure 4.11: General Demographic Information

From a graduate perspective, McDermott, Mangan and O'Connor (2006:457) state that graduates want jobs that exercise their abilities, confer status and with adequate pay and a route to career development. The issue of employee development had been supported by the South African Government. The new growth path adopted by the government calls for increased workplace training of workers already in employment in order to improve productivity and the overall growth and development of the economy (National Skills Development Strategy III 2010:18). To address these challenges, the National Skills Development Strategy III, through the mandatory and discretionary grants of the SETA's, support the training of employed workers and encourage employers to expand such training, in order to address skills imbalances in the workforce. Emphasis is placed on the use of a levy grant system. Therefore, it can be inferred that by making use of the grant levy, employers may assist graduates in terms of their career development.

Sturges and Guest (2004:7) highlight the importance of organisation supporting graduates through advocating and implementing policies in helping graduates to achieve a work life balance and effectively manage aspects of the psychological contract. A study conducted by Arnold, Bosley, and Van Overbeek (2002:479) who reviewed graduates' experience of work in a small organisation, showed that generally

graduates' expectations were exceeded. Due to the study specifically targeting small organisations, there was a view that career development was given in small organisation. In larger organisations, career development is often restricted and unclear (Dermot *et al* 2006:459).

The proceeding question refers to section C contained in appendix B. Section C. This section was an open ended questionnaire; it was designed to express the opinions of the graduates' responses.

4.12 Question Eight: Graduate Current Position

Question eight is designed to determine the current position performed by the graduate. This was to establish whether graduates were able to fulfil management positions in which they were employed.

	Number of Graduates	**% score**
Lower Management	11	15
Middle Management	59	85
Total	70	100

Table 4.7: Graduate current position

Eighty five percent of respondents indicated that they are in middle management positions such as supervisors or are in management advisory service. Only 15% indicated that they were in lower levels of the hierarchy and occupy positions such as in-service trainee and plant operators. These findings are similar to the findings of Keep and Mayhew (2004:299) who found that university graduates occupy management positions in the economy and there were competing interpretations about the outcomes of graduates when they enter the labour market. Graduates expect their qualification to provide opportunities at middle management level and are often unwilling to start at

entry level (Pauw, Oosthhuizen,Van De Westhuizen 2008:56). In addition, employers feel that the return to employing a graduate is low, given that graduates require substantial on the- job- training before they provide any returns to the organisation (Pauw *et al* 2008:56). It is necessary for graduates to have a more realistic view of what they can offer and what they can expect from the labour market. These results suggest that the majority of operations management graduates are able to secure employment at managerial positions.

4.13 Question Nine: Duties performed by the graduate (Appendix B)

The purpose of this question was to establish whether the duties that they perform are related to their qualification. Responses varied depending on the industry that they served. Graduates who were working for the service sector indicated that their duties included activities such as productivity improvement and interventions, work measurement, development of processes, and work sampling. Graduates who were involved in the manufacturing sector stated that their activities included production planning and control, scheduling, and day to day operational duties such as process inspection. These findings indicate that the level of employment attained by these graduates provide an indication of how well the degree or a diploma has prepared the graduate to enter into the market.

4.14 Question Ten: How have you changed personally and professionally from the time that you were initially employed?

Being in the working environment is different from the classroom environment and very often graduates need to adjust to such changes. This question was designed to assess the views of respondents regarding adaptation of graduates to the work environment and ascertain whether the changes have an impact on their personal and professional development. The following were responses from respondents:

- They were more focused and academically driven.
- Have realistic knowledge of employment as the financial aspect involved in life.
- Attained confidence and exposed to practicality.
- Being able to make recommendations to management.

- Involved in budgetary meetings and have grown due to the qualifications of Operations Management.
- Able to think analytically and have become more decisive.

These findings show a significant change between the tertiary life and the workplace environment. These results indicate that graduates have greater responsibility and accountability in terms of their career development.

4.15. Question Eleven: What challenges did you experience with your first employment as a graduate who had little or no industrial experience?

Question eleven was designed to gather information on the problems and obstacles faced by a new graduate who had little or no work experience. Respondents indicated the following obstacles:

- People were reluctant to accept their findings and recommendations.
- Finding a suitable position that is more related to the qualification.
- Adaptation to the workplace and meeting of deadlines.
- Assuring colleagues that conducting process and productivity improvements will not jeopardise their jobs.
- Application of work study in an office environment.

This finding indicates a variety of problems that graduates experience in the workplace. According to Njoku (2008:263), education attainment is a separate issue from the right preparation for the world of work. Therefore, it can be noted that the world of work will have challenges, and these challenges are part of the learning process that can not be attained from higher education.

4.16 Question Twelve: Would you consider changing your career path? Respondents needed to indicate whether they would consider changing their career path. Ninety percent of the respondents stated that they would not consider changing their career path. The respondents indicated the following reasons:

- There is a room for growth and there is a lot that one needs to learn about continuous improvement.

- Still believe there is a potential in the market for people who have Operations Management qualification.
- Working in the production environment is enjoyable because you are able to see results and make improvements where necessary.
- They enjoy working with challenging situations because it enhances their knowledge.

10% of the respondents indicated that they might consider changing their career path and their views were:

- More knowledge is needed to strengthen the Operations Management course and suggested that engineering, in conjunction with operations, would be a perfect match for senior positions.
- They would like to explore fields other than Operations Management.

Mazuki (2011:15) observes that a graduate employee may be dissatisfied with a particular job and consider it a temporary condition, but will not be dissatisfied by the organisation as whole. Therefore, it can inferred that the dissatisfaction of job does not influence the graduate decision on whether to change their career path.

4.17 Question 13: Would you recommend someone else to obtain a qualification in Operations Management. (Appendix B)

The response for question thirteen was positive and indicates a contentment and satisfaction from graduates. The following responses were noted:

- Operations management is relevant to most jobs.
- It provides a wide spectrum.
- There is a demand in the market.
- They would definitely recommend the course to other colleagues.

4.18 Question Fourteen: General Comment (Appendix B)

Respondents were required to provide their general comments on any issues concerning the Operations Management programme. This was needed in order to offer any suggestion and improvements that might enhance the programme. However, 65% of the respondents did not answer the question. The 35% who answered the question provided the following comments:

- They were happy with what they gained, all the knowledge and work through Operations Management.
- Very enlightening course that enabled one to manage the entire plant. Covers every aspect involved in industry but needs technical aspects included to reinforce the quality of the course, knowledge and competency of graduates.
- Organisations need to provide assistance and training, to help new graduates to blend easily in the workplace.

These findings suggest that graduates were content with the level of course content; however, suggestions were made regarding the lack of technical aspect relating to the course.

An open ended questionnaire was designed for the Employers to express their views regarding staff turnover and general comments. Refer to (appendix c).

4.19 Question Nine: What retention strategies do you have to reduce your staff turnover? (Appendix A).

The purpose was to identify whether employees have any retention to keep graduates. This was to determine whether employers do offer graduates with any form of motivation.

For question 4.6 employers responses were varied and indicated the following:

- Fifty five percent of the respondents stated that they offer incentive programmes where above average work is rewarded financially or through leisure activities.

- Ten percent of the respondents indicated that they mix new graduates with experienced members and make provision for skills and career development opportunities and fair remuneration for staff employment practices.
- Fifteen percent of the respondents mentioned that workers are encouraged to be involved in the skill development programmes and acquire additional training offered by the company.
- Twenty Percent of the respondents indicate that they do not have any strategy.

Monetary incentives are monetary rewards paid to employees over and above their normal salaries and wages. A performance bonus is an indication that the organisation recognises extra effort and is different from a traditional pay cheque, which remunerates an employee for his presence and compliance with work standards but does not account for extra effort (Arnolds, Boshoff, Mazibuko and Klems 2010:90). Cardon and Stevenson (2004:298) suggest that monetary incentives are not motivators of increased job performance and in fact they can undermine the process they are intended to enhance. Additionally, the above authors hold the view that employees often resent manipulative powers of monetary incentives and that negative behaviours such as favours from providers of monetary incentive lead to reduced exploration, learning, creativity and progress among employees. These results indicate that the majority of employers do offer incentive and rewards to graduates.

4.20 Question Ten: General Comment

Respondents were required to express their views regarding the general performance of the graduates as well as the relevance of the programme. Respondents indicated the following view:

- Graduates are able to express themselves, especially their communication skill and are willing to learn; however, the period of adjustment should be longer.
- Graduates have the necessary basic skills needed and are well impressed with the way they are able to blend their theoretical knowledge, such as production techniques, into their work.
- Much should be done to promote graduates and give them recognition.

- Graduates tend to have a problem in the initial stages of employment into adjusting properly to the workplace.
- Graduates are able to share ideas and are capable of making sustainable improvements.
- There is a need for organisations to give graduates recognition.
- Genuine and sustained support is essential for the success of any worker for this provides an environment with potential for the work to be fully unleashed and harnessed.
- Graduates have fresh ideas, are well motivated and able to achieve any task given.

The above comment shows a positive response; therefore, it can be concluded that the quality of the course content of operations does meet the expectations of the employers.

4.21 Summary

It is evident from the analysis of the results that graduates were content with the level of achievement obtained through the attainment of the Operations Management qualification. The results show that the majority of graduates were able to secure employment within six to twelve months after the completion of their studies. However, it can also be noted that graduates experience challenges in the workplace such as adaptation to the workplace environment and support from employers in terms of enhancing their self development.

From the employers' perspective, it is noted from the findings that employers are satisfied with graduates' performance, progression and transition from student life to working life.

The following chapter offers conclusions which are drawn from the current research and provides recommendations for future research.

CHAPTER FIVE: CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter will discuss the conclusions and recommendations of the study. The objectives of the study were:

- To assess the views of organisations regarding graduate performance.
- To determine the alignment of the programme to the workplace.
- To evaluate the views of graduates regarding employability and the quality of the course content.
- To provide an overview of quality in terms of CHE and SAQA requirements.

The conclusions and recommendations are discussed under these three objectives. The recommendations will highlight a possible suggestion in enhancing graduate employability and the relevance of the programme to the industry.

5.2 Summary of Theoretical Study

The review of literature was conducted to determine the role of higher education quality programmes, and its effect on graduate employment, the identification of skills that are required by industry and the relevance of work experience in enhancing the graduate's employment prospects. It was inferred that tertiary education is a key investment in developing South Africa's social, intellectual and creative potential.

Graduates and employers perceived higher education to be of good quality when learning content coincides with what happens in the industry. Higher education has a responsibility to produce graduates who can not only compete in the labour market but also make meaningful contributions in that particular field. This study has the potential to contribute to existing literature and knowledge so that prospective graduates and institutions understand issues regarding skills requirement and employability.

The overall institution's quality has a major impact on the competencies of graduates in the workplace; hence, the transformation of learning and knowledge will contribute to

developing the capabilities of an individual for personal enrichment as well as the requirements of social development and employment growth.

From the literature review, it can be inferred that implementing quality practice in higher education, such as quality circles, SWOT analysis, and total quality management are beneficiall to the institution's overall quality image and the needs of stakeholders can be fulfilled.

A University of Technology plays a major role in providing quality education that will be able to meet the needs of industries and the main focus is on the applied value of knowledge and cultivation of job related skills. Therefore, a University of Technology needs to be well informed about the expectations of the external environment so that it will be able to define its roles with regard to the preparation and employment patterns of graduates.

Therefore, establishing a relationship between a University of Technology and industry through programmes such as Work Integrated Learning (WIL), and the use of industry presentation and advisory boards to reflect on, and advise on curriculum issues provides institutions with cutting-edge information of external requirement. However, it is based on the individual student whether he/she is able to utilise the knowledge, learning and skills and practice in the real world environment.

5.3 Summary of Empirical Study

The research findings in chapter 4 showed that graduates found Work Integrated Learning (WIL) to be beneficial in securing the first employment. These findings highlighted the potential role that WIL can play in the development of a graduate. While WIL can provide a bridge between the world of work and the world of education, in developing curriculum, universities must be vigilant and ensure that they understand the world of work and thus the competency demands of the industry.

This study has also shown that employers placed great emphasis on skills such as acquiring of new knowledge, transferring of theoretical knowledge into practice and

leadership. These results showed that employers want graduates with a broad range of competencies. While the employers are generally satisfied with the performance of graduates, there is a performance gap between what employers perceived as important in relation to what graduates regarded as important in terms of performance. Problem solving and concern for quality were viewed as important by most employers. These findings suggest that graduates had a different focus on what was important to them as employees.

The study revealed that job dissatisfaction is not a significant factor in the decision of a graduate to change their career path.

The research findings reported that employers believed that graduates had an acceptable level of computer literacy, but there seemed to be room for improvement in some other skills and performance in the workplace. This suggested that to some extent one could expect that the level of importance employers placed on graduates' quality would be higher than their perception of graduate performance.

It was noted from the research findings that some employers did not have any retention strategies in place. This will result in the organisation's loss of valuable skills required in the workforce. According to McDermot *et al* (2006:467), organisations need to tailor programmes to match the expectations of graduates. Graduates are no longer looking for long term careers in one organisation. Organisations need to ensure that their graduates develop a spirit of cooperation and organisation loyalty.

Based on these research findings, some employers indicated that one of the obstacles to employing a graduate is that graduates spend less than five years in that particular organisation. These findings suggest that employers do not have proper strategies to retain graduates who are more competent and highly skilled.

5.4 Achievement of the research objectives

The aim of this study was to determine if the quality of the ND and BTech: Operations Management graduates are suitable in terms of skills, performance and attitudes for employers. Therefore, the researcher developed four objectives in order to achieve the aim of the study.

The first objective was to assess the views of employers regarding graduates' performance in the workplace. This objective was successfully achieved and the results in chapter 4 revealed that employers were satisfied with the performance of the graduates.

The second objective was to determine the relevance of the curriculum in the workplace. This objective was executed successfully and the review of literature in chapter two reflects that the Operations Management programme is in alignment with the CHE and SAQA requirements.

The third objective was to evaluate the views of graduates regarding the quality of the course content and employment. This objective was accomplished successfully. A pilot study was conducted, questionnaires were distributed to graduates and results were discussed in chapter three. In addition, a total of seventy questionnaires were administered to graduates for the main study and the results were highlighted in chapter 4.

The fourth objective was to provide an overview of quality in terms of CHE and SAQA requirements. This objective was achieved and literature review in chapter two provided an overview of quality in higher education.

5.5 Restriction of the study

The focus area of this study is limited to the Operations Management programme at DUT. Findings are valid for the programme offered at DUT and cannot be generalised for other institutions that offer the same programme. Another limitation is that the study is restricted to graduates who are residing within the eThekwini region. However, these limitations can be used as opportunities for future research. The data utilised by the researcher is derived from the database of the Management Information System (MIS) Department at DUT. However, due to changes on students' personal information, some details could not be verified.

5.6 Recommendations based on findings

Based on the research findings, the following recommendations are proposed:

5.6.1 The Role of Employers in Graduate Development

To address the issues of staff retention, employers need to provide incentives that are relative to the expectations of graduates. Linking the learning value and development of employees in obtaining a higher qualification is shown to be highly valued by the graduate for future plans with the same employer. Thus, employers need to recognise that engaging in partnership with higher education institutions can create a strong employer position that may improve staff retention and facilitate a desire for more senior roles.

Employers need to provide assistance and training to new graduates, to fill the deficiency in terms of workplace skills requirement. It is also advisable that in addition to the qualification, graduates need to attain workplace training, encouraging the link of skills development to career paths, career development and work progression.

5.6.2 Addressing Skill Shortages in the Workplace

It is encouraged that employers should make use of government initiatives such as National Skills Development Strategies (NSDSIII) to address issues of skill imbalances in the workforce. The training of employees addresses critical skills, enabling

productivity, economic growth and the ability of the workforce to adapt to change in the labour market.

Partnership should not only be limited to Higher Education institutions and industry, but this linkage should extend to the departmental programmes recognising the role of community partnership in planning and delivering the needs of stakeholders.

5.7 Recommendations for the Quality of the Graduates

Even though the process of experiential learning is monitored through the use of portfolios and logbooks, these activities should be designed as reflective learning activities as well to provide students with the opportunity to reflect on their skills, abilities, experience and areas of improvement. This should include more information than just a list of tasks completed. They should include assessment of those assignments, special accomplishments, quality of work and interactions with other personnel in the organisation to enhance competencies for future employment.

Graduates indicated that there were challenges with regard to their first employment and adaptation to the workplace environment. These challenges affect their performance and they are unable to deliver what is required of them due to the lack of experience. This is a major cost implication for organisations where they have to weigh the cost of employing a graduate relative to the time to recoup the initial cost. Even though Operations Management incorporated WIL into their programmes, it is recommended that the work experience period be extended to a six months period or a graduate should go through an internship programme as part of the curriculum.

5.8 Future Research

It is suggested that the study should be expanded to include more areas in the KZN region in order to investigate in-depth and to ascertain the views of graduates and employers. The study should expand to other institutions offering the Operations Management programme. It could be useful to determine if employers hold the same

view as graduates regarding the issues of skills, performance and employability prospects of students from other universities of technology.

5.6 Concluding Remarks

The review of literature reveals various aspects that contribute to the quality of a graduate. Quality policies and procedure of the institution, such as the programme review, enhances quality in higher education and has an impact on the competency levels of the graduate. Even though business and higher education differ in terms of the service they offer, both have the same output such as teamwork, leadership and the ability to identify problems and provide solutions. The challenges that graduates experience in the work environment have a negative impact on their performance and productivity. These negative impacts result in graduates seeking employment elsewhere. In doing so, employers are subjected to a loss of valuable knowledge and skills. Employers need to make maximum use of graduates' knowledge and skills. The level of motivation will directly influence graduates to perform at their best, thus contributing to productivity and the prosperity of the organisation.

It was evident from the study that employers required graduates to have certain attributes in the workplace such as the relevance of knowledge and applicability of skills. These attributes serve as the determinants of employment. Employers expressed great satisfaction with the relevance of the Operations Management course. The relevance of the Operations Management course serves as the passport for graduates to gain access to employment in this field.

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Appendix A

Questionnaire: The employer

General Demographic Information

1. Please indicate which sector you are employed?

Manufacturing	
service	

2. Please indicate the Length of years that you've been working for this organization.

2 to 5 years	5 to 10 years	10 to years	More than15 years

- Please read through each statement carefully before giving your opinion.
- For each of the following statement, please indicate the level of agreement.
- The rating is as follows：

1.	**Strongly disagree**
2.	**Disagree**
3.	**Uncertain**
4.	**Agree**
5.	**Strongly Agree**

A	**skills**					
1	Graduate's adapt well to the workplace environment	1	2	3	4	5
2.	Graduates are able to apply their theoretical knowledge into practice	1	2	3	4	5
3.	Graduates have good basic knowledge of Operations Management	1	2	3	4	5
4.	Ability to relate to other people (interpersonal skills)	1	2	3	4	5
5.	Willingness to acquire new skills	1	2	3		5
6.	Ability to work in teams and co-operation	1	2	3	4	5
7.	Good leadership potential and skills	1	2	3	4	5
B	**Performance**					

1.	Ability to formulate creative and original ideas	1	2	3	4	5
2.	Able to use technology	1	2	3	4	5
3.	Ability to think analytically and logically	1	2	3	4	5
4.	Can work under pressure	1	2	3	4	5
5.	Capability in decision making	1	2	3	4	5
6.	Ability in good problem solving	1	2	3	4	5
7	Can work independently	1	2	3	4	5
8.	Have good time management	1	2	3	4	5
9.	Capable to retrieve and analyse information	1	2	3	4	5
10.	Ability to give and receive critism about performance	1	2	3	4	5
C.	**General Demographic Information**					
1.	Concern for quality(wanting to succeed)	1	2	3	4	5
2.	The task that they perform is related to their qualification	1	2	3	4	5
3.	Undergo ongoing professional development	1	2	3	4	5
4.	Graduates are able to improve their qualification	1	2	3	4	5
5.	Organisation is aware of the appropriate NQF(National Qualification Framework) level requirement.	1	2	3	4	5
6.	The organisation have good relations with the university in terms of recruitment of graduates	1	2	3	4	5
7.	University has given graduates adequate preparation to enter the workplace	1	2	3	4	5
8.	The graduates have met my expectations	1	2	3	4	5

9. What retention strategies do you have in place to reduce your staff turnover?

_____
_____
_____

10. **General Comments:-**

_____
_____
_____
_____
_____

Appendix B

Questionnaire: The Graduate

General Demographic Information

1. Please indicate by means of a tick in the appropriate box.

Male	
Female	

17 to 20	21 to 30	31 to 40	More than 40

2. For statistical purpose.

African	Indian	White	coloured

National Diploma	
BTech Degree	

3. Which year did you complete your study?

2005		2006		2007		2008	

4. After completing your diploma, how long did it take you to get your first employment?

3 to 6 Months	6 to 1 year	1 to 2years	2 to Years	More than 3 years

7 Please indicate the sector that you work for.

Manufacturing	
Service	

8 Do you work for the following industries

Food beverages	automotive	Textile	Printing and Packaging	Education	other

- Please read through each statement carefully before giving your opinion.
- Cross only one number for each statement.
- Please return questionnaire after completion.
- For each of the following statement, please indicate the level of agreement.
- The rating is as follows：

1.	**Strongly disagree**
2.	**Disagree**
3.	**Uncertain**
4.	**Agree**
5.	**Strongly Agree**

A	**skills**					
1.	Ability to adapt well to the workplace environment	1	2	3	4	5
2	Ability to apply their theoretical knowledge into practice	1	2	3	4	5
3.	Capable to work in teams and cooperation	1	2	3	4	5
4.	Ability to relate to other people (interpersonal skills)	1	2	3	4	5
5.	Ability to acquire new skills	1	2	3	4	5
B	**Performance**	1	2	3	4	5
1.	Ability to formulate creative and original ideas	1	2	3	4	5
2.	Capable of using technology	1	2	3	4	5
3.	Ability to think analytically and logically	1	2	3	4	5
4.	Ability to work under pressure	1	2	3	4	5
5.	Capable of making decision	1	2	3	4	5
6.	Involved in problem solving	1	2	3	4	5
7.	Ability to work independently	1	2	3	4	5
8.	Have good time management	1	2	3	4	5
9.	Ability to retrieve and analyse information	1	2	3	4	5
10.	Ability to give and receive critism about performance	1	2	3	4	5
11.	Concern for quality(wanting to succeed)	1	2	3	4	5

C.	General Demographic Information					
1.	The task that they perform is related to my qualification	1	2	3	4	5
2.	Undergo ongoing professional development	1	2	3	4	5
3.	I am able to improve my qualification	1	2	3	4	5
4.	I am satisfied with the quality of teaching that I received from the institution	1	2	3	4	5
5.	I am content with the level of my achievement and progression	1	2	3	4	5
6.	The work integrated learning was beneficial to my profession	1	2	3	4	5
7.	The university gave me adequate preparation to enter the workplace	1	2	3	4	5

8. What is your current position?

_____

9. What duties do you perform?

_____

_____

10. How have you changed personally and professionally from the time that you were initially employed?

_____

_____

11. What challenges did you experience with your first employment as a graduate who had little or no industrial experience?

_____

_____

12. Would you consider changing your career path, please elaborate.

_____

_____

13. Would you recommend someone else to obtain a qualification in Operations/Production Management?

_____

_____

14. **General Comments:-**

_____

_____

Thank you for participating in this study!

Appendix C: The covering Letter

02 June 2010

Sir/Madam

I'm a master's student at the Durban University of Technology and I am currently engage in a study entitled, the Quality of Graduates from the Department of Operations and Quality Management at the Durban University of Technology.

I humbly appeal for your co-operation in this research study, I would appreciate if you could kindly complete the questionnaire. The questionnaire would take approximately twenty minutes to complete. You are permitted to request the summary of the results of the study, if so desired.

Confidentiality of the information will be respected.

Yours Sincerely

N.Nogaya

Tel: 031 373 5343
Cell: 0835128388
Email: noloyison@dut.ac.za

I consent to participate in this study

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Signature of Participant Date

Appendix D:

Communality Scores for each Category

Category	Communality score/extraction n
Ability to apply theoretical knowledge into practice	0.516
Capable to work in teams and cooperation	0.626
Ability to relate to other people (interpersonal skills)	0.693
Ability to acquire new skills	0.414
Ability to formulate creative and original ideas	0.782
Ability to use technology	0.573
Ability to think analytically and logically	0.492
Can work under pressure	0.418
Capability in decision making	0.569
Involved in problem solving	0.616
Ability to work independently	0.510
Self management(time management and self confidence)	0.355
Retrieval and analysis of information	0.455
Recognition of different views	0.409
Concern for quality (wanting to succeed)	0.489
The task performed is related to the qualification	0.423
Undergo ongoing professional development	0.614
Able to improve my qualification	0.561
Quality of teaching meets NQF levels	0.690
Content with the level of achievement and progression	0.467
Work integrated learning was beneficial to the profession	0.583
University training meets industry needs	0.632