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Quality assurance in higher education : a managerial perspective at a university of technology

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Cape Peninsula
University of Technology

**QUALITY ASSURANCE IN HIGHER EDUCATION: A MANAGERIAL
PERSPECTIVE AT A UNIVERSITY OF TECHNOLOGY**

by

MALEECKA HARRIS

Dissertation submitted in fulfilment of the requirements for the degree

Magister Technologiae: Quality

in the Faculty of Engineering

at the Cape Peninsula University of Technology

Supervisor: A. Bester


Co-supervisor: Prof. Dr. J A Watkins D. Phil., D. Com., Ph. D.

Bellville

November 2008

DECLARATION

“I Maleecka Harris, hereby declare that the contents of this dissertation submitted for the degree Magister Technologiae at the Cape Peninsula University of Technology, represent my own original unaided work, and that the dissertation has not previously been submitted to any other institutions of higher education towards any qualification. I further declare that all sources cited or quoted are indicated and acknowledged by means of a comprehensive list of references. Furthermore, it represents my own opinions and not necessarily those of the Cape Peninsula University of Technology”.

A handwritten signature in black ink, appearing to read 'Maleecka Harris', with a long horizontal flourish extending to the right.

Maleecka Harris

November 2008

DEDICATION

This study is dedicated to my mother Jasmine, sister Shamiela, brother Azis, niece Kishaan, boyfriend Dillon and friends for their unconditional love and support.

ACKNOWLEDGEMENTS

“I would like to express my sincerest gratitude and appreciation to the following:
The Lord our saviour for giving me the patience and wisdom to complete my dissertation.

CPUT for granting me a study bursary.

Mr Patrick McLaren the Head of Department for his encouragement and support.

My supervisor Mr Andre Bester for his guidance and support.

My co-supervisor Prof. Dr. J. Andre Watkins for his guidance and support.

My colleagues for their support”.

ABSTRACT

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Title: Quality Assurance in Higher Education: A
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Increasing customer demand for quality products and services have virtually forced organisations to adopt quality in every aspect of their business enterprises. Due to dynamic technological, political and economic changes in the world of business, the science of management is volatile. Higher Education Institutions are service providers and the customers thereof should be the focal point of their existence, requiring very specific structures to manage service quality within the various areas of application.

After extensive research on customer complaint behaviours, the value of customer complaints have been highlighted, as it leads to useful insight into critical aspects pertaining to service organisations. Some customers ‘pre-plan’ complaints, and this act has been labeled as ‘faked complaints’. This may lead to the organisation obtaining an image of service failure, however this is not a true representation of the organisation, thus impacting adversely on the efficiency of the organisation.

The primary research objectives of this study are the following:

- To identify key drivers underpinning complaints at the Cape Peninsula University of Technology (CPUT), in terms of service delivery.

- To determine if management has a strategic focus on the quality of service to students at CPUT.
- To demonstrate the impact that management has on the quality of service delivery.
- To improve customer service at CPUT by minimizing complaints.

It is anticipated that the research will lead to an improvement in the current state of service delivery at CPUT. By identifying and providing possible solutions to customer complaints and addressing problem areas, the research in addition should lead to improved communication between departments and communication between CPUT and its customers (students).

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CHAPTER 1: SCOPE OF THE RESEARCH

1.1 INTRODUCTION AND MOTIVATION

In the early 20th century, the foundation stone of a building in Cape Town that would later house the Cape Peninsula University of Technology was laid. During 1920 and 1962, the Cape Technical College and Peninsula Technical College was established respectively (CPUT, 2008a:Online). During the Apartheid era prior to 1994, the Peninsula Technical College catered for the Coloured community and was relocated from Cape Town to Bellville in 1967. The two Colleges were established as Technikons in 1979. The Cape Peninsula University of Technology (CPUT) was established following the merger of the Cape Technikon and the Peninsula Technikon in January 2005. The University has seven campuses throughout the Western Cape, and it consists of six faculties. The first Vice-Chancellor, Prof L Vuyisa Mazwi-Tanga, of the Cape Peninsula University of Technology, was appointed in February 2006.

Increasing customer demand for quality products and services have virtually forced organisations to adopt quality in every aspect of its business enterprises. Due to dynamic technological, political and economic changes in the world of business, the science of management is unstable (Ehlers, 2004:1). Higher Education Institutions are service providers and as a result, the customer should be the focal point of their existence. The question which arises is what structures are required to manage service quality within Higher Education Institutions?

Due to the intangible nature of services, it is difficult to determine whether the service that CPUT offer, ensures that a high level of quality is maintained. As a result, the researcher intends to provide insight and potential solutions to this problem by conducting research into the following aspects:

- Management.
- Continuous Improvement.
- Six Sigma.
- Quality.

- Lean.
- Total Quality Management (TQM).

Higher Education Institutions' primary business function should be to meet or exceed customer (student) expectations, in order to deliver exceptional quality service. The researcher is in contact with customers both internally and externally on a daily basis, where complaints on the quality of customer service provided is more the norm, than the exception. This leads into the question of how this particular problem of service delivery can be addressed, to ultimately mitigate the problem?

1.2 BACKGROUND TO THE RESEARCH PROBLEM

Atalic (2007:409), is of the opinion that organisations view complaints as, “. . . not only an unpleasant fact of business life, but also a waste of time and money in investigating these concerns”. Furthermore, many front-line employees suggest to customers that lodging a complaint may not be appropriate under certain circumstances, while only 10 percent of dissatisfied customers lodge formal complaints.

It is imperative that organisations should encourage customer complaints (Bennet, 1997; Prim and Pras, 1999; Dewitt and Brady, 2003; Snellman and Vihtkari, 2003 cited by Reynolds and Harris 2005:321) as it leads to useful insight into the nature of complaints. According to Day *et al.* 1981 (cited by Reynolds and Harris 2005:322), some customers 'pre-plan' complaints and this act has been labeled as 'faked complaints'. This may lead to the organisation obtaining an image of service failure, however this is not a true representation of the organisation, thus impacting adversely on the efficiency of the organisation.

1.3 STATEMENT OF THE RESEARCH PROBLEM

Against the above background the research problem to be researched within the ambit of this dissertation reads as follows: “Management at CPUT is not

strategically focused on the quality of service to students, impacting adversely on the efficiency of the organisation”.

1.4 THE RESEARCH HYPOTHESIS STATEMENT

The research hypothesis to be researched in this dissertation reads as follows:

H₀: Management has a strategic focus on the quality of service to students at CPUT, having a positive impact on the efficiency of the organisation.

H₁: Management does not have a strategic focus on the quality of service to students at CPUT, having a negative impact on the efficiency of the organisation.

1.5 INVESTIGATIVE (SUB-) QUESTIONS

The investigative questions to be researched in support of the research hypothesis reads as follows:

- Are there clear tangent planes between management, Six Sigma and quality?
- To what extent is management responsible for quality assurance?
- What are the key drivers of continuous improvement in an organisation?
- Does Six Sigma hold the key to improvement in an organisation?
- To what extent does quality management improve the efficiency of an organisation?

1.6 PRIMARY RESEARCH OBJECTIVES

The primary research objectives of this dissertation, the following:

- To identify key drivers underpinning complaints at CPUT in terms of service delivery.
- To determine if management has a strategic focus on the quality of service to students at CPUT.
- To demonstrate the impact that management has on the quality of service delivery.
- To improve customer service at CPUT, by minimizing complaints.

1.7 THE RESEARCH PROCESS

The research process provides insight into the process of ‘how’ the research will be conducted from developing the proposal to submitting the dissertation. Remenyi, Williams, Money and Swartz (2002:64-65), explains that the research process as consisting of eight specific phases, which will also be applied to this research study. The phases include:

- Reviewing the literature.
- Formalising a research question.
- Establishing the methodology.
- Collecting evidence.
- Analysing the evidence.
- Developing conclusions.
- Understanding the limitations of the research.
- Producing management guidelines or recommendations.

1.8 RESEARCH DESIGN AND METHODOLOGY

Descriptive research will be conducted in this dissertation, which will take place in the social world. The research will be theoretical in nature using a phenomenological research paradigm as basis. Case study research will serve as the research method. Case study research mainly falls in the qualitative research paradigm, but it could also be applied within the quantitative research paradigm, as in the instance of this research study. According to Yin (1994:1) case study research can be applied in the following areas:

- Policy, political science and public administration research.
- Community psychology and sociology research.
- Organisational and management studies.
- City and regional planning research.
- Research into social science, the academic disciplines as well as professional fields such as business administration, management sciences, and social work.

Case studies essentially investigate events in its real-life context and it addresses the following: It answers ‘How’ and ‘Why’ questions, and explore events and aids

the understanding thereof in a particular context. It is seen as an all-inclusive research strategy when contextual conditions are the subject of the research.

Four types of case studies can be identified namely, descriptive, illustrative, experimental and explanatory case studies. Collis and Hussey (2003:68-70), implies that case studies are used in areas where there's an inadequate amount of knowledge. Yin (1994:20-27), focuses on the important elements of case study research design, namely:

- Study questions.
- Study propositions.
- Unit of analysis.
- Linking data to propositions.
- Criteria for interpreting findings.

1.9 DATA COLLECTION DESIGN AND METHODOLOGY

Questionnaires will serve as the data collection methodology, as it falls within the broader definition of 'survey research' or 'descriptive survey'. Remenyi *et al.* (2002:290), defines the concept of 'survey' as: ". . . the collection of a large quantity of evidence usually numeric, or evidence that will be converted to numbers, normally by means of a questionnaire". A questionnaire consists of a list of questions compiled in order to elicit reliable responses from a chosen sample with the aim to determine what the participants do, think or feel. There are two approaches in structuring questions namely, positivistic (structured 'closed' questions) and phenomenological (unstructured 'open-ended questions).

The sample frame will consist of students and management of CPUT, whereas the sample will be drawn randomly from students and management. Fifteen to twenty managers will be surveyed, while 100 students will be surveyed.

1.10 DATA VALIDITY AND RELIABILITY

According to Collis and Hussey (2003:186), 'validity' is concerned with the extent to which the research findings accurately represents what is happening.

More specific, whether the data is a true picture of what is being studied. According to Cooper and Schindler (2006:318-320), three major forms of validity can be identified, namely ‘content validity’, ‘criterion-related validity’ and ‘construct validity’.

Reliability (also referred to as ‘trustworthiness’), is concerned with the findings of the research (Collis & Hussey, 2003:186). The findings can be said to be reliable if you or anyone else repeated the research and obtained the same results. There are three common ways of estimating the reliability of the responses to questions in questionnaires or interviews, namely:

- Test re-test method.
- Split halves method.
- Internal consistency method.

1.11 ETHICS

In the context of research, according to Saunders, Lewis and Thornhill, (2001:130), “. . . ethics refers to the appropriateness of your behaviour in relation to the rights of those who become the subject of your work, or are affected by it”.

The following ethics will be observed in the research study:

- **Informed consent:** Participants should be given the choice to participate or not to participate, and furthermore be informed in advance about the nature of the study.
- **Right to privacy:** The nature and quality of participants’ performance must be kept strictly confidential.
- **Honesty with professional colleagues:** Findings must be reported in a complete and honest fashion, without misrepresenting what has been done or intentionally misleading others as to the nature of it. Data may not be fabricated to support a particular conclusion.
- **Confidentiality/Anonymity:** It is good research practice to offer confidentiality or anonymity, as this will lead to participants giving more open and honest responses.

1.12 RESEARCH ASSUMPTIONS

The following assumption applies to the research:

- CPUT complies with the Higher Education Qualifications Committee's (HEQC) guidelines.

1.13 RESEARCH CONSTRAINTS

The following constraints apply to the research:

- Availability of managers may pose as a constraint to the research.
- The research is limited to the CPUT, Bellville campus.

1.14 CHAPTER AND CONTENT ANALYSIS

The following chapter and content analysis will be applicable to the research study:

- **Chapter 1 - Scope of the research:** In this chapter, a high level background will be provided of the scope of the research taking place within Higher Education Industry. The research process will be explained and the research design and methodology elaborated upon. The research constraints will be listed, and a high level overview provided of the chapter and content analysis of the dissertation. The chapter will be concluded with a list of primary research objectives.
- **Chapter 2 - Holistic perspective of the research environment:** In this chapter, service delivery to students at CPUT will be analyzed in detail. Specific focus will be leveled at external and internal factors, which impact the service sector of the industry. This focus will in particular be centered on the impact of management on quality assurance.
- **Chapter 3 - Quality management (A literature review):** In this chapter, an in depth literature review will be inducted on the concept of 'service quality'.
- **Chapter 4 - Data collection design and methodology:** In this chapter, the survey environment will be elaborated upon and the de-limitations of the survey listed. The approach to data collection will be explained and the target population defined. The measurement scales to be used in the survey and the

survey design will be explained in detail. The chapter will be concluded with a list of questions to be posed to the target population.

- **Chapter 5 - Data analysis and interpretation of results:** In this chapter, data gleaned from the survey conducted within the ambit of chapter 4, will be analyzed in detail and interpreted in terms of the primary theme of the dissertation. In addition, the results from the survey will be mapped to the literature review conducted within the ambit of chapter 3.
- **Chapter 6 – Conclusion:** In this chapter, the research will be concluded. The research problem, research hypothesis, investigative questions and key research objectives are revisited and final conclusions drawn. In addition, recommendations will be made to mitigate the research problem.

1.15 CONCLUSION

In this chapter an introduction and motivation was provided to substantiate the need for the research to be conducted. The aim of the research is to address the current state of service delivery students at CPUT and to improve the efficiency of the organisation. In order to achieve the above, the researcher will address the following research problem which reads as follows: Management at CPUT is not strategically focused on the quality of service to students, impacting adversely on the efficiency of the organisation.

The researcher intends to investigate the problem by working through the research process by way of the research hypothesis and investigative (sub-) questions. It is anticipated that this will ultimately lead to the achievement of the primary research objectives, which reads as follows:

- To identify key drivers underpinning complaints at CPUT in terms of service delivery.
- To determine if management has a strategic focus on the quality of service to students at CPUT.
- To demonstrate the impact that management has on the quality of service delivery.
- To improve customer service at CPUT, by minimizing complaints.

This chapter served as the basis for the proposed research and served as background information to chapter two, which will provide for a holistic perspective of the research environment.

CHAPTER 2: A HOLISTIC PERSPECTIVE OF THE RESEARCH ENVIRONMENT

2.1 INTRODUCTION TO THE RESEARCH ENVIRONMENT

The research takes place within the higher education industry in South Africa. With reference to the Cape Peninsula University of Technology (CPUT) of which there are seven campuses throughout the Western Cape. Emphasis will be placed on service delivery to students at CPUT's Bellville campus, which consist of six faculties. The internal and external factors that impact the service sector of this industry will be analyzed and this focus will specifically be centered on the impact of management on quality assurance.

The six faculties, which will be researched are:

- Applied Science.
- Business.
- Education & Social Science.
- Engineering.
- Health and Wellness Science.
- Informatics and Design.

Yeo (2008:267) citing Lewis & Smith (1994), states that due to increasing competition in the service industry, organisations are forced to focus on their internal and external customers, due to the intangible nature of services and the fact that in most instances, no actual products are involved. According to Gapp and Fisher (2006) and O'Neil and Palmer (2004) cited by Yeo (2008:267), an example of the competition as mentioned above would be that of the use of virtual technology to deliver courses, and as a result service quality has become the means for institutions to capture the education market and retain students. Furthermore according to Yeo (2008:267), higher education falls within the service sector, as the primary focus of tertiary institutions are to deliver quality learning experiences to customers (students).

2.2 DEFINING THE CUSTOMER

Eagle and Brennan (2007:44), are of the opinion that, “. . . people who pay for a service are customers”. From the above definition it is evident that anyone who pays for a good or service is seen as a ‘customer’. However, if the statement above applies to anyone, the question can be asked if this include education and is students at higher education institutions seen as customers? Eagle and Brennan (2007:44), found that students at higher education institutions in the United Kingdom are expected to pay an increasing percentage of their tuition themselves, therefore there is a tendency to refer to them as ‘customers’. Eagle and Brennan (2007:44), as a result suggest that a clear or proper interpretation of the ‘student as customer’ concept in higher education should be developed, as this will be of value to policy makers and managers.

Furthermore, Eagle and Brennan (2007:45), found that the interpretation of the ‘student as customer’ concept originated from the Total Quality Management (TQM) movement (in the manufacturing industry), due to its ‘mechanistic standardised production emphasis’ embedded in the movement, which caused discomfort when applied in the education industry (Lagrosen *et al.*, 2004; and Scrabec, 2000 cited by Eagle and Brennan 2007:45).

Controversially, Douglas, Douglas and Barnes (2006:251), are of the opinion that students of higher education institutions are direct recipients of the services provided by universities, while Crawford (1991) cited by Douglas *et al.* (2006:251), suggests that students in the UK are considered as the ‘primary customers’ of a university. The Higher Education Funding Council for England (HEFCE) introduced a National Student Survey, which basically confirms the status of the ‘student as customer’.

Svensson and Wood (2007:17) citing Shurpe (1999), states that from a marketing perspective the relationship between customer-supplier or buyers-seller is inappropriate for the student-university relationship. Due to the fact that the relationship is not exclusively based on the purchase and use of a product. Irrespective of this misinterpretation of the student-university relationship in

institutions, it is however based on the level of interaction between the following three components, namely the product, the consumer and the supplier.

2.3 THE BASIC PRINCIPLES OF TOTAL QUALITY MANAGEMENT AS APPLIED IN HIGHER EDUCATION

Eagle and Brennan (2007:45), list the following as the basic principles of Total Quality Management (TQM) as applied in higher education:

- **Delight the customer:** In essence it is about meeting and exceeding customer expectations while bearing in mind that customer expectations change over time.
- **People based management:** Encouraging people to take responsibility for their work by, “. . . knowing what to do and how to do it and getting feedback on performance.”
- **Continuous improvement:** In order to move toward total quality, requires continuous improvement or incremental change.
- **Management by fact:** It is imperative that management have the facts necessary to manage the organisation at all levels. As a result, information regarding current performance of products or services in the customers' hands are essential.

Knji & Tambi (1999) cited by Eagle and Brennan (2007:45), states that, “. . . giving that information to people so that decisions are based on facts rather than 'gut feelings' is essential to continuous improvement”.

2.4 QUALITY IN HIGHER EDUCATION

Universities cannot ignore quality due to the deemphasizing of the customer concept (Sharrock, 2000 cited by Eagle and Brennan, 2007:47). According to Eagle and Brennan (2007:47), TQM is based on customer defined quality, rather than to technical quality as defined by engineers. The Quality Assurance Agency for Higher Education (QAA) in the United Kingdom defines quality in higher education as follows: “Academic quality is a way of describing how well the learning opportunities available to students help them to achieve their award. It is

about making sure that appropriate and effective teaching, support, assessment and learning opportunities are provided for them” (QAA, 2004 cited by Eagle and Brennan, 2007:47).

2.5 HIGHER EDUCATION STRUCTURES IN SOUTH AFRICA

2.5.1 Council on Higher Education (CHE)

In 1998, the Council on Higher Education (CHE) was established in terms of the Higher Education Act, No 101 of 1997 (Council of Higher Education, 2008:Online). This Act and the Education White Paper 3 of 1997, a programme for the Transformation of Higher Education, basically established the CHE’s responsibilities as advising the Minister of Education regarding all policy issues related to higher education. The CHE is also responsible for training and quality assurance within higher education, and as a result, the Act, the White Paper and the Higher Education Quality Committee called for closer scrutiny in terms of content quality.

2.5.2 The Higher Education Act 101 of 1997

The Higher Education Act (South Africa, 2008a:Online) was formulated to:

- Regulate higher education.
- To provide for the establishment, composition and functions of a Council on Higher Education.
- To provide for the establishment, governance and funding of public higher education institutions.
- To provide for the appointment and functions of an independent assessor.
- To provide for the registration of private higher education institutions.
- To provide for quality assurance and quality promotion in higher education.
- To provide for transitional arrangements and the repeal of certain laws.
- To provide for matters connected therewith.

2.5.3 Education White Paper 3: A Programme for the Transformation of Higher Education:

South Africa's transition from apartheid and minority rule to democracy requires that all existing practices, institutions and values are viewed anew and rethought in terms of their fitness for the new era. Higher education plays a central role in the social, cultural and economic development of modern societies. In South Africa today, the challenge is to redress past inequalities and to transform the higher education system to serve a new social order, to meet pressing national needs, and to respond to new realities and opportunities. It must lay the foundations for the development of a learning society, which can stimulate, direct and mobilise the creative and intellectual energies of all the people towards meeting the challenge of reconstruction and development.

The Education White Paper 3 (South Africa, 2008b:Online), outlines a comprehensive set of initiatives for the transformation of higher education through the development of a single co-ordinated system with new planning, governing and funding arrangements.

2.5.4 The Higher Education Quality Committee (HEQC)

The Higher Education Quality Committee (HEQC) is a sub-committee of the Council on Higher Education (CHE). The goals the CHE would like to accomplish and listed by Anonymous 5 (2008:Online), reads as follows:

- By providing informed, considered, independent and strategic advice on Higher Education (HE) policy issues to the Minister of Education.
- Through the quality assurance activities of its sub-committee, the Higher Education Quality Committee (HEQC).
- Through publications and through broader dissemination of information, and through conferences and workshops on HE and other focused activities.

The Cape Peninsula University of Technology is an accredited provider of higher education, and adheres to the guidelines as set out in the Higher Education Quality Committee. One of the HEQC's responsibilities is to collect data regarding

students' achievement from accredited providers in the prescribed format and submit it to the South African Qualifications Authority (SAQA). This data is then included in the National Learners' Records Database (NLRD). The HEQCIS system was developed in order to collect this data from the respective private providers of higher education. However, the data from public higher education providers are not included in this system, as this data is directly submitted by the Department of Education (DoE) to SAQA. Once the data is received from public providers, the data is processed by the DoE's Higher Education Information System (HEMIS).

2.5.5 South African Qualifications Authority (SAQA)

SAQA is a body consisting of twenty nine members. These members were nominated by identified national stakeholders in education and training, who were appointed by the Minister of Education and Labour. According to SAQA (2008: Online), the Authority's functions include the following:

- To oversee the development of the National Qualifications Framework (NQF), by formulating and publishing policies and criteria for the registration of bodies responsible for establishing education and training standards or qualifications, and for the accreditation of bodies responsible for monitoring and auditing achievements in terms of such standards and qualifications.
- To oversee the implementation of the NQF by ensuring the registration, accreditation and assignment of functions to the bodies referred to above, as well as the registration of national standards and qualifications on the framework. It must also take steps to ensure that provisions for accreditation are complied with and where appropriate, that registered standards and qualifications are internationally comparable.

SAQA advises the Minister of Education and Labour, and all tasks performed by it will only be put in motion once consultation with all bodies and institutions responsible for education and training have taken place. The Authority is required to comply with various rights and powers of bodies (in terms of the Constitution and Acts of Parliament), and it is also responsible for implementing policies and decisions. According to SAQA (2008: Online), the NQF, “. . . is a set of

principles and guidelines by which records of learner achievement are registered to enable national recognition of acquired skills and knowledge, thereby ensuring an integrated system that encourages life-long learning”.

2.6 FACTORS THAT IMPACT THE SERVICE SECTOR

2.6.1 Customer expectations

According to Johns and Howard (1998:250), the theory on expectancy-disconfirmation assumes that the expectations customers have regarding a service are qualitatively adequately similar to their perceptions of performance. Furthermore, this will enable the direct measurement of the differences between the two variables (Johns & Howard, 1998:250). John and Tyas (1997) cited by Johns and Howard (1998:250), found that previous critical incidences and culture has a strong influence on a customer’s expectation and perception of service performance. Johns and Howard (1998:250), are of the opinion that “. . . expectations are the basis upon which customers select and judge services”. Furthermore, an understanding of the customer’s dimensionality, will provide insight into the following:

- The satisfaction process.
- The most appropriate way to measure service quality.
- The design of services to best match customers’ needs.

2.6.2 Customer perceptions

According to Johns and Howard (1998:249) citing Bolton and Dew (1991), and Oliver (1980), that research on service quality originated from the expectancy-disconfirmation theory, which states that the customers’ perception of service quality is the difference between their expectations and the actual service performed. Furthermore, when service performance exceeds expectations, disconfirmation is positive, and negative when the opposite occurs (Johns & Howard, 1998:249).

Douglas *et al.* (2006:254) citing Galloway (1999), found that the faculty administration office at a university in the UK had a profound impact on the students' perception on service quality, thus influencing their perception of the entire institution, and it also had a direct impact on technical and academic staff. Furthermore, Douglas *et al.* (2006:254), found that front-line staff directly impact on other clients, students and potential students, and the main predictors of quality are as follows:

- Office having a professional appearance.
- Staff who are dressed smartly.
- Staff never too busy to help.
- Opening hours are personally convenient.

The service - product bundle to follow is based on students' perception of service quality (Douglas *et al.* 2006:252).

2.6.3 The service-product bundle

Douglas *et al.* (2006:252), refers to the service-product bundle as a group of goods and services offered inseparably to students, which consists of the following:

- **The physical or facilitating goods:** This includes lectures, presentation slides and course material.
- **The sensual service provided – the explicit services:** Refers to knowledge levels of staff, teaching ability and consistency of teaching quality regardless of personnel.
- **The psychological service – the implicit service:** This includes friendliness and approachability of staff, respecting students' feelings and opinions, and showing concern towards student problems.

2.6.4 Facilities

The results reported from a survey at various universities by Price *et al.* (2003) cited by Douglas *et al.* (2006:253), on undergraduate students choice of universities, returned the following eight reasons for selecting a particular university:

- The right course.
- Availability of computers.
- Quality of library facilities.
- Good teaching reputation.
- Availability of 'quiet' areas.
- Availability of self study areas.
- Quality of public transport.
- Friendly attitude towards students.

The following two factors decrease student satisfaction: Firstly large class sizes tend to decrease satisfaction, and secondly, compulsory core modules as opposed to optional models (Coles, 2002 cited by Douglas *et al.*, 2006:253). Douglas *et al.* (2006:254) citing Banwet and Datta (2003), states that services are delivered to people by people, and the quality of any service encounter has an impact on a universities' image. As a result, students' interaction will impact all service offerings whether delivered by front-line contact staff (lecturers) or non-contact staff (e.g. management), who should adhere to the principles of quality customer service in order to deliver 'total student satisfaction' (Douglas *et al.*, 2006:254 citing Banwet & Datta, 2003).

2.7 MECHANISMS USED TO MEASURE STUDENT SATISFACTION

Douglas *et al.* (2006:251), are of the opinion that the National Student Survey referred to under Paragraph 2.2, is aimed at obtaining students' views with regard to teaching, assessment and support rendered in the form of courses and the university. According to Douglas *et al.* (2006:251), Government and Funding Bodies will use the results of the survey to produce league tables of university performance, and the position on the league will ultimately have an impact on the universities image. James *et al.* (1999) cited by Douglas *et al.* (2006:251), found that image impacts heavily on customer retention as well as attracting potential customers, therefore customer retention and recruitment was seen as the most important item on many universities' agendas by the HEFCE.

Universities desire to increase its student population to meet Government targets, as poor retention rates impact negatively on funding for institutions (Rowley 2003a, cited by Douglas *et al.* 2006:251). There is a strong correlation between student satisfaction, retention and recruitment, and as a result universities and management view student satisfaction as an important issue (Douglas *et al.* 2006:251-252), Furthermore Douglas *et al.* (2006: 252), states that by minimizing dissatisfaction, the organisation will improve its performance within league tables.

2.8 A PERSONAL PERSPECTIVE ON SERVICE DELIVERY AT CPUT

Many students with whom the researcher interacts on a daily basis whether in person or via telephone, often complain about having been shunted around from ‘pillar to post’ in the various departments. Students also complain about having to wait in long queues in general at the following service points:

- During registration periods,
- at their respective faculties,
- cashiers,
- financial aid, and
- housing (on campus accommodation) etc.

Furthermore students often complain about the services rendered by the following departments:

- The Library,
- the Information Technology Centre,
- the Exam Department, and at
- Administration (cashiers and student debtors).

2.9 SIGNIFICANCE OF STUDENT FEEDBACK

Rowley (2003b) cited by Douglas *et al.* (2006:252-253), points out that the following are the key motives for student feedback:

- Providing audit evidence that students were availed the opportunity to provide comments with regard to courses, for improvement purposes.

- Encourage reflection on learning (in terms of student reflection).
- Will allow benchmarking to take place, which leads to the providing of indicators that will contribute to the universities reputation in the market.
- To avail students the opportunity to express their level of satisfaction with regard to their experience.

2.10 SIGNIFICANCE OF MANAGERMENTS' ROLE IN QUALITY ASSURANCE

According to Becket and Brookes (2006:126) citing Cheng and Tam (1997), there are two constituents in the quality management process, namely 'internal' and 'external' stakeholders. Employers, government funding bodies, prospective students, professional bodies and institutional management are viewed as external stakeholders, whereas current students and frontline staff are viewed as internal stakeholders. Furthermore, according Becket and Brookes (2006:126) citing Borahan and Ziarati (2002:914), conventional quality assurance procedures are associated with external stakeholders, while quality assurance refers to the, "planned and systematic actions (deemed) as necessary to provide adequate confidence that a product or service will satisfy given requirements for quality".

McKay and Kember (1999) cited by Becket and Brookes (2006:126), states that external bodies usually impose the following two assurance mechanisms, namely 'accreditation' and 'quality audits'. The role of the external stakeholders' quality focus is 'primarily measurement of procedures' and the 'extent to which the outcome amounts to appropriate levels of quality' (Becket & Brookes. 2006:126).

2.11 CONCLUSION

This chapter provided the reader with a holistic perspective of the research environment where the research is to be conducted. The investigation takes place at CPUT Bellville campus throughout its six faculties as elaborated upon in Paragraph 2.1, where emphasis will be placed on service delivery and the customer. The factors that impact the service sector were also identified in order to aid management in assuring quality at the organisation. In Chapter three, a

literature review will be conducted on the concept of 'Quality Management' where aspects pertaining to Quality Management, Continuous improvement, Quality improvement mechanisms, Quality assurance and the concept of TQM will be addressed.

CHAPTER 3: QUALITY MANAGEMENT: A LITERATURE REVIEW

3.1 INTRODUCTION AND BACKGROUND

This chapter serves as the natural progression from chapter two, as it will provide the reader with an in depth review of the literature pertaining to the subject of quality management. Emphasis will be placed on the importance of managements' role in assuring quality.

Peters (1999:6), suggests that quality management was mooted from two ideas on how to improve the running of an organisation, namely 'customers' and 'efficiency'. Firstly the organisation needs to identify customer needs and expectations and ensure that these needs and expectations are met to encourage repeat purchase and attract further customers by word of mouth. Secondly, the organisation need to determine the most efficient manner in which to produce a product or service, without wasting time and resources on rework or delivering an unsatisfactory product or service. In so doing, the organisation will be more efficient or successful.

Against the above background, quality is about simplicity and designing out potential mistakes. Peters (1999:7) states that, ". . . the simpler a service or production process is, and the simpler the surrounding and supporting processes, the more likely they are to be right". Furthermore, Peters (1999:7) found that by designing out mistakes will lead to cost saving because mistakes tend to be expensive and difficult to rectify. For example, should an organisation have a complex service process, it will be more beneficial to the organisation to design it in such a manner that mistakes are less likely to occur, as opposed to trying to catch them (mistakes) when they occur (Peters, 1999:7). "You cannot inspect quality in at the end of a process, but you can design it in from the start" (Peters, 1999:7).

3.2 QUALITY MANAGEMENT DEFINED

“Quality management is a method for ensuring that all the activities necessary to design, develop and implement a product or service are effective and efficient with respect to the system and performance” (Anonymous 3, 2008:Online). Quality management consists of three components namely, ‘quality control’, ‘quality assurance’ and ‘quality improvement’. Foster (2001:23), points out that quality control and quality assurance are important elements in quality management. In this respect see the discussion in Paragraph 3.5.5 of this chapter. Quality management focuses on both product quality, and the means to achieve it. Quality assurance, process control and products are used by quality management in order to achieve more consistent quality. Furthermore, according to Anonymous 3 (2008:Online), determining quality policies, objectives and the implementation thereof within a quality system could be described as ‘quality management’.

3.3 EVOLUTION OF QUALITY MANAGEMENT

According to Anonymous 3 (2008:Online), societies who support the arts and crafts, allow customers to select the finest goods that are rated higher in terms of quality’ compared to other goods. The master craftsman’s responsibility was to lead and train the craftsmen. The master craftsman also set the standards and ordered rework if necessary. The advantage of the craft approach was that each item was produced or tailored to meet each customer’s individual expectations. The disadvantage of the approach was that few goods were produced due to constant rework. This approach to quality and practices served as major input to the establishment of quality management as a management science.

The significance of craftsmanship diminished during the industrial revolution because mass production was instituted. Furthermore according to Anonymous 3 (2008:Online), the intention was to produce large numbers of the same goods consisting of interchangeable parts. This in particular is evident in the manufacturing of muskets by Eli Whitney where the process included the manufacturing of interchangeable parts. As a result of the approach to musket

manufacturing, the assembly line was created by Henry Ford who also instituted quality management practices in the process of motor vehicle manufacturing. Frederick Taylor, a mechanical engineer, also known as ‘the father of scientific management’, with his work on Efficiency Movement laid the foundation for quality management as well as the concept of ‘standardization’.

3.4 DEFECTS OF MANAGEMENT THEORY

According to Carson *et al.* (1999) cited by Anderson, Erickson and Torstensson (2006:282), the following are the major defects of management theory:

- It is constitutionally incapable of self-criticism.
- Its terminology and industry-specific jargon rather confuse than inform.
- It rarely rises above common sense.
- It is replete with fads and plagued with contradictions that would be intolerable in other scientific disciplines.

3.5 MANAGEMENT AS A SERVICE

Foster (2001:101), is of the opinion that, “quality is strategic”, and as a result of being reactive rather than proactive, organisations fail to plan effectively. Designing and assuring quality in organisations requires strategic quality planning, which is imperative for sustainability. Strategic planning consists of the dimensions ‘content’ and ‘process’. Strategic content answers the question of ‘what is to be contained in the strategic plan’.

Furthermore according to Foster (2001:102), strategy content includes the following variables: Time, leadership, quality costs, generic strategies, order winners and quality. These variables should be taken into consideration when management develops strategies. Time can be broken down into two elements, namely in the first instance, it takes time to realize goals taking quality in consideration, and secondly, the speed at which organisations improve. Foster is of the opinion that, “. . . quality improvement is a planned managerial activity” (Foster, 2001:101).

Organisations tend to invest vast numbers of resources and time to develop strategies, however in most instances, these strategies fail. Athol Williams, MD of Taurus strategy consultants (Williams, 2007:14), implies that these strategies do not fail due to the fact that not enough thought has gone in the development thereof, but the fault actually lies in the ineffective implementation thereof. According to Williams (2007:14), “. . . the value of a business strategy can only be captured when it is implemented”. In order to implement the strategy effectively, bold leadership is required. Leadership is the second principle of the eight quality management principles as proposed by Goetsch and Davis, (2002:5-7).

The eight quality management principles referred to above, will be discussed in more detail under Paragraph 3.8.4 of this chapter. Management is an important factor in effective implementation, as management should take ownership of the strategy and be actively involved in the execution thereof. Visually displaying their commitment in striving towards achieving organisational excellence and demonstrate the value that it could add to the shareholders, should form the top priority of management in service organisations.

3.6 CONTINUOUS IMPROVEMENT

Schroeder and Robinson (1991) cited by Bhuiyan and Baghel (2005:762), states that the origins of modern improvement programs dates back to the 1800s. Management of numerous organisations during the 1800s encouraged employee driven improvement. Incentive programs were also put in place in order to reward employees who made positive changes within the organisation (Schroeder & Robinson, 1991 cited by Bhuiyan & Baghel, 2005:762). Furthermore, during the late 1800s and early 1900s, emphasis was placed on scientific management, which involved the development of methods to assist managers in analyzing and solving production problems based on scientific methods (Bhuiyan & Baghel, 2005:762).

During the Second World War, the US government set up the ‘Training Within Industry’ service, which enhanced the industrial output on a national scale and included job method training, which is basically a program design to educate

supervisors on the importance and techniques of continuous improvement methods. According to Robinson (1990) cited by Bhuiyan and Baghel (2005:762), Deming, Juran and Gilbreth known quality gurus of that time, later introduced this program in Japan.

3.6.1 Continuous improvement defined

Bhuiyan and Baghel (2005:761), are of the opinion that, “Continuous Improvement (CI) is a culture of sustained improvement targeting the elimination of waste in all systems and processes of an organisation”. Yeo (2008:267) citing Henderson-Smart *et al.* (2006), define continuous improvement as follows: “Continuous improvement is a systematic way of evaluating process and outcome, learning from mistakes as well as exceeding internal and external expectations”.

Furthermore according to Bhuiyan and Baghel (2005:762), the best known continuous improvement methodologies, are as following:

- Lean Manufacturing.
- Six Sigma.
- The Balance Scorecard.
- Lean Six Sigma.

According to Atkinson (1994:6), there are 6 elements that an organisation should consider when embarking on a continuous improvement program. The six elements include the following:

- Management commitment.
- Education.
- Implementation.
- Measurement and benchmarking.
- Recognition.
- Regeneration.

The concept of benchmarking according to Foster (2001:168), is that it provides for a ‘foundation’ of continuous improvement. Furthermore according to Foster (2001:163), there are seven main reasons for benchmarking and different levels of

involvement are required in establishing benchmarking activities. The reasons for benchmarking, are listed below:

- Learning from success.
- Borrowing ideas.
- Best-in-firm.
- Beating industry standards.
- Best-in-class
- National leadership.
- Best-in-world.

Foster (2001:166), is of the opinion that different benchmarking measures applies to different organisations in their respective industries, however the measure that an organisation ultimately chooses will depend on the Key Business Factors (KBFs) of the organisation. Furthermore, according to Foster (2001:166), these KBFs are clear tangent planes to the success of the organisation. For example, in the case of this research, the CPUT would be interested in keeping score of its customers as it falls within the service sector. Therefore, the organisation would engage in the following possible activities that concerns customer-related results, namely customer satisfaction and dissatisfaction, as well as comparisons of customer satisfaction relative to that of competitors (Foster, 2001:166). Customer satisfaction measures are imperative as it plays a significant role in measuring the effectiveness of quality improvement, and it is also an excellent indicator of financial performance (Foster, 2001:166).

Foster (2001:168), explains that in order to embark on 'best-in-class' benchmarking, an organisation firstly need to decide on 'who' it wishes to benchmark, and it is often frightening due to the 'dog-eat-dog' nature of the competition. The purpose of 'best-in-class' benchmarking is to provide a foundation for continual improvement, it involves the following process, firstly the initiator organisation need to choose to benchmark the best-in-class organisation, secondly the initiator organisation will observe the processes of the best-in-class organisation, thus generating ideas for improvement. Finally this will then assist the initiator organisation to learn and even become best in class too (Foster, 2001:168).

Bounds *et al.* (1994) cited by Kaye and Anderson (1999:485), identified the following as the four major 'quality eras', in the evolution of the quality paradigm namely:

- Inspection,
- statistical quality control,
- quality assurance, and
- strategic quality management.

Kaye and Anderson (1999: 486), found that initially, quality was viewed as a problem that needed to be resolved during the first three eras as listed above and was focused on the internal operations of the organisation. Only during the 1980s, was quality first viewed as a competitive opportunity or 'strategic weapon' that could be used against organisations competitors. The focus of the fourth quality era was placed on the customer and the organisation, and it was more proactive in terms of anticipating and responding to customer and market needs. Furthermore, Kaye and Anderson (1999:486), are of the opinion that management involvement and commitment is imperative in ensuring the full integration of quality in business plans, and the adequate deployment thereof throughout the organisation.

Kaye and Anderson (1999:486), points out that the approach of the fourth era is inadequate to meet the present rapidly changing business environment, which is characterized by 'uncertainty and unpredictability'. Kaye and Dyason (1995) cited by Kaye and Anderson (1999: 486), identified that a fifth quality era was needed, in order to meet the challenges as elaborated upon above, namely 'competitive continuous improvement'. The key focus of this era involves the flexibility, responsiveness and quick adaptation of organisations in order to make changes in strategies based on feedback from customers and benchmarking competitors. A sound strategy for continuous improvement is imperative in achieving the objectives of the fifth era. Yeo (2008:267), is of the opinion that ". . . continuous improvement is crucial to the sustainability of service quality."

3.6.2 Quality improvement

Anonymous 3 (2008:Online), list the following methods to improve quality pertaining to process and product improvement as well as people based improvement:

- **ISO 9004:2000:** Guidelines for performance improvement
- **QFD:** Quality Functional Deployment, also known as the House of Quality
- **Kaizen:** Japanese for change for the better; more commonly referred to as 'continual improvement'.
- **Zero Defect Program:** created by the NEC Corporation of Japan, based upon Statistical Process Control and one of the inputs from the formulators of Six Sigma.
- **Six Sigma:** Six Sigma is based upon Statistical Process Control.
- **PDCA:** Plan Do Check Act cycle for quality control purposes.
- **TQM:** Total Quality Management is a management strategy aimed at embedding awareness of quality in all organisational processes.

3.6.3 Basic tools of quality

It was Dr. Kauro Ishikawa who introduced quality control techniques and practices to the workers of Japan (Omachonu & Ross, 2004:251). According to Kanji (2001:26), Ishikawa's basic seven tools of quality are as follows:

- Flowcharts.
- Check sheets.
- Histograms.
- Scatter plots.
- Control charts.
- Cause-and-effect diagram (or Fishbone diagram).
- Pareto charts.

Furthermore, Foster (2001:276-277) is of the opinion that these tools can be used in a logical order (as listed above), which provides a holistic perspective of the process that need to be improved. Thereafter, data is collected by way of check sheets, and analysed by using histograms, scatter plots or control charts. The

cause-and-effect diagram is used to identify the root causes associated with the process, and finally these causes are prioritised by means of Pareto charts.

3.6.4 PDCA (Plan-Do-Check-Act) Cycle

Walter Shewhart developed the concept of the PDCA (Plan-Do-Check-Act) Cycle in the early 1930's, however Deming promoted it effectively from the 1950's onward (Anonymous 1, 2008:Online). The concept consists of a four stage checklist, that coordinates organisations continuous improvement efforts. The PDCA Cycle is more commonly known as the Deming Cycle (Omachonu & Ross, 2004:103), and is elaborated upon below.

The four stages in the PDCA Cycle:

- **Plan:** Organisations need to determine where the problem areas are.
- **Do:** Testing on a small scale is done in order to check whether the changes are solving the problems.
- **Check:** Check whether the results from the above testing are delivering the desired improved outcome.
- **Act:** Once the organisation is satisfied with the outcome of the testing, then it can be implemented on a large scale.

There are various tools that organisations can use at every stage of the cycle in order to assist in making a success of their improvement efforts. The following serve as examples of tools which can be deployed for each of the stages of the PDCA Cycle:

- **Plan:** Customer mapping, flowcharting, Pareto analysis etc.
- **Do:** Experiment design, conflict resolution on-job training etc.
- **Check:** Control charts, key performance indicators etc.
- **Act:** Process mapping and standardization, controlled reference information etc.

In order to improve an organisation, it needs to plan, which is also the starting point of the PDCA Cycle. Planning is furthermore a managerial function, and an important element for processes improvement, and ultimately for quality.

3.7 SIX SIGMA AS A QUALITY IMPROVEMENT MECHANISM

In the UK, the popularity of Six Sigma as a service quality improvement tool has grown exponentially over the last couple of years. The concept offers a disciplined approach to improve service effectiveness (meeting service attributes) as well as service efficiency (time and cost) (Antony, 2004:1006).

3.7.1 Origins of Six Sigma

One of Motorola's senior engineers Bill Smith, introduced the concept of Six Sigma in 1986, however it was Mikel Harry who was accredited with the development of the concept in the late 1980's (Maguire 1999 cited by Antony, 2004:234). Harry formally worked for Motorola and the company as a result of his work, was awarded the Malcom Baldrige Award in 1988.

3.7.2 Six Sigma defined

According to Foster (2001:402), Sigma refers to the Greek symbol σ used by statisticians to designate a standard deviation in statistics. Elliott (2004:201), is of the opinion that within the manufacturing industry, "Six Sigma performance is less than 3.4 defective parts for every 1.0 million parts produced". More specific, Six Sigma refers to having an organisational culture that is committed to achieve 'zero' defects. This is virtually impossible, however the logic behind the Six Sigma philosophy, is to have the commitment of the entire organisation to strive towards this goal, thus improving continually on a sustained basis. In so doing, organisations should come very close in achieving a culture of excellence. Table 3.1 below depicts the number of defective parts per million (ppm) produced between one and Six-Sigma levels:

Sigma Level	Long-term ppm* Defects
1	691,462
2	308,538
3	66,807
4	6,210
5	233
6	3.4

*ppm = parts per million.

Table 3.1: Sigma levels and ppm defects (Source: Adapted from Foster, 2001:403)

Furthermore, Foster (2001:403) is of the opinion that 90% of quality problems can be solved by using the basic quality tools, while most of the remaining 10% requires advanced training and analytical techniques. Less than 1% of quality related problems requires external expertise. Figure 3.1 below graphically depicts the breakdown of Six Sigma's effectiveness:

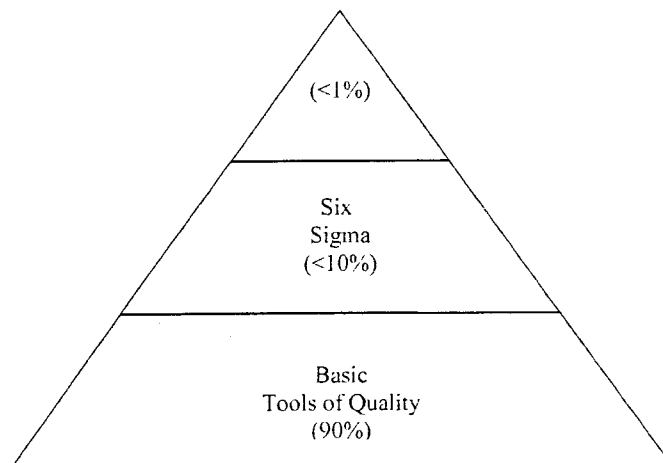


Figure 3.1: Six-Sigma Effectiveness (Source: Adapted from S. Foster, 2001:403)

Six Sigma can also be applied in the service industry, as it is, “. . . a business strategy used to improve business profitability to improve the effectiveness and efficiency of all operations to meet or exceed customer needs and expectations” (Kwak & Anbari 2006, cited by Chakrabarty & Tan 2007:195). This definition is appropriate, as it best describes Six Sigma in a service industry.

According to Thevnin (2004:195), after assessing the competitiveness of the business environment, a shift in quality and customer satisfaction is required by organisations. Should organisations not take quality in consideration, they will not achieve competitive superiority. As a result, a need has arisen to adopt a quality tool and chart a strategy in a quality direction. The purpose of this tool is to improve the organisation's position in the market environment as well as obtain a good reputation with regard to quality.

3.7.3 Benefits of Six Sigma

Antony (2006:236-237), is of the opinion that service organisations will encounter the following benefits by adopting the Six Sigma philosophy:

- Variability will be reduced.
- Cross-functional teamwork will improve.
- A change in mindset will occur, by being proactive rather than reactive.
- Improved internal operations, leading to increased market share.
- Organisations will gain more insight in understanding customer requirements.

3.8 THE CONCEPT OF QUALITY

According to Doherty (2008:255), a quality debate still rages on in academia with regard to 'quality', 'Total Quality Management' (TQM) and 'autonomy'. Doherty (2008:256), addresses the debate by means of the following question: 'What do you mean by quality? According to Doherty (2008:256), this question is not simple to answer as, "quality like beauty is subjective" (i.e. a matter of personal judgement).

3.8.1 Quality defined

According to Garvin (1984) cited by Foster (2001:5), there are various definitions of quality, however the majority of definitions of quality are transcendent, product-based, user-based, manufacturing-based or value-based. These terms are elaborated upon by Foster (2001:5), are as follows:

- **Transcendent:** Quality is something that is intuitively understood, but nearly impossible to communicate, such as beauty or love.
- **Product-based:** Quality is found in the components and attributes of a product.
- **User-based:** If the customer is satisfied, the product has good quality.
- **Manufacturing-based:** If the product conforms to design specifications, it has good quality.
- **Value-based:** If the product is perceived as providing good value for the price, it has good quality.

Based on the above five definitions of quality, Garvin (1984) cited by Foster (2007:5) developed the following eight quality management dimensions, which describe product quality:

- Performance.
- Features.
- Reliability.
- Conformance.
- Durability.
- Serviceability.
- Aesthetics.
- Perceived quality.

Controversially, it is difficult to define service quality opposed to product quality. Parasuraman, Zeithamel, and Berry (1984) cited by Foster (2001:7), list the following as service quality dimensions:

- Tangibles.
- Service reliability.
- Responsiveness.
- Assurance.
- Empathy.
- Availability.
- Professionalism.
- Timeliness.
- Completeness.

- Pleasantness.

Foster (2007:8), is of the opinion that it is imperative that departments within an organisation share a common definition of quality, as multiple definitions could cause departments to have a different understanding of quality, thus leading to the strategic plan not being in alignment. As a result, by having a shared common definition of quality departments within an organisation can work towards achieving a common objective.

3.8.2 The essence of service quality

Lehtinen and Lehtinen (1982), cited by Kang and James (2004:267), are of the opinion that service quality can be defined in terms of physical quality, interactive quality and corporate (image) quality. Physical quality refers to the tangible aspect thereof, whereas interactive quality refers to the interaction between the customer and the service provider. The manner in which current and potential customers view the image of a service provider, is known as ‘corporate quality’. Kang and James (2004:267) cite Grönroos (2001), the latter who emphasized the importance of corporate image when referring to quality. Rust and Oliver (1994:1-19), list the following as conceptualized service quality dimensions:

- The customer-employee interaction (i.e. functional or process quality),
- the service environment, and
- the outcome (i.e. technical quality).

3.8.3 Key contributors to quality

Within the quality sphere, Deming is viewed as, “. . . the world’s preeminent authority on quality management” (Foster, 2001:35). This fact is attributable to Deming’s contribution to the establishment of the concept of Quality in Japanese and American industries. Furthermore, Deming is perhaps better known for his ‘14 Points for Management’ and his ‘Seven Deadly Diseases of Management’. Juran (Kanji, 2001:18), another quality guru of the time formulated Juran’s Trilogy, which includes planning, control and improvement. Juran is also considered as one of the major contributors to the establishment of quality in the

workplace. Furthermore, Juran identified that the Pareto Analysis (Omachonu Ross, 2004:260), which is an economic concept applied to quality problems (Foster, 2001:45). Ishikawa's Quality Philosophy (Kanji, 2001:26), consists of eleven points which focuses on improving quality whereas Feigenbaum's 19 steps (Omachonu & Ross, 2004:10-12), outline his approach to total quality control.

Foster (2001:37) and Omachonu & Ross (2004:7-9), elaborated on Deming's 14 points as follows:

- **Create consistency of purpose with a plan:** Requires management to commit resources over an extended period of time to ensure that a quality job is done. This is however in contrast with managers who strive to obtain quick returns and bottom-line results after embarking on quality programs.
- **Adopt a new philosophy of quality:** Management should realise that it is a new economic age, awaken to its challenges, learn its responsibilities and take on leadership of change. The new age that Deming refers to was an age where Americans no longer accepted defective products. Once many organisations obtained excellent quality at reasonable cost. A shift to service quality took place to make the next big advancements.
- **Cease dependence on mass inspection:** The purpose of this aspect is to build quality into the product in the first place, thus eliminating the need for mass inspection. Many organisations have a quality department that is responsible to assure quality, but often than not, by the time that inspection takes place, it is too late to add quality. Alternatively, Deming believed in quality at the source, which implies that all workers are responsible for his or her own work and perform inspections at each stage in the process, thus maintaining control. However, this will only be possible if management trusts and train workers properly.
- **End the practice of choosing suppliers based on price:** Total cost should be minimized, and organisations should move toward single suppliers and long-term relationships of loyalty and trust. Many U.S firms had numerous suppliers and the theory underlying this approach was an increase in competition amongst suppliers would increasing quality and decrease cost. However, many suppliers caused an increase in variability and overemphasis

on cost, alternatively Just-In-Time (JIT) purchasing was used in order to minimize suppliers and thus decreasing variability.

- **Identify problems and continuously improve the system:** Refers to the continuous improvement of production and service systems, thus improving quality and productivity, and constantly decreasing cost. In essence, this aspect focuses on the management of the production system which includes product design, process design, training, tools, machines, process flows, and numerous other variables that affect the production and services processes. Management is responsible for the majority of the design elements as they have the budget and authority to implement the systems. Workers can be held responsible for inputs in the systems, however poor performance of the system, is often the result of poor performance of management.
- **Adopt modern methods of training on the job:** To enable people to perform their work, it is imperative that they have the essential training and knowledge. Although training is a requirement for improvement, it does not guarantee the successful implementation of quality management and effective training, is imperative for quality improvement.
- **Change the focus from production numbers (quantity) to quality:** The purpose of supervision is to help people and machines perform better. The majority of quality experts agree that leadership is imperative for quality improvement, and the supervision of management and production workers requires close scrutiny. Assembly line employees will be able to make some improvements to the organisation should they become enthusiastic about quality management, however in order to make major improvements, top management must be involved as they have the necessary authority and resources to implement quality improvement. “Without management support and leadership, quality improvement efforts will fail” (Foster, 2001:39).
- **Drive out fear:** Driving out fear is imperative as this will allow employees to work effectively for the organisation. The fears that Deming are referring to, pertain to the fear change, and not being able to admit that problems exist. Employees who highlight problems are often seen as trouble makers or dissatisfied. It would not be beneficial for an organisation to have employees who simply accept or are satisfied with poor quality. Employees who highlight inefficiencies should actually be prized as they actually identified areas where

improvement is needed and thus improving efficiency. Often employees make recommendations for improvement, but are ignored, which leads to or fosters fear of ever making recommendations again. Top managements' desire to improve quality could also be viewed as a fear to employees, as employees often associate process-improvement with major staff reduction exercises. Reengineering at many organisations leads to a reduction of staff, and as a result, reengineering is more often than not viewed as an easy solution to downsizing. Loosing the ability to be creative, and improve the organisations ability to increase value to the customer is a major barrier organisations faces. A Midwestern defence contractor developed a written policy which stated the following: “. . . management reserved the right to reduce staffing levels as a result of economic downturn”. Furthermore, the policy also stated that, “. . . no layoffs will result from productivity or quality improvement projects or efforts”. Japanese organisations offered lifetime employment, thus eliminating this fear.

- **Break down barriers between departments:** People from different department (e.g. sales, production, research and design) within an organisation should work as a team in order to foresee problems with regard to production and use of the products or services. Often it takes a considerable length of time to get design and marketing concepts to market. Delays in design can be extremely costly for organisations within today's competitive environment. For example, in the 1980's Honda nearly bankrupted Yamaha due to Honda's rapid ability to introduce new designs to the market. A sequential or departmental approach to design is one of the causes for slow design cycles, as this approach requires marketers to work through organisational lines of authority to perform work. The solution the above problem is 'parallel processing' using focussed teams and involves teams working on various designs simultaneously.
- **Eliminate slogans:** Includes the elimination of exhortations, calls for workforce targets, zero defect drives and new levels of productivity. Exhortations create adversial relationships because low quality and productivity is often inherent in the system, rendering the workforce powerless, Deming (Omachonu & Ross, 2004:8), believes that these exhortations (e.g. 'zero defects forever' and 'get it right the first time'), often

exhibit the opposite affect that was originally intended. Due to the fact that employees are put under sever pressure to achieve higher levels of productivity and quality, management is actually placing the responsibility of improving on the employees. Improvement is management's responsibility, because if they do not provide systems or the means to accomplish high performance goals, this may lead to employees becoming discouraged. An increase in quality and productivity can be achieved by providing better training, empower employees to make process decisions, and provide strategic structures to ensure the alignment of goals.

- **Stop requesting improved productivity without methods to achieve it:** Even though works standards are used throughout the world and Lincoln Electric was successful with such standards, Deming was opposed to work measurement standards as it was often implemented incorrectly. Once quantity becomes the overriding concern in organisations, quality tend to suffer. Having rigid production standards in place, may cause employees who reached the highest or satisfactory level, to loose drive to continuously improve. Management by objective should also be eliminated, as this refers to the setting of annual objectives (usually during performance appraisals) that are binding on employees, however management often does not provide the necessary systems that will aid employees in achieving such goals.
- **Remove barriers to pride of workmanship:** The number driven mindset of supervisor responsibility, should be shifted to quality. Workers have the right to have pride in the quality of their work, therefore barriers that hinder, this right should be removed. Often workers are hired to perform only the physical tasks assigned by management, and in most instances these workers have low morale and commitment to the organisation. This implies that workers cannot be trusted with decisions and self-determination, due to the fact that unskilled managers reinforce this, thus adding to the problem.
- **Institute vigorous education and re-training:** This refers to the institution of energetic programs for education and self improvement. Many quality experts suggest that organisations should exhibit the ability to increase and 'freeze' learning. In this instance learning refers to the creativity of employees and the ability of the organisation to institutionalise lessons learnt over a period of time, however this is difficult in organisations that have a high employee

turnover. The ISO 9000:2000 standard requires that processes and improvement to processes be documented, thus making learning permanent through the aid of procedure manuals. A structure that reinforces and reward learning is thus required.

- **Create a structure in top management that will emphasise the preceding aspects every day:** Everybody within the organisation is responsible for the accomplishment of transformation and the improvement of quality. This reinforces the fact that a total quality improvement system is required that includes all employees within the organisation.

Foster (2001:41), list Deming's seven deadly diseases as follows:

- Lack of consistency of purpose.
- Emphasis on short-term profits.
- Evaluation of performance, merit rating, or annual reviews.
- Mobility of management.
- Running a company on visible figures alone.
- Excessive medical costs for employee health care.
- Excessive costs of warranties.

3.8.4 Quality management principles

Goetsch and Davis (2002:5-7), list the following as quality management principles:

- **Customer focus:** Understanding customer needs, striving to exceed their expectations.
- **Leadership:** Establishing direction, unity of purpose, and a supporting work environment.
- **Involvement of people:** Ensuring that all employees at all levels are able to fully use their abilities for the organisation's benefit.
- **Process approach:** Recognising that all work is done through processes, and managed accordingly.
- **System approach:** Expands on the previous principle in that achieving any objective, requires a system of interrelated processes.

- **Continual improvement:** As a permanent organisational objective, recognising and acting on the fact that no process is so good that further improvement is impossible.
- **Factual approach:** Acknowledging that sound decisions must be based on factual data and information.
- **Mutually beneficial supplier relationships:** Synergy can be found in such relationships

The above principles, have been included in the revised standard (International Organisation for Standardization (ISO) 9000:2000), which is derived from the concept of TQM. Furthermore, ISO considers the following as major changes in the revised standard:

- Increased focus on top management commitment.
- Customer satisfaction.
- Emphasis on processes.
- Continual improvement.

As a result of ISO 9000, customers worldwide can expect that the goods or services provided by organisations that are registered, will conform to a recognized set of standards (Goetsch & Davis,2002:7). Kanji (2001:80), cite Juran (1994), the latter who pointed out that certain aspects pertaining to quality activities are essential for ISO 9000 to maintain world-class quality. These aspects include:

- Personal leadership
- Training managers for quality.
- Quality goals n the business plan.
- Quality improvement.
- Empowerment.

3.8.5 Three Spheres of Quality

Foster (2001:23), is of the opinion that the essence of quality management can be defined with the aid of the three spheres of quality namely quality control, quality

assurance and quality management. A graphical depiction of these concepts reflected as the ‘Spheres of Quality’, is shown in Figure 2.3 below.



Figure 3.2: Three Spheres of Quality (Source: Adapted from Foster, 2001:23)

‘Quality Control’ involves monitoring capability, measuring performance, reducing variability and maintaining control charts. ‘Quality Assurance’ in turn, relates to guaranteeing the quality of products or services, while ‘Quality Management’ is the ‘adhesive’, that keeps the control and assurance activities together. From the above, the analogy can be drawn that management is an important factor in assuring quality within organisations.

3.9 THE CONCEPT OF ‘LEAN’

3.9.1 Lean defined

According to Liker (1996) cited by Bhasin and Burcher (2006:57), Lean can be defined as, “. . . a philosophy that when implemented reduces time from customer order to delivery by eliminating waste in the production flow”.

3.9.2 Benefits of Lean

According to Anonymous 2 (2007:Online), the benefits of Lean implementation are as follows:

- Productivity improvement.
- Total manufacturing time saved.
- Less equipment utilization (Machine time, wear and tear).
- Less scrap - material cost saved.
- Low inventory levels - stock holding cost saved.
- Quality improvement.
- Plant space saved – more efficient layout.
- Better labour utilization.
- Safety of operations.

The above benefits indicate that through the application of Lean principles, the efficiency of the organisation can be improved as it will be using its resources in the best possible manner.

3.9.3 Five basic principles of Lean manufacturing

Andersson *et al.* (2006:288), identified the following as the five basic principles of Lean manufacturing:

- **Understanding customer value:** Involves the fact that what the customer perceive as value, is what is important.
- **Value stream analysis:** Once the value of the customer is understood, the next step would be to analyse business processes in order to identify which ones actually add value, and modify or eliminate actions in the processes that do not add value.
- **Flow:** This aspect focuses on having a continuous flow through the production or supply chain, as opposed to moving merchandise in large quantity.
- **Pull:** Management of the command chain aids in the prevention of producing merchandise to stock. As a result, work is performed only when it is required downstream.
- **Perfection:** Involves the elimination of waste (non-value adding elements), which is the process of continuous improvement.

3.10 QUALITY ASSURANCE

Doherty (2008:255), states that the current Quality Assurance (QA) methods used in education originated from industrial applications. Furthermore, Doherty (2008:260), states the following: “QA, however, is something that organisations do: a methodology for judging the degree to which the macro and micro organisational aims, objectives and outcomes have been achieved”. More specific, quality assurance is a management tool used to make effective contributions to improving performance at institutional level or at subject or departmental levels within an institution (Doherty 2008:260).

3.10.1 Performance indicators

Barnett (1994), cited by Cullen, Joyce, Hassel and Broadbent (2003:5), is of the opinion that due to the different views of quality, there are various methods of assessing quality. Performance Indicators (PIs) are limited with regard to informational content, and does not provide one with information regarding the quality of the educational process (Barnett, 1994 cited by Cullen *et al.*, 2003:5-6).

The three issues regarding quality assurance in higher education are: ‘a direct relationship between higher education being taken, the definition of quality being used, and the performance indicators chosen to measure quality’. Tam (2001) cited by Cullen *et al.* (2003:6), is of the opinion that the main challenge that organisations are faced with is to overcome the three issues listed above, and to develop a performance evaluation framework that will allow equal expression of views.

Furthermore, Barnett (1994:76) cited by Cullen *et al.* (2003:6), is of the opinion that, “. . . current performance indicators only tell us (at best) about the past. In themselves, they cannot give us insight into future or even suggest ways in which things ought to be modified or improved”.

3.10.2 The need for quality improvement

According to Gamage, Suwanabroma,, Ueyama, Hada & Sekikawa (2008:182), there are numerous public and private universities in Thailand who are competing against each other to attract students. Due to the intensity of the competition, a need has arisen to attract more students and survive within limited budgets. Vargo (2000) cited by Gamage *et al.* (2008:182), points out that students and their parents demand a strong link between costs and courses followed. As a result, universities acknowledge their obligation to meet stakeholder needs and specifically the needs of students.

Universities are currently working on improving the quality of services to students by researching the needs of students in order to improve the quality of programs and services. This leads to an increasing need to develop more effective quality assurance mechanisms within higher education institutions.

3.10.3 Higher education

As noted in the previous chapter (refer Paragraph 2.5.4), the HEQC is a permanent committee of the CHE, tasked with the following responsibilities (SAQA 2008:Online):

- Advise the Minister at his/her request or proactively on all matters related to higher education.
- Assume executive responsibility for quality assurance within higher education and training.
- Monitor and evaluate whether the policy goals and objectives for higher education are being realised.
- Contribute to developing higher education through publications and conferences.
- Report to parliament on higher education.
- Consult with stakeholders on higher education.

The following are the specific functions of the HEQC:

- Promote quality assurance in higher education.

- Audit the quality assurance mechanisms of institutions of higher education.
- Accredite programmes of higher education.

3.10.3.1 Models used in higher education

According to Lagrosen and Lagrosen (2006:88) citing Lagrosen and Lagrosen, (2005), the ISO 9000 standard is the most frequently used model in higher education, as it contains a vast number of criteria that organisations should comply with to become certified. Furthermore, certification requires that all processes in organisation are documented. Being ISO certified, does not imply that the organisation is of high quality, however it does prove that the organisation works in achieving quality in a systematic manner (Lagrosen and Lagrosen, 2006:88).

3.11 TOTAL QUALITY MANAGEMENT (TQM)

Doherty (2008:261), is of the opinion that even though there are vast amounts of information in various sources on TQM, it is still frequently misrepresented and misunderstood by many academics. Furthermore, Doherty (2008:261) believes that Deming preferred the idea of continuous improvement to TQM as everyone understood it better, however TQM is much more fundamental than continuous improvement.

3.11.1 TQM defined

Isaksson (2006:632) citing Sila & Ebrahimpour (2003), points out that there is no agreed definition on TQM, however the definitions are similar as most emphasize the following concepts, namely continuous improvement, customer focus, human resources management and process management.

According to Bergman and Klefsjo (2003) cited by Isaksson (2006:632), TQM is “. . . a constant endeavour to fulfil and preferably exceed customer needs and expectations at the lowest cost, by continuous improvement work, to which all involved are committed, focusing on the processes in the organisation”. The

International Organisation for Standardization (ISO) defines TQM as follows: “TQM is a management approach for an organisation, centred on quality, based on the participation of all its members and aiming at long-term success through customer satisfaction, benefits to all members of the organisation and to society” (Anonymous 4, 2008:Online).

Hellsten and Klefsjo (2000) cited by Anderson *et al.* (2006:283), suggest that TQM can be defined as: “. . . A continuously evolving management system consisting of values, methodologies and tools, the aim of which is to increase external and internal customer satisfaction with a reduced amount of resources”. Doherty (2008:261), states that, “. . . TQM is a holistic management system requiring the development of a system-wide culture”. The culture referred to in the above definition applies to the fact that everyone, regardless of his/her role or position in hierarchy is responsible for managing their own contribution to the whole, the latter which refers to the ‘total’ in TQM.

By comparing the above definitions it is clear that they all contain some of the concepts mentioned by Issaksson (2006:632) cited above. Hellsten and Klefsjo (2000) cited by Anderson *et al.* (2006:283) and Doherty (2008:261), refers to TQM as a management system or approach, however the definition which best describes TQM in the service sector where ‘more value at a lower cost’ and ‘economic sustainability’ are emphasised, comes from Isaksson (2006:633). From the above, the analogy can be drawn that TQM should contribute to sustainable development through improved economic performance.

3.11.2 Sustainable development

According to WCED (1987) cited by Isaksson (2006:632), “. . . sustainable development is development that meets the needs of the present generation, without compromising that ability of future generations to meet their own needs”. Furthermore Isaksson (2006:632), is of the opinion that sustainable development is a global concern, which relates to individuals, organisations and nations. Elkington (1999) and Topfer (2000) cited by Isaksson (2006:632), states that at organisational level, sustainable development is described by using the Triple

Bottom Line (TBL), whereby performance is split into economic, environmental and social dimensions.

Svensson and Klefsjo (2006) cited by Klefsjo, Bergquist and Gavare (2008:120), states that in many parts of the world TQM has been used to improve competitiveness, efficiency and profitability, but originally it was used in the private sector. Later it was also applied in the public sector and societies.

3.12 MECHANISMS TO MEASURE SERVICE QUALITY IN TERTIARY INSTITUTIONS

According to the research by Buzzell and Gales with PIMS (profit impact of marketing strategy) database, the researchers found that, “. . . quality is what the customers say it is and customer perception is all-important” (Soutar and McNeil 1996:74). Furthermore Soutar and McNeil (1996:74), is of the opinion that it is important to define service quality from a customer perspective. A model (the Grönroos-Gummesson’s Quality Model) describes the four sources of quality and distinguishes between technical and functional quality (Soutar and McNeil 1996:74). The four sources of quality, the following”

- Design,
- production,
- delivery, and
- relations.

Soutar and McNeil (1996:74), found that the SERVQUAL model (developed by Parasuraman, Zeithaml & Berry) identified the gaps that influence a customers judgement with regard to the quality of the service rendered. Soutar and McNeil (1996:74-75), list the gaps as follows:

- Consumer expectations and management perceptions of these expectations.
- The perception of service quality held by top management and the translation of these into quality specifications.
- Quality specifications and the service delivery at the front line.
- What is promised in external communications and the actual service delivered.
- Perceived performance and expectations, which is a function of gaps (1) – (4).

3.13 CONCLUSION

In this chapter, a literature review was conducted on the concept of quality management, with specific reference to the following: Management, continuous improvement, Six Sigma, quality, Lean and TQM. Management commitment has been highlighted as of importance to establish quality within the organisation. Management commitment has a profound impact on continuous improvement and quality, with quality assurance viewed as a managerial function. Six Sigma as a tool for improvement and TQM have been identified as contributors to sustainable development. In chapter 4 the survey design and methodology will be elaborated upon.

CHAPTER 4: QUALITY MANAGEMENT SURVEY DESIGN AND METHODOLOGY

4.1 THE SURVEY ENVIRONMENT

This chapter will provide the reader with insight into the survey design and methodology deployed for the purpose of the collection of primary data. The approach to data collection will be explained, de-limitations listed and the target population will be defined. The Cape Peninsula University of Technology (CPUT) consists of six faculties and it has seven campuses throughout the Western Cape.

CPUT's vision statement reads as follows: "To be at the heart of Technology Education and Innovation in Africa" (CPUT, 2008b:Online). CPUT's mission statement reads as follows: "Our mission is to develop and sustain an empowering environment where, through teaching, learning, research and scholarship our students and staff, in partnership with the community and industry, are able to create and apply knowledge that contributes to development" (CPUT, 2008b:Online). One obvious analogy which can be drawn from the vision and mission statements is that they will not be able to be achieved if the organisation (CPUT), do not pursue the concept of quality and quality assurance in the provision of its products and services. Furthermore, the organisation will not be able to compete with other tertiary institutions on an equal footing, if these objectives are not pursued at the highest level.

The research will take place at the Cape Peninsula University of Technology's Bellville campus, and the following areas will serve as the research environment:

- Applied Science.
- Business.
- Education & Social Science.
- Engineering.
- Health and Wellness Science.
- Informatics and Design.

4.2 PURPOSE OF THIS CHAPTER

The purpose of this chapter and survey conducted therein is to determine what key factors are impacting the efficiency of the CPUT. The objective of the research is to solve the research problem as defined in Chapter 1, Paragraph 1.3, and which reads as follows:

“Management at CPUT is not strategically focused on the quality of service to students, impacting adversely on the efficiency of the organisation”.

4.3 SAMPLING METHOD

The organisation consists of six faculties, each committed to delivering excellent service to its students. The various faculties are listed below will serve as the ‘sample frame’ (Vogt, 1993:202) for the research survey.

- Applied Science.
- Business.
- Education & Social Science.
- Engineering.
- Health and Wellness Science.
- Informatics and Design.

4.4 THE TARGET POPULATION

Collis and Hussey (2003:232), defines target population as follows: “A population is any precisely defined set of people or collection of items which is under consideration”. A random sample (Collis and Hussey, 2003:156) will be drawn from the faculties listed above, ten respondents from each faculty. This approach was taken to ensure that each faculty identified as the survey population represented (Collis & Hussey, 2003:232; Easterby-Smith & Lowe, 1996:122-125).

Babbie (2005:196-197), suggests that the following are the two reasons for using random sampling:

- It serves as a check on conscious or unconscious bias of the researcher as it (random sampling) erases the danger of the researcher selecting cases on intuitive basis to support the research expectations or hypothesis.
- Random sampling offer access to the body of probability theory, forming the basis of estimating characteristics of the population as well as estimates of accuracy of the samples.

The random sample will consist of students and management of CPUT, Twenty managers or Heads of Departments (HOD) and sixty students were randomly selected.

Of the target population of twenty managers or HOD's and the sixty students randomly selected from the sample frame, only fifteen managers and fifty nine students returned their completed questionnaires. From this data, descriptive and inferential statistics were compiled, which one elaborated upon in detail in Chapter 5.

4.5 DATA COLLECTION

According to Anonymous 5 (2008:Online) data collection refers to, “. . . data gathered from surveys, or input from several independent or networked locations via data capture, data entry, or data logging.” Emory and Cooper (1995:286), suggests that there are three primary types of data collection (survey) methods, the methods are as follows:

- Personal interviewing.
- Telephone interviewing.
- Self administered questionnaires/ surveys.

According to Remenyi *et al.* (2000) cited by Watkins (2008:67), a survey is defined as, “. . . the collection of a large quantity of evidence usually numeric, or evidence that will be converted to numbers, normally by means of a questionnaire.” Questionnaires served as the primary data collection method in

this survey. Watkins (2008:67), defines a questionnaire as “: a list of carefully structured questions, chosen after considerable testing with a view to elicit reliable responses from a chosen sample”. Furthermore, the purpose of a questionnaire is to establish what a selected group of respondents do, think or feel, and a positivistic approach was used in the design of the questionnaires used in the survey.

According to Leedy & Ormrod (2005:185), participants will be more truthful in responding to questions in a questionnaire as it allows the participants to remain anonymous as opposed to personal interviews.

4.6 MEASUREMENT SCALES

Watkins (2008:162), suggests the use of the popular Lickert scale for use in surveys relating to research in business and management. The Lickert scale allows respondents to respond to each question or statement by choosing one of the five agreement choices (Emroy & Cooper, 1995 cited by Watkins, 2008:162).

Emroy & Cooper (1995) cited by Watkins (2008:162), list the following as the advantages of the Lickert scale:

- Easy and quick to construct.
- Each item meets an empirical test for discriminating ability.
- The Lickert scale is probably more reliable than the Thurston differential scale.
- The Lickert scale is also treated as an interval scale.

The Lickert scale was used in this survey as it can be used in both ‘respondent-centred’ and stimulus-centred’ studies (Emroy & Cooper (1995) cited by Watkins, 2008:163).

4.7 THE REQUIREMENTS/DEMAND FOR A QUALITATIVE RESEARCH STRATEGY

The concepts listed below are inherited from the empirical analytical paradigm and are suggested for business research as represented in the research study. The concepts are defined by Emroy & Cooper (1995:156) as follows:

- **Practicality:** Practicality is concerned with a wide range of factors of economy, convenience, and interpretability.
- **Validity:** Validity refers to the extent to which a test measures what we actually wish to measure. Yin (1994:18), identifies 3 subsets to the concept validity, namely: Construct validity, internal validity and external validity.
- **Reliability:** Reliability has to do with the accuracy and precision of a measurement procedure.

4.8 SURVEY SENSITIVITY

No survey sensitivity issues were identified to apply to this research.

4.9 SURVEY DESIGN

Watkins (2008:140), is of the opinion that the ‘descriptive survey’ is the most common design used in business and management. Leedy & Ormrod, 2001 (cited by Watkins 2008:140), states that “. . . a survey is simple in design. The researcher poses a series of questions to willing participants; summarizes their responses with percentages, frequency counts, or more sophisticated statistical indexes; and then draws inference about a particular population from the responses of the sample.”

According to Leedy and Ormrod (2001) cited by Watkins (2008:140), the following nine step processes should be followed when executing a questionnaire based survey:

Step 1: Determine the research question or hypothesis statement and key research objectives.

Step 2: Develop a questionnaire based on relevance of the proposed research to be conducted.

Step 3: Identify the sample frame from the target population and select a sample

Step 4: Choose an interviewing method.

Step 5: Pilot the survey.

Step 6: Conduct the survey.

Step 7: Data processing

Step 8: Data analysis follows which includes descriptive analysis and statistical inferences.

Step 9: Formulation of the report in order to draw conclusions and interpret findings.

Furthermore Watkins (2008:141), points out that the most important aspect of good questionnaire design is to ensure that the questionnaire address the primary objective of the proposed research. A quality questionnaire consists of questions that will enable the researcher to mitigate the research problem and provide possible solutions to the research question or hypothesis statement, including the investigative questions (Watkins, 2008:141).

Watkins (2008:143), noted that the questions contained within the survey should be concise and unambiguous, therefore when designing a survey the researcher should bear the following in mind:

- Avoidance of double-barreled questions.
- Avoidance of double-negative questions.
- Avoidance of prestige bias.
- Avoidance of leading questions.
- Avoidance of the assumption of prior knowledge.

4.10 VALIDATION OF SURVEY QUESTIONS

Questionnaires are associated with both quantitative and qualitative methodologies (Collis and Hussey 2003:173), and it has the following benefits:

- Relatively economical.
- Ensure anonymity.
- Contains questions for specific purposes.
- Existing questionnaires can be used, or modified.

Two separate questionnaires were developed, one for students and the other management. The attention of the reader is drawn to the fact that more than 50% of the questions posed to the respondents in the separate questionnaires (student/management) are the same. This was done to determine whether both

students and management have similar views regarding the quality of service delivery or contrasting each other. Babbie (2005:285), states that survey research is generally weak on validity, and strong on reliability.

4.10.1 Quality assurance questionnaires

The purpose of this questionnaire is to, determine the impact that management have on the quality of service delivery, improve service delivery and ultimately improve the efficiency of CPUT.

The survey posed to students were in terms of a Lickert scale where the respondents had to respond to statements in terms of a scale reflecting the choices strongly agree, agree, undecided, disagree or strongly disagree. A list of questions/ statements posed to students are reflected below for ease of reference.

Question one: Management of CPUT is strategically focused on quality of service to students.

Question two: CPUT is an efficient organisation.

Question three: Students are CPUT's most important asset.

Question four: CPUT can improve on the service it provides to students.

Question five: The current service that CPUT offers its students is satisfactory.

Question six: Management is responsible to improve on the current level of service that CPUT offer to students.

Question seven: Students are availed the opportunity to give feedback on the service that CPUT offer on a regular basis.

Question eight: Management spends sufficient time and resources on providing good service to students.

Question nine: CPUT complies with the ISO 9000:2000 Standard for service delivery.

Question ten: Strong leadership is required to improve the efficiency of CPUT.

Question eleven: The management of CPUT is committed to continuously improving on the current state of service delivery at CPUT.

Question twelve: CPUT have measures in place to ensure that a high level of quality is maintained.

Question thirteen: CPUT have a quality representative to ensure quality of service.

Question fourteen: Continuous improvement is an important element for sustainability of CPUT.

Question fifteen: Management has an impact on quality.

Question sixteen: Quality control is an absolute requirement for assuring quality.

Question seventeen: Communication between CPUT and its students need to be improved.

Question eighteen: CPUT's managers share information regarding the organisation's performance with students.

Question nineteen: Communication between departments within CPUT needs to be improved.

The purpose of the above questionnaire is to obtain the students perception of the quality of service that CPUT renders to students.

The survey posed to management or HOD's were as in the instance of the student questionnaire in terms of the Lickert scale where the respondents had to respond to statements in terms of a scale reflecting the choices strongly agree, agree, undecided, disagree or strongly disagree. A list of questions/ statements posed to management or HOD's are reflected below for ease of reference.

Question one: Management of CPUT is strategically focused on quality of service to students.

Question two: CPUT is an efficient organisation.

Question three: Students are CPUT's most important asset.

Question four: CPUT can improve on the service it provides to students.

Question five: The current service that CPUT offers its students is satisfactory.

Question six: Management is responsible to improve on the current level of service that CPUT offer to students.

Question seven: Students are availed the opportunity to give feedback on the service that CPUT offer on a regular basis.

Question eight: Management spends sufficient time and resources on providing good service to students.

Question nine: CPUT complies with the ISO 9000:2000 Standard for service delivery.

Question ten: Strong leadership is required to improve the efficiency of CPUT.

Question eleven: The management of CPUT is committed to continuously improving on the current state of service delivery at CPUT.

Question twelve: CPUT have measures in place to ensure that a high level of quality is maintained.

Question thirteen: CPUT have a quality representative to ensure quality of service.

Question fourteen: CPUT is using Six Sigma in order to improve the efficiency of the organisation.

Question fifteen: CPUT makes its quality policy accessible to all staff.

Question sixteen: Continuous improvement is an important element for sustainability of CPUT.

Question seventeen: Management has an impact on quality.

Question eighteen: CPUT's quality manual is accessible to all staff?

Question nineteen: Performance Indicators is an effective mechanism to measure quality.

Question twenty: Communication between departments within CPUT needs to be improved.

Question twenty one: To effectively implement Six Sigma one requires a high level of managerial support and commitment.

Question twenty two: Quality control is an absolute requirement for assuring quality.

4.11 CONCLUSION

The quality assurance survey design and methodology was addressed under the following headings:

- The survey environment.
- Purpose of this chapter.
- Choice of sampling.

- The target population data collection.
- Measurement scales.
- The requirements for a qualitative research strategy.
- Survey sensitivity validation of survey questions.

The results from the survey will be analyzed in detail in Chapter 5 after which final analogies will be drawn.

CHAPTER 5: DATA ANALYSIS AND INTERPRETATION OF RESULTS

5.1 INTRODUCTION

This chapter discusses the statistical analysis of data gleaned from the surveys conducted as described within the ambit of Chapter 4. The aim of this study is to determine whether the Management of CPUT is strategically focused on the quality of service to students and whether this have an adverse impact on the efficiency of the organisation. The information obtained from the questionnaires posed to students and management will be presented and analysed in this chapter.

To serve the purpose of this research, descriptive and inferential statistics were used to analyse the data. The data has been analysed by using SAS software. As descriptive statistics, frequency tables displayed in Paragraph 5.3 shows the distributions of statement responses.

5.2 ANALYSIS METHOD

5.2.1 Validation survey results

A descriptive analysis of the study results are reflected below. The distribution of all variables is indicated in table format for ease of reference. Each variable is tested to fall within the boundaries.

5.2.2 Data format

The data was provided in its original questionnaire form. A database in Micro Soft Access is developed and the questionnaires were captured in the database. It was then imported into SAS-format through the SAS ACCESS module.

5.2.3 Preliminary analysis

Descriptive statistics were used to establish the frequency, range, mean and standard deviation of the statements. The table which contains the frequencies, percentages, cumulative frequencies and cumulative percentages are shown in Paragraphs 5.3.1 (In this respect, see Annexure A).

5.2.4 Inferential statistics

The following inferential statistics are performed on the data:

- Reliability analysis (Cronbach's alpha coefficient to determine consistency). Alpha coefficient ranges in value from 0 to 1 and may be used to describe the reliability of factors extracted from dichotomous (that is, questions with two possible answers) and / or multi-point formatted questionnaires or scales (i.e., rating scale: 1=poor, 5=excellent). The higher the score, the more reliable the generated scale is.
- Analysis of Variance to determine whether the means of the responses of management and students of CPUT differed with respect to the same questions that were posted to them. The purpose of the ANOVA is to test for statistically significant differences between the means of two different groups. It assesses the relationship between a dependent variable and classification variables.
- Spearman rank correlations to determine whether the students and / or management who indicated that CPUT is an efficient organisation also indicated whether the management of CPUT is strategically focused on quality of service to students.

5.2.5 Technical report with graphical displays

A written report with explanations of all variables and their outcome has been compiled. A cross analysis of variables where necessary is performed, attaching statistical probabilities to indicate the magnitude of differences or associations.

All inferential statistics are discussed in Paragraph 5.3.3. It includes Spearman rank correlations to determine relationships and analysis of variance tests to determine differences in means.

5.2.6 Assistance to researcher

The conclusions made by the researcher, is validated by the statistical report. The final statistical analysis was validated and checked by a qualified statistician to exclude any misleading interpretations.

5.2.7 Sample

The target population consisted of management and HOD's and students from CPUT. The randomly selected target population consisted of twenty managers or HOD's and sixty students.

5.3 ANALYSIS

In total 15 managers and 59 students responded to the questionnaires, that were posted to them. All the statements used a 5 point Likert scale as response method, to enable the use of an ordinal scale and descriptive and inferential statistics for continuous data.

5.3.1 Descriptive statistics

In Table 5.1 the descriptive statistics for all the responses on the statements are presented for the managers and students separately. It shows the frequencies in each category and the percentage out of total sample. The following two aspects are of particular importance and are thus highlighted to the reader as it impacts on the final outcome as documented in the descriptive statistics:

- In both surveys, the outcomes of Question 9 will be omitted from the study as it was found that CPUT adheres to the guidelines of the HEQC as opposed to the ISO 9000:2000 standard. This fact only became known to the researcher after all data have been collected.

The descriptive statistics are based on the total sample. In some cases the respondents did not indicate their response on a statement. These non responses are also included and are indicated as the “unknown” category.

Table 5. 1: Descriptive statistics of responses from management and students

Variables	Categories	Frequency	Percentage out of total
Students Questionnaire			
1. Management of CPUT is strategically focused on quality of service to students.	Strongly agree	5	8.5%
	Agree	35	59.3%
	Undecided	10	17.0%
	Disagree	9	15.2%
2. CPUT is an efficient organisation.	Strongly agree	10	17.0%
	Agree	31	52.5%
	Undecided	9	15.2%
	Disagree	9	15.2%
3. Students are CPUT's most important asset.	Strongly agree	14	23.7%
	Agree	22	37.3%
	Undecided	12	20.3%
	Disagree	8	13.6%
	Strongly disagree	3	5.1%
4. CPUT can improve on the service it provides to students.	Strongly agree	24	40.7%
	Agree	26	44.1%
	Undecided	8	13.6%
	Disagree	1	1.7%
5. The current service that CPUT offers its students is satisfactory.	Strongly agree	4	6.8%
	Agree	26	44.1%
	Undecided	16	27.1%
	Disagree	7	11.9%
	Strongly disagree	5	8.5%
	Unknown	1	1.7%
6. Management is responsible to improve on the current level of service that	Strongly agree	23	39.0%
	Agree	22	37.3%

Variables	Categories	Frequency	Percentage out of total
CPUT offer to students.	Undecided	8	13.6%
	Disagree	4	6.8%
	Strongly disagree	2	3.4%
7. Students are availed the opportunity to give feedback on the service that CPUT offer on a regular basis.	Strongly agree	8	13.6%
	Agree	23	39.0%
	Undecided	16	27.1%
	Disagree	9	15.2%
	Strongly disagree	3	5.1%
8. Management spends sufficient time and resources on providing good service to students.	Agree	23	39.0%
	Undecided	25	42.4%
	Disagree	8	13.6%
	Strongly disagree	2	3.4%
	Unknown	1	1.7%
9. CPUT complies with ISO 9000:2000 Standard for service delivery.	Strongly agree	2	3.4%
	Agree	16	27.1%
	Undecided	35	59.3%
	Disagree	4	6.8%
	Strongly disagree	2	3.4%
10. Strong leadership is required to improve the efficiency of CPUT.	Strongly agree	34	57.6%
	Agree	17	28.8%
	Undecided	6	10.2%
	Disagree	2	3.4%
11. The management of CPUT is committed to continuously improving on the current state of service deliver at CPUT.	Strongly agree	8	13.6%
	Agree	18	30.5%
	Undecided	24	40.7%
	Disagree	7	11.9%
	Strongly disagree	1	1.7%
	Unknown	1	1.7%
12. CPUT has measures in place to ensure that a high level of quality is maintained.	Strongly agree	8	13.6%
	Agree	27	45.8%
	Undecided	17	28.8%
	Disagree	5	8.5%
	Strongly disagree	2	3.4%

Variables	Categories	Frequency	Percentage out of total
13. CPUT has a quality representative to ensure quality of service.	Strongly agree	4	6.8%
	Agree	30	50.8%
	Undecided	18	30.5%
	Disagree	2	3.4%
	Strongly disagree	3	5.1%
	Unknown	2	3.4%
14. Continuous improvement is an important element for sustainability of CPUT.	Strongly agree	25	42.4%
	Agree	26	44.1%
	Undecided	6	10.2%
	Disagree	1	1.7%
	Unknown	1	1.7%
15. Management has an impact on quality.	Strongly agree	18	30.5%
	Agree	27	45.8%
	Undecided	8	13.6%
	Disagree	5	8.5%
	Unknown	1	1.7%
16. Quality control is an absolute requirement for assuring quality.	Strongly agree	27	45.8%
	Agree	22	37.3%
	Undecided	9	15.2%
	Unknown	1	1.7%
17. Communication between CPUT and its students need to be improved.	Strongly agree	30	50.8%
	Agree	18	30.5%
	Undecided	7	11.9%
	Disagree	3	5.1%
	Strongly disagree	1	1.7%
18. CPUT's managers share information regarding the organisation's performance with students.	Strongly agree	5	8.5%
	Agree	20	33.9%
	Undecided	13	22.0%
	Disagree	13	22.0%
	Strongly disagree	6	10.2%
	Unknown	2	3.4%
19. Communication between departments within CPUT needs to be improved.	Strongly agree	25	42.4%
	Agree	26	44.1%

Variables	Categories	Frequency	Percentage out of total
	Undecided	7	11.9%
	Disagree	1	1.7%
Management questionnaires			
1. Management of CPUT is strategically focused on quality of service to students.	Agree	11	73.3%
	Undecided	1	6.7%
	Disagree	2	13.3%
	Strongly disagree	1	6.7%
2. CPUT is an efficient organisation.	Agree	7	46.7%
	Undecided	3	20.0%
	Disagree	3	20.0%
	Strongly disagree	2	13.3%
3. Students are CPUT's most important asset.	Strongly agree	4	26.7%
	Agree	10	66.7%
	Undecided	1	6.7%
4. CPUT can improve on the service it provides to students.	Strongly agree	9	60.0%
	Agree	5	33.3%
	Undecided	1	6.7%
5. The current service that CPUT offers its students is satisfactory.	Agree	4	26.7%
	Undecided	8	53.3%
	Disagree	3	20.0%
6. Management is responsible to improve on the current level of service that CPUT offer to students.	Strongly agree	4	26.7%
	Agree	10	66.7%
	Unknown	1	6.7%
7. Students are availed the opportunity to give feedback on the service that CPUT offer on a regular basis.	Strongly agree	1	6.7%
	Agree	3	20.0%
	Undecided	6	40.0%
	Disagree	5	33.3%
8. Management spends sufficient time and resources on providing good service to students.	Agree	4	26.7%
	Undecided	2	13.3%
	Disagree	8	53.3%
	Strongly disagree	1	6.7%
9. CPUT complies with ISO 9000:2000 Standard for service delivery.	Agree	2	13.3%
	Undecided	6	40.0%

Variables	Categories	Frequency	Percentage out of total
	Disagree	3	20.0%
	Strongly disagree	3	20.0%
	Unknown	1	6.7%
10. Strong leadership is required to improve the efficiency of CPUT.	Strongly agree	7	46.7%
	Agree	8	53.3%
11. The management of CPUT is committed to continuously improving on the current state of service deliver at CPUT.	Strongly agree	1	6.7%
	Agree	6	40.0%
	Undecided	3	20.0%
	Disagree	3	20.0%
	Strongly disagree	1	6.7%
	Unknown	1	6.7%
12. CPUT has measures in place to ensure that a high level of quality is maintained.	Strongly agree	1	6.7%
	Agree	8	53.3%
	Undecided	3	20.0%
	Disagree	3	20.0%
13. CPUT has a quality representative to ensure quality of service.	Strongly agree	3	20.0%
	Agree	10	66.7%
	Undecided	1	6.7%
	Disagree	1	6.7%
14. CPUT is using Six Sigma in order to improve the efficiency of the organisation.	Agree	2	13.3%
	Undecided	8	53.3%
	Disagree	1	6.7%
	Strongly disagree	4	26.7%
15. CPUT makes its quality policy accessible to all staff.	Strongly agree	4	26.7%
	Agree	7	46.7%
	Undecided	3	20.0%
	Disagree	1	6.7%
16. Continuous improvement is an important element for sustainability of CPUT.	Strongly agree	9	60.0%
	Agree	6	40.0%
17. Management has an impact on quality.	Strongly agree	7	46.7%
	Agree	5	33.3%
	Undecided	1	6.7%

Variables	Categories	Frequency	Percentage out of total
	Disagree	1	6.7%
	Strongly disagree	1	6.7%
18. CPUT's quality manual is accessible to all staff.	Strongly agree	2	13.3%
	Agree	4	26.7%
	Undecided	5	33.3%
	Disagree	3	20.0%
	Strongly disagree	1	6.7%
19. Performance Indicators is an effective mechanism to measure quality.	Strongly agree	3	20.0%
	Agree	9	60.0%
	Undecided	3	20.0%
20. Communication between departments within CPUT needs to be improved.	Strongly agree	7	46.7%
	Agree	8	53.3%
21. To effectively implement Six Sigma one requires a high level of managerial support and commitment.	Strongly agree	6	40.0%
	Agree	6	40.0%
	Undecided	2	13.3%
	Strongly disagree	1	6.7%
22. Quality control is an absolute requirement for assuring quality.	Strongly agree	7	46.7%
	Agree	6	40.0%
	Undecided	2	13.3%

5.3.2 Uni-variate graphs

5.3.2.1 Students

It is of importance to note that there is a high percentage of “undecided” students for statements 8 (42.4%), 9 (59.3%), 11 (40.7%) and 13 (30.5). The students also “agree” to “strongly agree” to most of the statements.

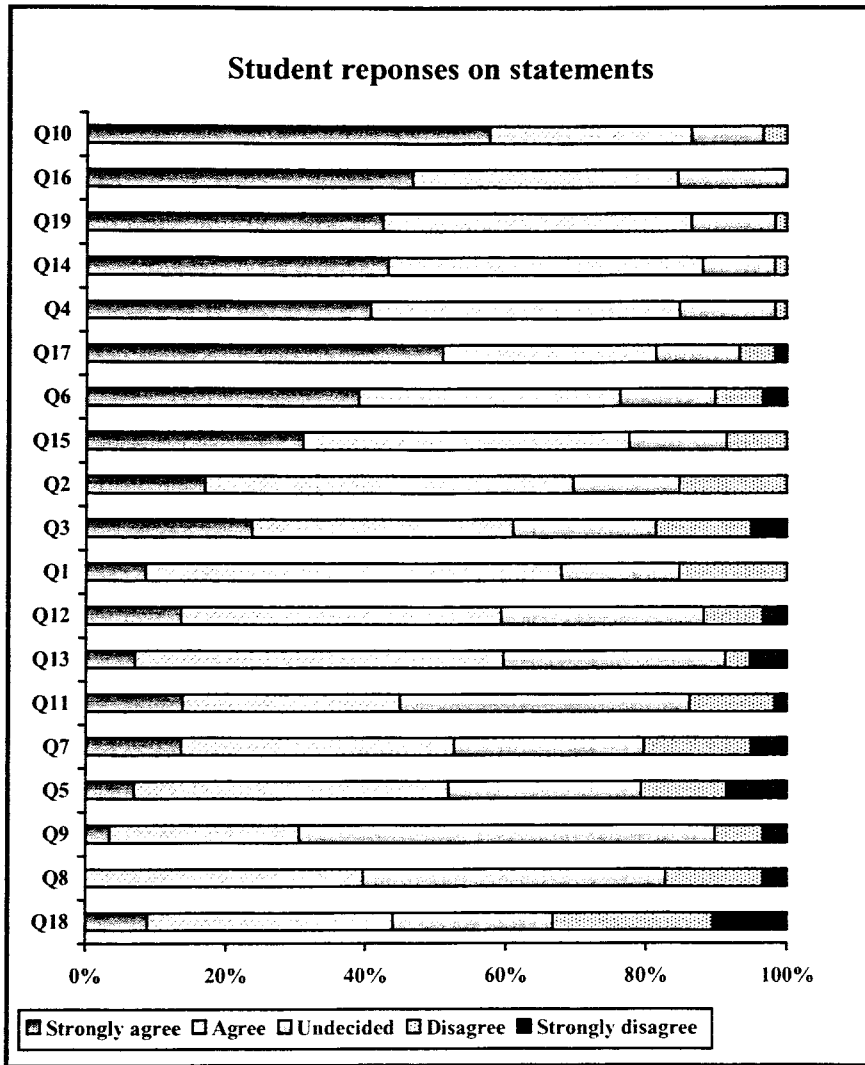


Figure 5. 1: 100% stack bar for student responses

5.3.2.2 Management

It is of importance to note that there is a high percentage of undecided management for statements 5 (42.4%), 7 (40.0%), 9 (40.0%) and 14 (53.3%). Management respondents mostly positive to all the statements except for statement 7, 8, 9 and 149 where the percentage of the negative responses (strongly disagree or disagree) are higher than the positive responses.

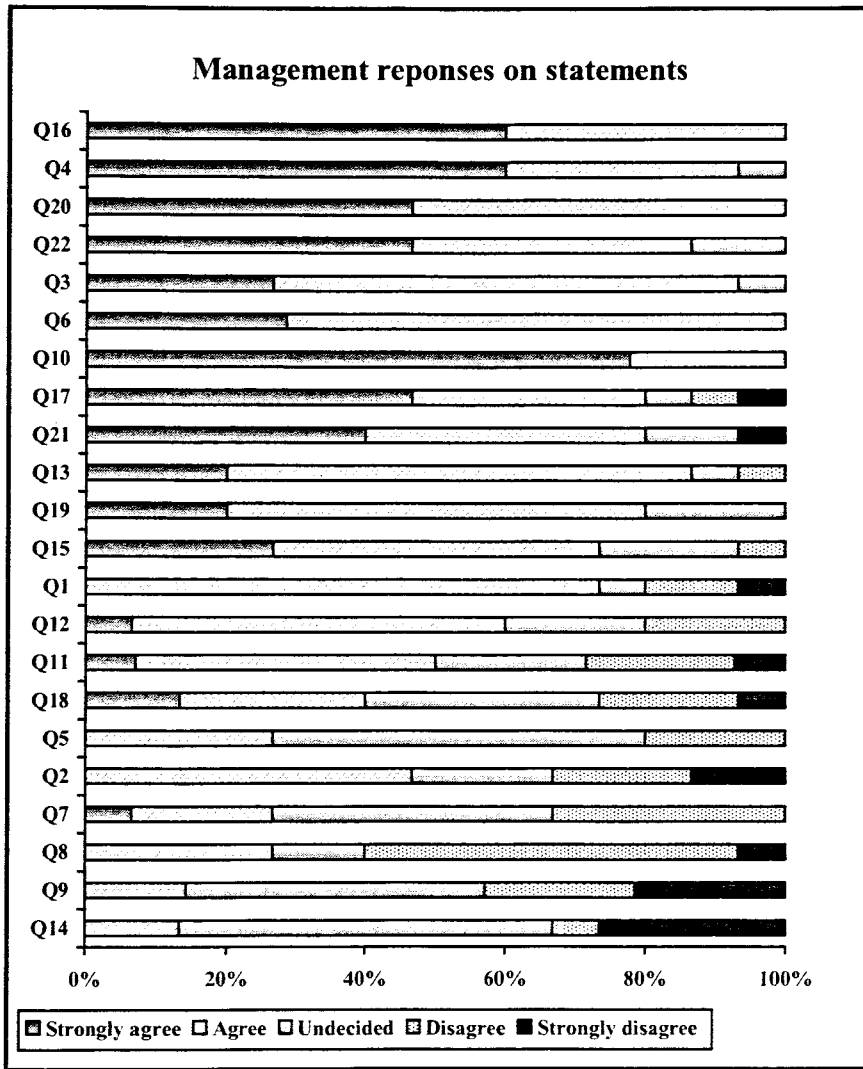


Figure 5. 2: 100% stack bar for management responses

5.3.3 Inferential statistics

5.3.3.1 Reliability testing

A reliability test (Cronbach's Alpha Coefficient) was done on all the items (statements), which represent the measuring instrument of this survey, with respect to the management and students responses separately. According to the Cronbach's Alpha Coefficients (Table 5.3) for the management questionnaire:

- 0.7615 for raw variables; and
- 0.6355 for standardized variables.

In the case of the raw variables were more than the acceptable level of 0.70 this questionnaire proves to be reliable and consistent.

For the student questionnaire however the Cronbach's Alpha Coefficients were less than 0.70. This can be attributed to the fact that data is multidimensional, an aspect which will be addressed later in this paragraph. Nunnally (1978:48) has indicated 0.7 to be an acceptable coefficient but lower thresholds are sometimes used in literature.

Table 5. 2: Cronbach's Alpha Coefficient for student questionnaires

Statements	Variable nr.	Correlation with total	Cronbach's Alpha Coefficient
1. Management of CPUT is strategically focused on quality of service to students.	Q1	0.4455	0.6179
2. CPUT is an efficient organisation.	Q2	0.3965	0.6226
3. Students are CPUT's most important asset.	Q3	0.2735	0.6376
4. CPUT can improve on the service it provides to students.	Q4	-0.0098	0.6668
5. The current service that CPUT offers its students is satisfactory.	Q5	0.1534	0.6547
6. Management is responsible to improve on the current level of service that CPUT offer to students.	Q6	0.3490	0.6273
7. Students are availed the opportunity to give feedback on the service that CPUT offer on a regular basis.	Q7	0.2258	0.6444
8. Management spends sufficient time and resources on providing good service to students.	Q8	0.4135	0.6266
9. CPUT complies with ISO 9000:2000 Standard for service delivery.	Q9	0.2172	0.6443
10. Strong leadership is required to improve the efficiency of CPUT.	Q10	0.1340	0.6532
11. The management of CPUT is committed to continuously improving on the current state of	Q11	0.5009	0.6078

Statements	Variable nr.	Correlation with total	Cronbach's Alpha Coefficient
service deliver at CPUT.			
12. CPUT has measures in place to ensure that a high level of quality is maintained.	Q12	0.3978	0.6220
13. CPUT has a quality representative to ensure quality of service.	Q13	0.2253	0.6434
14. Continuous improvement is an important element for sustainability of CPUT.	Q14	0.2538	0.6410
15. Management has an impact on quality.	Q15	0.3082	0.6338
16. Quality control is an absolute requirement for assuring quality.	Q16	0.2600	0.6406
17. Communication between CPUT and its students need to be improved.	Q17	0.2680	0.6382
18. CPUT's managers share information regarding the organisation's performance with students.	Q18	-0.0486	0.6845
19. Communication between departments within CPUT needs to be improved.	Q19	-0.0423	0.6691
Cronbach's Coefficient Alpha for standardized variable			0.6632
Cronbach's Coefficient Alpha for raw variables			0.6540

Table 5. 3: Cronbach's Alpha Coefficient for management questionaires

Statements	Variable nr.	Correlation with total	Cronbach's Alpha Coefficient
1. Management of CPUT is strategically focused on quality of service to students.		0.5404	0.7348
2. CPUT is an efficient organisation.		0.8029	0.7075
3. Students are CPUT's most important asset.		-0.5238	0.7886
4. CPUT can improve on the service it provides to students.		-0.4060	0.7865
5. The current service that CPUT offers its students is satisfactory.		0.2012	0.7589
6. Management is responsible to improve on the current level of service that CPUT offer to students.		-0.5633	0.7844

Statements	Variable nr.	Correlation with total	Cronbach's Alpha Coefficient
7. Students are availed the opportunity to give feedback on the service that CPUT offer on a regular basis.		0.4741	0.7411
8. Management spends sufficient time and resources on providing good service to students.		0.5701	0.7325
9. CPUT complies with ISO 9000:2000 Standard for service delivery.		0.4780	0.7398
10. Strong leadership is required to improve the efficiency of CPUT.		-0.3080	0.7774
11. The management of CPUT is committed to continuously improving on the current state of service deliver at CPUT.		0.6914	0.7205
12. CPUT has measures in place to ensure that a high level of quality is maintained.		0.3324	0.7513
13. CPUT has a quality representative to ensure quality of service.		0.4801	0.7425
14. CPUT is using Six Sigma in order to improve the efficiency of the organisation.		0.3734	0.7482
15. CPUT makes its quality policy accessible to all staff.		0.5610	0.7387
16. Continuous improvement is an important element for sustainability of CPUT.		0.3096	0.7548
17. Management has an impact on quality.		0.6238	0.7241
18. CPUT's quality manual is accessible to all staff.		0.5861	0.7288
19. Performance Indicators is an effective mechanism to measure quality.		-0.1016	0.7741
20. Communication between departments within CPUT needs to be improved.		0.0315	0.7651
21. To effectively implement Six Sigma one requires a high level of managerial support and commitment.		0.2716	0.7566
22. Quality control is an absolute requirement for		0.1387	0.7625

Statements	Variable nr.	Correlation with total	Cronbach's Alpha Coefficient
assuring quality.			
Cronbach's Coefficient Alpha for standardized variable			0.6355
Cronbach's Coefficient Alpha for raw variables			0.7615

Shown in Table 5.2 are the results of the statements to the students used as measuring instrument. It shows the correlation between the respective item and the total sum score (without the respective item) and the internal consistency of the scale (coefficient alpha) if the respective item would be deleted. By deleting the items (statements) one by one each time with the statement with the highest Cronbach Alpha value, the Alpha value will increase. In the right-most column of Table 5.2, one can observe that the reliability of the scale would be higher if any of these statements are deleted. The items (statements) will be deleted from the scale for "Question 18" because the Cronbach Alpha Coefficient will increase to 0.6845 if it is deleted. By deleting the statements with the highest Cronbach Alpha Coefficient, one by one, eventually a final set of items, which proves to be reliable will be identified. (Note the fewer items in a scale, the less reliable the scale)

After deleting the items (statements) "Question18", "Question19" and "Question 4" in that order, the alpha coefficients were calculated on the remaining items (statements) and the results which prove to be reliable, are shown in Table 5.4.

Table 5. 4: Cronbach's Alpha Coefficient after deleting some statements for student questionnaires

Statements	Variable nr.	Correlation with total	Cronbach's Alpha Coefficient
1. Management of CPUT is strategically focused on quality of service to students.	Q1	0.4850	0.6775
2. CPUT is an efficient organisation.	Q2	0.4634	0.6787
3. Students are CPUT's most important asset.	Q3	0.3209	0.6955
5. The current service that CPUT offers its students is satisfactory.	Q5	0.2560	0.7035

Statements	Variable nr.	Correlation with total	Cronbach's Alpha Coefficient
6. Management is responsible to improve on the current level of service that CPUT offer to students.	Q6	0.3310	0.6934
7. Students are availed the opportunity to give feedback on the service that CPUT offer on a regular basis.	Q7	0.2064	0.7096
8. Management spends sufficient time and resources on providing good service to students.	Q8	0.4484	0.6838
9. CPUT complies with ISO 9000:2000 Standard for service delivery.	Q9	0.1965	0.7069
10. Strong leadership is required to improve the efficiency of CPUT.	Q10	0.0483	0.7211
11. The management of CPUT is committed to continuously improving on the current state of service deliver at CPUT.	Q11	0.5171	0.6715
12. CPUT has measures in place to ensure that a high level of quality is maintained.	Q12	0.4394	0.6812
13. CPUT has a quality representative to ensure quality of service.	Q13	0.2647	0.7006
14. Continuous improvement is an important element for sustainability of CPUT.	Q14	0.2700	0.7002
15. Management has an impact on quality.	Q15	0.2803	0.6991
16. Quality control is an absolute requirement for assuring quality.	Q16	0.1978	0.7063
17. Communication between CPUT and its students need to be improved.	Q17	0.2052	0.7078
Cronbach's Coefficient Alpha for standardized variables			0.7127
Cronbach's Coefficient Alpha for raw variables			0.7100

Cronbach's Alpha is an index of reliability associated with the variation accounted for by the true score of the "underlying construct". Construct is the

hypothetical variables (statements) that are being measured (Cooper & Schindler, 2006:216-217). More specific, Cronbach's alpha measures how well a set of items (or variables) measures a single uni-dimensional latent construct.

5.3.3.2 Analysis of variance

Due to the fact that the Likert scale is used as response method, where "Strongly agree" takes on the value '1' and "Strongly disagree" takes on the value '5', the mean scoring of the students was compared to the mean scoring of management for where the statements that were posted were the same, by using the Analysis of Variance (ANOVA). The analysis of variance proves that there are statistically significant differences between the means of the student's responses and management's responses for a number of statements. These differences are shown in Table 5.5. The F-ratio will be used to determine statistical significance. The decision of whether or not to reject the null hypothesis is determined by the relative size of the F ratio. The critical value for the level of significance used is $\alpha=0.05$. See Annexure B for the statistical outputs.

Table 5. 5: Statistical significant differences between mean responses of students and management

Statement	Mean Management	Mean Student	Difference	F-Value	P-Value
2. CPUT is an efficient organisation.	3.000	2.288	0.712	6.41	0.0135*
8. Management spends sufficient time and resources on providing good service to students.	3.400	2.810	0.590	5.82	0.0184*
9. CPUT complies with ISO 9000:2000 Standard for service delivery.	3.500	2.797	0.703	8.45	0.0049**

Figures 5.3 – 5.5 show the box plots for the statements where the students and management differed statistically significantly. It is of importance to note that the

1 on the Y-axis means strongly agree and the 5 on the y-axis means strongly disagree as the original Likert scale determined.

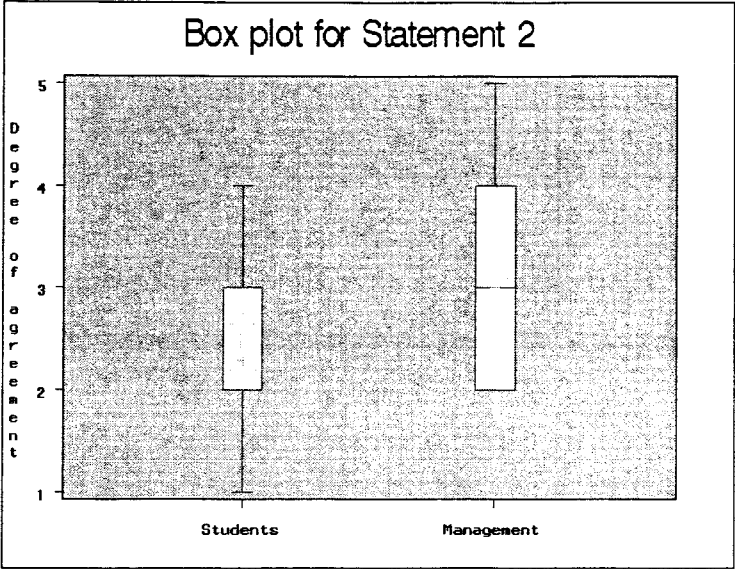


Figure 5. 3: Box plot for statement 2

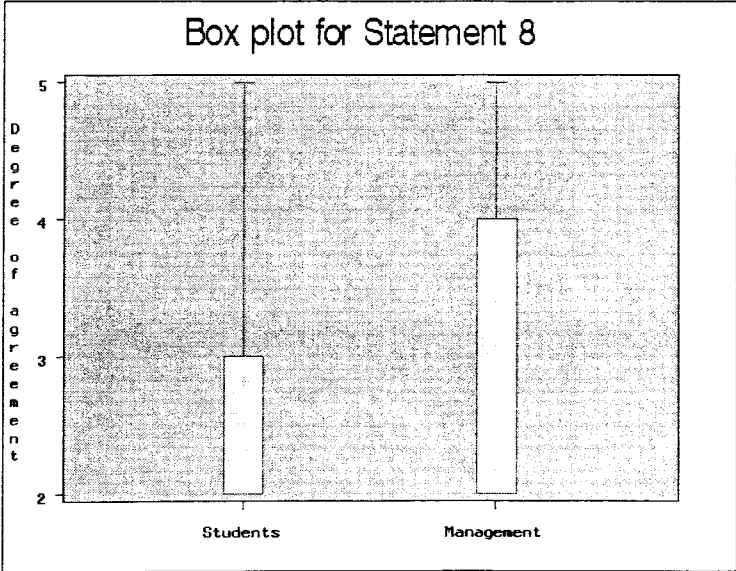


Figure 5. 4: Box plot for statement 8

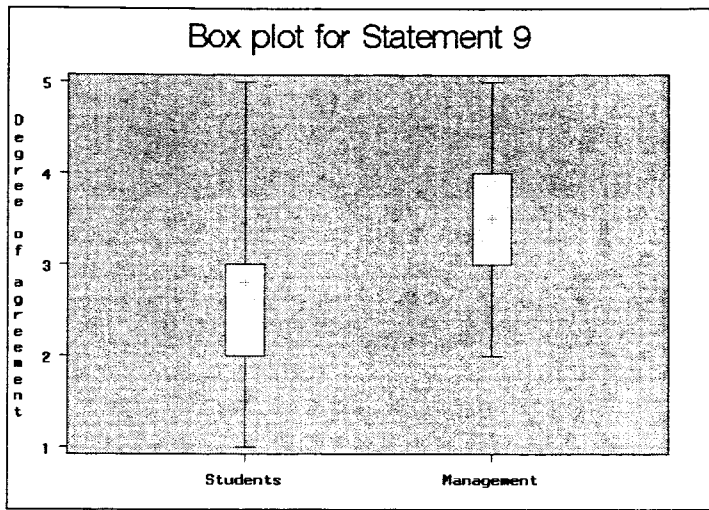


Figure 5. 5: Box plot for statement 9

Students agree stronger than management to all three these statements.

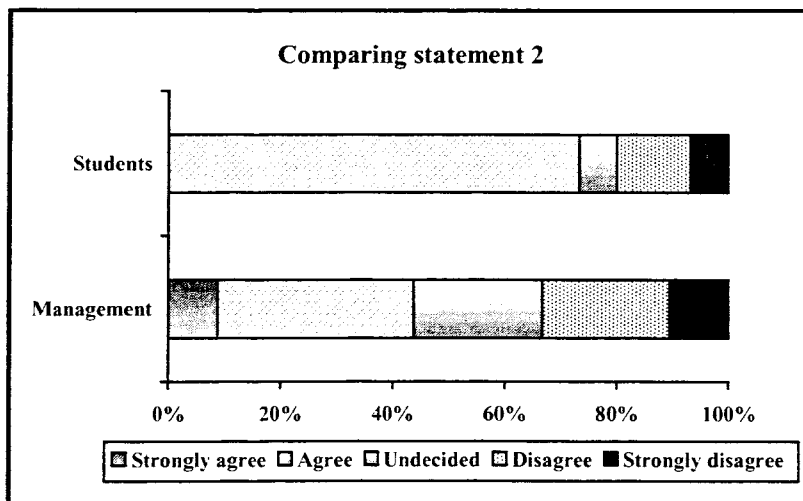


Figure 5. 6: 100% stack bar showing comparison for statement 2

Statistically significantly more students agree that CPUT is an efficient organisation than Management.

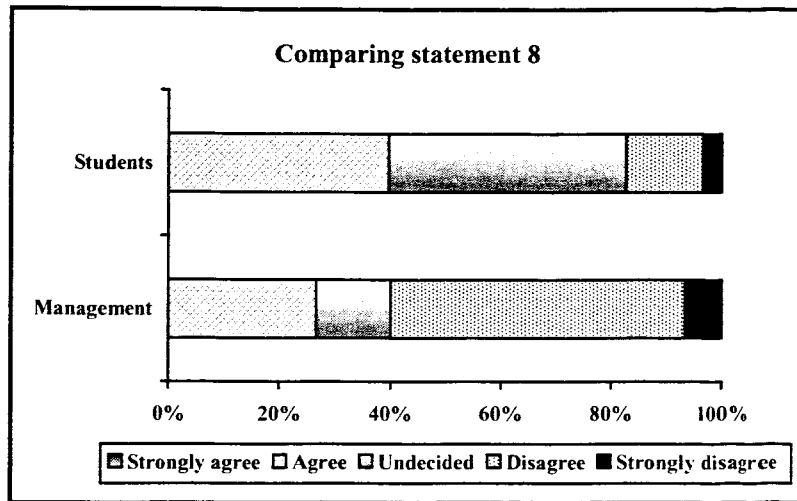


Figure 5. 7: 100% stack bar showing comparison for statement 8

Statistically significantly more respondents from management, disagree management spend sufficient time and resources on providing good service to students than the student respondents.

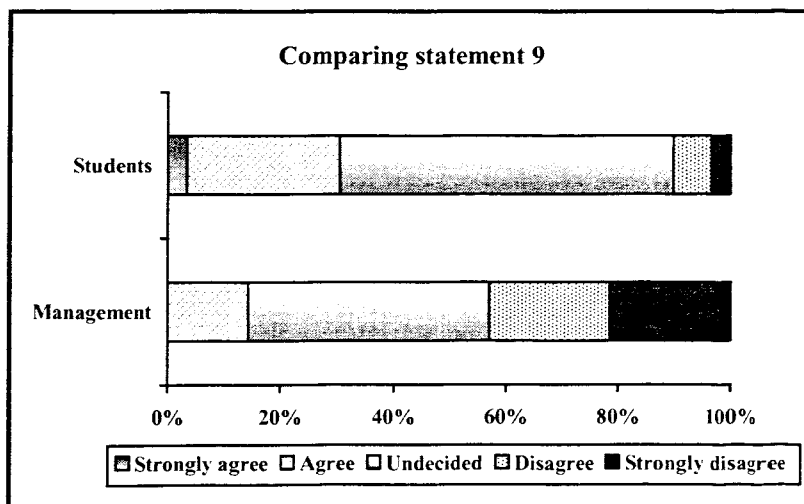


Figure 5. 8: 100% stack bar showing comparison for statement 9

Statistically significantly more respondents from management disagree that CPUT complies with ISO 9000:2000 standard for service delivery, than the student respondents. It is of importance to note that a large percentage is undecided.

For the statements that there were no statistically significant difference in outcome; the responses of the students and management can be aggregated to describe the view of students and management together at CPUT. These aggregations for the statements that are the same are shown in Table 5.6.

Table 5. 6: Descriptive statistics of responses for management and students together

Variables	Categories	Frequency	Percentage out of total
1. Management of CPUT is strategically focused on quality of service to students.	Strongly agree	5	6.8%
	Agree	46	62.2%
	Undecided	11	14.9%
	Disagree	11	14.9%
	Strongly disagree	1	1.4%
3. Students are CPUT's most important asset.	Strongly agree	18	24.3%
	Agree	32	43.2%
	Undecided	13	17.6%
	Disagree	8	10.8%
	Strongly disagree	3	4.0%
4. CPUT can improve on the service it provides to students.	Strongly agree	33	44.6%
	Agree	31	44.9%
	Undecided	9	12.2%
	Disagree	1	1.4%
5. The current service that CPUT offers its students is satisfactory.	Strongly agree	4	5.4%
	Agree	30	40.5%
	Undecided	24	32.4%
	Disagree	10	13.5%
	Strongly disagree	5	6.8%
	Unknown	1	1.4%
6. Management is responsible to improve on the current level of service that CPUT offer to students.	Strongly agree	27	36.5%
	Agree	32	43.2%
	Undecided	9	12.2%
	Disagree	4	5.4%
	Strongly disagree	2	2.7%
7. Students are availed the opportunity to give feedback on the service that CPUT offer on a regular basis.	Strongly agree	9	12.2%
	Agree	26	35.1%
	Undecided	22	29.7%
	Disagree	14	18.9%
	Strongly disagree	3	4.0%
10. Strong leadership is required to improve the efficiency of CPUT.	Strongly agree	41	55.4%
	Agree	25	33.8%

Variables	Categories	Frequency	Percentage out of total
	Undecided	6	8.1%
	Disagree	2	2.7%
11. The management of CPUT is committed to continuously improving on the current state of service deliver at CPUT.	Strongly agree	9	12.2%
	Agree	24	32.4%
	Undecided	27	36.5%
	Disagree	10	13.5%
	Strongly disagree	2	2.7%
	Unknown	2	2.7%
12. CPUT has measures in place to ensure that a high level of quality is maintained.	Strongly agree	9	12.2%
	Agree	35	47.3%
	Undecided	20	27.0%
	Disagree	8	10.8%
	Strongly disagree	2	2.7%
13. CPUT has a quality representative to ensure quality of service.	Strongly agree	7	9.5%
	Agree	40	54.0%
	Undecided	19	25.7%
	Disagree	3	4.0%
	Strongly disagree	3	4.0%
	Unknown	2	2.7%

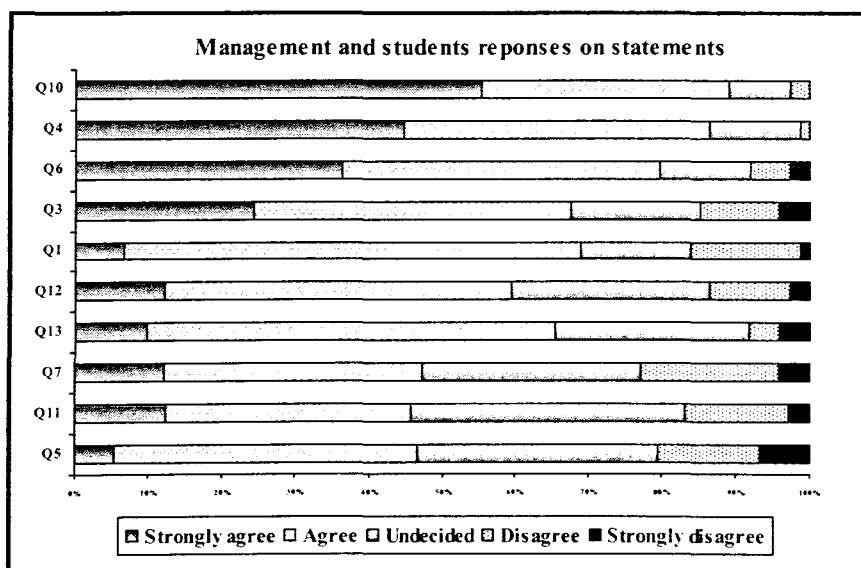


Figure 5. 9: 100% stack bar for students and management responses

5.3.3.3 Spearman Rank Correlations

The main purpose of this study is to determine whether management of CPUT is strategically focused on quality of service to students and whether this has an impact on the efficiency of CPUT as an organisation.

Spearman rank correlations (Myers, Arnold and Well 2003:508) were calculated to determine whether there is a relationship between the two statements which indicate whether:

- The management of CPUT is strategically focused on the quality of service to students; and
- CPUT is an efficient organisation.

The results for the students as well as management are shown in table 5.7 and 5.8. Annexure C shows all the statistics.

Table 5. 7: Spearman Rank Correlation for students

Spearman rank correlation / P-value	Management of CPUT is strategically focused on quality of service to students.
CPUT is an efficient organisation.	0.4658 0.0002***

Table 5. 8: Spearman Rank Correlation for management

Spearman rank correlation / P-value	Management of CPUT is strategically focused on quality of service to students.
CPUT is an efficient organisation.	0.4028 0.1366

According to the student responses, there is a statistically significant positive relationship between these two statements, but according to the management responses there is no proof of such a relationship. This can be due to the fact that the management are not so sure whether CPUT is an efficient organisation.

CHAPTER 6: CONCLUSION

6.1 BACKGROUND

In the research conducted thus far, the scope of the research was discussed (Chapter 1), and a holistic perspective of the research environment was provided in Chapter 2. In Chapter 3 a literature review was conducted on the issue of quality management with specific focus levelled at the following:

- Management,
- Continuous improvement,
- Six Sigma,
- Quality,
- Lean, and
- Total Quality Management.

In Chapter 4, the research design and methodology was elaborated upon in detail to ultimately culminate in the data analysis and interpretation of results in Chapter 5.

6.2 THE RESEARCH PROBLEM REVISITED

The research problem which was researched within the ambit of this dissertation reads as follows: “Management at CPUT is not strategically focused on the quality of service to students, impacting adversely on the efficiency of the organisation”.

6.3 THE RESEARCH HYPOTHESIS REVISITED

The research hypothesis which forms the crux of this dissertation reads as follows:

Ho: Management has a strategic focus on the quality of service to students at CPUT, having a positive impact on the efficiency of the organisation.

H1: Management does not have a strategic focus on the quality of service to students at CPUT, having a negative impact on the efficiency of the organisation.

Two surveys were developed and randomly distributed to managers and students of CPUT. The majority of the questions posed to both groups were the same, the purpose thereof was to determine whether management and students responded differently in terms of service delivery at CPUT. According to the data gleaned from the survey with specific reference to Paragraph 5.3.3.2, the mean values of management and students with regard to statements 2 and 8 compares favourably.

Table 5.5 (Chapter 5) provides the statistical significant differences between the mean responses of students and management. The ANOVA or analysis of variance was used to compare the responses of management and students and proved that there are statistically significant differences in the means of management and students. For statement 2 the difference was 0.712 and 0.590 for statement 8, and the F-ratio was used to determine statistical significance. The relative size of the F-ratio determined whether or not to reject the null hypothesis. Based on the findings obtained from the survey it is evident that the null hypothesis should be rejected as the p-value (0.0135) is smaller than the level of significance (0.05) for statement 2. Furthermore, the findings also indicate that the null hypothesis should be rejected as the p-value (0.0184) is smaller than the level of significance (0.05) for statement 8. When combining statements 2 and 8 it actually amalgamates into the hypothesis statement and the findings in both statements 2 and 8 indicates that the null hypothesis be rejected. This transposes into the fact that management do not have a strategic focus on the quality of service to students at CPUT, culminating in a negative impact on the efficiency of the organisation.

Based on the box plots for statements 2 and 8 (Refer to Figures 5.3 and 5.4 respectively in Paragraph 5.3.3.2, Chapter 5), students agree stronger than management to both statements. Figure 5.6 indicates the comparison of statement 2 of both management and students, and indicates that statistically significantly more students agree that CPUT is an efficient organisation than management. Controversially, Figure 5.7 which indicates the comparison of statement 8 of both management and students show that statistically significantly more respondents from management disagree that management spend sufficient time and resources on providing good service to students.

According to Deming's first point (create consistency of purpose) of his 14 points, management is required to commit resources over the long term to ensure that a quality job is done. 'The job' referred to in this instance is that of providing or delivering a quality service to students of CPUT (Refer to Paragraph 3.8.3, Chapter 3). In the literature review Peters (1999:6) were cited who suggests that, in order to run an organisation better the needs and expectation of its customers need to be identified to ensure that these needs and expectations are met to encourage repeat purchase and attract potential customers (Refer to Paragraph 3.1, Chapter 3). As a result, management should have a strategic focus on the quality of service to students

6.4 THE INVESTIGATIVE QUESTIONS REVISITED

The investigative questions researched in support of the research question reads as follows:

- Are there clear tangent planes between management, Six Sigma and quality?
- To what extent is management responsible for quality assurance?
- What are the key drivers of continuous improvement in an organisation?
- Does Six Sigma hold the key to improvement in an organisation?
- To what extent does quality management improve the efficiency of an organisation?

According to the literature with reference to Paragraph 3.6.1, Atkinson (1994:6) is of the opinion that the following six elements need to be considered when embarking on continuous improvement program:

- Management commitment.
- Education.
- Implementation.
- Measurement and benchmarking.
- Recognition.
- Regeneration.

Deming's views on improving leadership indicates that an organisation can only make major improvements with regard to quality, if top management is involved

as they have the necessary authority and resources to implement quality improvement. “Without management support and leadership, quality improvement efforts will fail” (Omachonu & Ross, 2004:7). The obvious analogy can be drawn that the above elements are key drivers in the quest for continuous improvement in organisations.

According to Anonymous 1 (2008:Online), Deming’s PDCA cycle (which consists of a four stage checklist) (Omachonu & Ross, 2004:103), coordinates organisations’ improvement efforts and improvement will only occur if plans are formulated. It is evident that planning is the starting point of the PDCA cycle. Furthermore planning is a managerial function thus indicating that management has an impact on quality (Refer to Paragraph 3.6.4, Chapter 3).

Thevnin (2004:195), states that due to the competitiveness of the business environment, a shift in quality and customer satisfaction are required by organisations as they will not achieve competitive superiority if they do not take quality in consideration. Furthermore, according to Thevnin (2004:195), a need has thus arisen to adopt a quality tool and chart a strategy from a quality perspective, the purpose of the tool to improve the organisation’s position in the market environment and leading to the organisation obtaining a good reputation with regard to quality.

According to Peters (1999:6), quality management culminated as a result of the requirement to run the organisation better and more efficiently. Furthermore, the organisation needs to determine the most efficient manner in which to produce a product or service without wasting time and resources on rework or delivering an unsatisfactory service.

Anonymous 3 (2008:Online), is of the opinion that, “Quality management is a method for ensuring that all the activities necessary to design, develop and implement a product or service are effective and efficient with respect to the system and performance”. According to Deming (Omachonu & Ross, 2004:7), improvement is management’s responsibility because they need to provide the systems or means to accomplish high performance goals.

6.5 KEY RESEARCH OBJECTIVES REVISITED

The key research objectives of this dissertation read as follows:

- To identify key drivers underpinning complaints at CPUT in terms of service delivery.
- To determine if management has a strategic focus on the quality of service to students at CPUT.
- To demonstrate the impact that management has on the quality of service delivery.
- To improve customer service at CPUT by minimizing complaints.

Reynolds and Harris (2005:321), are of the opinion that organisations should encourage complaints, as this leads to useful insight into the nature of complaints. Furthermore, Reynolds and Harris (2005:322) citing Day *et al.* (1981), found that in some instances, customers pre-plan complaints and this act is labelled as ‘faked complaints’ which could lead to the organisation obtaining an image of service failure, however this is not a true representation of the organisation, thus impacting adversely on the efficiency of the organisation.

Based on the results of the survey, management does not have a strategic focus on the quality of service to students. This fact is supported by the data gleaned from the survey shown in Table 5.5 as the results indicate that the p-values for statements 2 and 8 are both smaller than the level of significance. Peters (1999:6), states that the needs and expectations of the customer need to be highlighted to ensure customer satisfaction. Customers should as a result, be the focal point of management’s improvement efforts. In the opinion of this researcher, the research objectives were met through the literature review and the conducted surveys.

6.6 DISCUSSIONS AND CONCLUSION

The following analogies can be drawn from the information gleaned from the questionnaires sent to students and management of CPUT:

- Strong leadership is required to improve the efficiency of CPUT.
- CPUT can improve on the service it provides to students.

- Management is responsible to improve on the current level of service that CPUT offers to students.
- Students are CPUT's most important asset.
- Management of CPUT is strategically focused on quality of service to students.
- CPUT has measures in place to ensure that a high level of quality is maintained.
- CPUT has a quality representative to ensure quality of service.

Data returned from the management questionnaire points to the following:

- Continuous improvement is an important element for sustainability of CPUT.
- Performance indicators are an effective mechanism to measure quality.
- CPUT is using Six Sigma in order to improve the efficiency of the organisation.
- Management has an impact on quality.
- CPUT makes its quality policy accessible to all staff.

6.7 RECOMMENDATIONS

Recommendations to mitigate to the research problem and to provide an answer to the investigative questions, the following:

- Develop a more sophisticated management system tailored to higher education as the manufacturing based systems are not as effective when applied in higher education.
- CPUT's management need to have a strategic focus on meeting and exceeding customer (student) expectations by delivering quality service in order to capture the market.
- Management of CPUT need to focus their energy on continuous improvement for sustainability purposes, and in order to meet the challenges of globalisation and market competition.
- Encourage student feedback by providing students with the opportunity to give suggestions or feedback with regard to improving service delivery. (By having suggestion boxes, feedback cards or questionnaires at all faculties and

servicing departments for example: Information Technology, Library, Clinic, student debtors departments etc.).

6.8 CONCLUSION

The challenges facing higher education was identified as increasing customer demand for quality products and services, globalisation and competition for market share. In order for organisations (higher education institutions) to keep abreast with these technological advancements, management of these organisations need to have a strategic focus on quality of service to students. By encouraging student feedback management will be able to identify areas where improvement is needed and subsequently focus their energy on improving customer service by minimizing complaints.

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ANNEXURE A:

Descriptive statistics for each variable
Students

	The FREQ Procedure			
Q1	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Strongly agree	5	8.47	5	8.47
Agree	35	59.32	40	67.80
Undecided	10	16.95	50	84.75
Disagree	9	15.25	59	100.00
	Chi-Square Test			

for Equal Proportions
 Chi-Square 38.0169
 DF 3
 Pr > ChiSq <.0001
 Sample Size = 59

	Q2	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Strongly agree		10	16.95	10	16.95
Agree		31	52.54	41	69.49
Undecided		9	15.25	50	84.75
Disagree		9	15.25	59	100.00

Chi-Square Test
 for Equal Proportions
 Chi-Square 23.9153
 DF 3
 Pr > ChiSq <.0001
 Sample Size = 59

	Q3	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Strongly agree		14	23.73	14	23.73
Agree		22	37.29	36	61.02
Undecided		12	20.34	48	81.36
Disagree		8	13.56	56	94.92
Strongly disagree		3	5.08	59	100.00

Chi-Square Test
 for Equal Proportions
 Chi-Square 17.0169
 DF 4
 Pr > ChiSq 0.0019
 Sample Size = 59

	Q4	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Strongly agree		24	40.68	24	40.68
Agree		26	44.07	50	84.75
Undecided		8	13.56	58	98.31
Disagree		1	1.69	59	100.00

Chi-Square Test
 for Equal Proportions
 Chi-Square 30.2881
 DF 3
 Pr > ChiSq <.0001
 Sample Size = 59

	Q5	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Strongly agree	0	1	1.69	1	1.69
Agree		4	6.78	5	8.47
Undecided		26	44.07	31	52.54
Disagree		16	27.12	47	79.66
Strongly disagree		7	11.86	54	91.53
		5	8.47	59	100.00

Chi-Square Test
 for Equal Proportions
 Chi-Square 45.0339
 DF 5
 Pr > ChiSq <.0001
 Sample Size = 59

	Q6	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Strongly agree		23	38.98	23	38.98
Agree		22	37.29	45	76.27
Undecided		8	13.56	53	89.83
Disagree		4	6.78	57	96.61
Strongly disagree		2	3.39	59	100.00

Chi-Square Test
 for Equal Proportions
 Chi-Square 33.9661
 DF 4
 Pr > ChiSq <.0001
 Sample Size = 59

	Q7	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Strongly agree		8	13.56	8	13.56
Agree		23	38.98	31	52.54
Undecided		16	27.12	47	79.66
Disagree		9	15.25	56	94.92
Strongly disagree		3	5.08	59	100.00

Chi-Square Test
 for Equal Proportions
 Chi-Square 20.5763
 DF 4
 Pr > ChiSq 0.0004

Sample Size = 59

Q8	Frequency	Percent	Cumulative Frequency	Cumulative Percent
0	1	1.69	1	1.69
Agree	23	38.98	24	40.68
Undecided	25	42.37	49	83.05
Disagree	8	13.56	57	96.61
Strongly disagree	2	3.39	59	100.00

Chi-Square Test
for Equal Proportions
Chi-Square 44.6441
DF 4
Pr > ChiSq <.0001
Sample Size = 59

Q9	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Strongly agree	2	3.39	2	3.39
Agree	16	27.12	18	30.51
Undecided	35	59.32	53	89.83
Disagree	4	6.78	57	96.61
Strongly disagree	2	3.39	59	100.00

Chi-Square Test
for Equal Proportions
Chi-Square 68.5424
DF 4
Pr > ChiSq <.0001
Sample Size = 59

Q10	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Strongly agree	34	57.63	34	57.63
Agree	17	28.81	51	86.44
Undecided	6	10.17	57	96.61
Disagree	2	3.39	59	100.00

Chi-Square Test
for Equal Proportions
Chi-Square 41.6780
DF 3
Pr > ChiSq <.0001
Sample Size = 59

Q11	Frequency	Percent	Cumulative Frequency	Cumulative Percent
0	1	1.69	1	1.69
Strongly agree	8	13.56	9	15.25
Agree	18	30.51	27	45.76
Undecided	24	40.68	51	86.44
Disagree	7	11.86	58	98.31
Strongly disagree	1	1.69	59	100.00

Chi-Square Test
for Equal Proportions
Chi-Square 44.2203
DF 5
Pr > ChiSq <.0001
Sample Size = 59

Q12	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Strongly agree	8	13.56	8	13.56
Agree	27	45.76	35	59.32
Undecided	17	28.81	52	88.14
Disagree	5	8.47	57	96.61
Strongly disagree	2	3.39	59	100.00

Chi-Square Test
for Equal Proportions
Chi-Square 35.1525
DF 4
Pr > ChiSq <.0001
Sample Size = 59

Q13	Frequency	Percent	Cumulative Frequency	Cumulative Percent
0	2	3.39	2	3.39
Strongly agree	4	6.78	6	10.17
Agree	30	50.85	36	61.02
Undecided	18	30.51	54	91.53
Disagree	2	3.39	56	94.92
Strongly disagree	3	5.08	59	100.00

Chi-Square Test
for Equal Proportions
Chi-Square 68.8305
DF 5
Pr > ChiSq <.0001
Sample Size = 59

Q14	Frequency	Percent	Cumulative Frequency	Cumulative Percent
0	1	1.69	1	1.69
Strongly agree	25	42.37	26	44.07
Agree	26	44.07	52	88.14
Undecided	6	10.17	58	98.31
Disagree	1	1.69	59	100.00

Chi-Square Test
for Equal Proportions
Chi-Square 54.4746
DF 4
Pr > ChiSq <.0001
Sample Size = 59

Q15	Frequency	Percent	Cumulative Frequency	Cumulative Percent
0	1	1.69	1	1.69
Strongly agree	18	30.51	19	32.20
Agree	27	45.76	46	77.97
Undecided	8	13.56	54	91.53
Disagree	5	8.47	59	100.00

Chi-Square Test
for Equal Proportions
Chi-Square 37.8644
DF 4
Pr > ChiSq <.0001
Sample Size = 59

Q16	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Strongly agree	27	45.76	28	47.46
Agree	22	37.29	50	84.75
Undecided	9	15.25	59	100.00

Chi-Square Test
for Equal Proportions
Chi-Square 28.7966
DF 3
Pr > ChiSq <.0001
Sample Size = 59

Q17	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Strongly agree	30	50.85	30	50.85
Agree	18	30.51	48	81.36
Undecided	7	11.86	55	93.22
Disagree	3	5.08	58	98.31
Strongly disagree	1	1.69	59	100.00

Chi-Square Test
for Equal Proportions
Chi-Square 49.7288
DF 4
Pr > ChiSq <.0001
Sample Size = 59

Q18	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Strongly agree	5	8.47	7	11.86
Agree	20	33.90	27	45.76
Undecided	13	22.03	40	67.80
Disagree	13	22.03	53	89.83
Strongly disagree	6	10.17	59	100.00

Chi-Square Test
for Equal Proportions
Chi-Square 22.6610
DF 5
Pr > ChiSq 0.0004
Sample Size = 59

Q19	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Strongly agree	25	42.37	25	42.37
Agree	26	44.07	51	86.44
Undecided	7	11.86	58	98.31
Disagree	1	1.69	59	100.00

Chi-Square Test
for Equal Proportions
Chi-Square 32.5932
DF 3
Pr > ChiSq <.0001
Sample Size = 59

Students

The CORR Procedure							
Simple Statistics							
Variable	N	Mean	Std Dev	Sum	Minimum	Maximum	Label
Q1	53	2.35849	0.85697	125.00000	1.00000	4.00000	Q1
Q2	53	2.20755	0.90636	117.00000	1.00000	4.00000	Q2
Q3	53	2.32075	1.08793	123.00000	1.00000	5.00000	Q3
Q4	53	1.77358	0.77563	94.00000	1.00000	4.00000	Q4
Q5	53	2.67925	1.08793	142.00000	1.00000	5.00000	Q5
Q6	53	1.88679	0.99345	100.00000	1.00000	5.00000	Q6
Q7	53	2.64151	1.07586	140.00000	1.00000	5.00000	Q7
Q8	53	2.71698	0.68997	144.00000	2.00000	4.00000	Q8
Q9	53	2.81132	0.78585	149.00000	1.00000	5.00000	Q9
Q10	53	1.56604	0.82063	83.00000	1.00000	4.00000	Q10
Q11	53	2.58491	0.94937	137.00000	1.00000	5.00000	Q11
Q12	53	2.37736	0.92459	126.00000	1.00000	5.00000	Q12
Q13	53	2.41509	0.84202	128.00000	1.00000	5.00000	Q13
Q14	53	1.67925	0.72784	89.00000	1.00000	4.00000	Q14
Q15	53	1.96226	0.87623	104.00000	1.00000	4.00000	Q15
Q16	53	1.66038	0.70557	88.00000	1.00000	3.00000	Q16
Q17	53	1.75472	0.95888	93.00000	1.00000	5.00000	Q17
Q18	53	2.81132	1.14450	149.00000	1.00000	5.00000	Q18
Q19	53	1.77358	0.75042	94.00000	1.00000	4.00000	Q19

Cronbach Coefficient Alpha
 Variables Alpha
 Raw 0.653955
 Standardized 0.663175

Cronbach Coefficient Alpha with Deleted Variable					
Raw Variables			Standardized Variables		
Deleted Variable	Correlation with Total	Alpha	Correlation with Total	Alpha	Label
Q1	0.445493	0.617902	0.456444	0.626193	Q1
Q2	0.396462	0.622595	0.369446	0.636680	Q2
Q3	0.273472	0.637598	0.256173	0.649963	Q3
Q4	-.009812	0.666762	0.025005	0.675806	Q4
Q5	0.153401	0.654731	0.137416	0.663448	Q5
Q6	0.349044	0.627340	0.358986	0.637924	Q6
Q7	0.225848	0.644364	0.230223	0.652947	Q7
Q8	0.413479	0.626569	0.402984	0.632667	Q8
Q9	0.217168	0.644335	0.209449	0.655322	Q9
Q10	0.133956	0.653161	0.169471	0.659852	Q10
Q11	0.500944	0.607767	0.501092	0.620714	Q11
Q12	0.397839	0.622030	0.371466	0.636439	Q12
Q13	0.225294	0.643424	0.177830	0.658909	Q13
Q14	0.253760	0.640978	0.264388	0.649013	Q14
Q15	0.308190	0.633786	0.313684	0.643271	Q15
Q16	0.260028	0.640590	0.277775	0.647461	Q16
Q17	0.268045	0.638231	0.301026	0.644753	Q17
Q18	-.048560	0.684475	-.051399	0.683985	Q18
Q19	-.042292	0.669105	-.014056	0.680010	Q19

Cronbach Coefficient Alpha
 Variables Alpha
 Raw 0.709995
 Standardized 0.712659

Cronbach Coefficient Alpha with Deleted Variable					
Raw Variables			Standardized Variables		
Deleted Variable	Correlation with Total	Alpha	Correlation with Total	Alpha	Label
Q1	0.485016	0.677471	0.489673	0.678901	Q1
Q2	0.463477	0.678688	0.450054	0.683391	Q2
Q3	0.320911	0.695500	0.311711	0.698683	Q3
Q5	0.255998	0.703476	0.240234	0.706352	Q5
Q6	0.330972	0.693451	0.333029	0.696365	Q6
Q7	0.206408	0.709618	0.221615	0.708324	Q7
Q8	0.448366	0.683789	0.452005	0.683171	Q8
Q9	0.196521	0.706903	0.187750	0.711884	Q9
Q10	0.048307	0.721087	0.075947	0.723395	Q10
Q11	0.517131	0.671478	0.525100	0.674843	Q11
Q12	0.439413	0.681169	0.424916	0.686214	Q12
Q13	0.264679	0.700591	0.239527	0.706427	Q13
Q14	0.269962	0.700224	0.264982	0.703714	Q14
Q15	0.280259	0.699062	0.293372	0.700666	Q15
Q16	0.197838	0.706297	0.212847	0.709249	Q16
Q17	0.205209	0.707849	0.214389	0.709087	Q17

Management

	Q1	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Agree	11	73.33	11	73.33	
Undecided	1	6.67	12	80.00	
Disagree	2	13.33	14	93.33	
Strongly disagree	1	6.67	15	100.00	

Chi-Square Test
for Equal Proportions

ffffffffffffffffffff

Chi-Square 18.8667

DF 3

Pr > ChiSq 0.0003

WARNING: The table cells have expected counts less than 5. Chi-Square may not be a valid test. Sample Size = 15

	Q2	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Agree		7	46.67	7	46.67
Undecided		3	20.00	10	66.67
Disagree		3	20.00	13	86.67
Strongly disagree		2	13.33	15	100.00

Chi-Square Test

for Equal Proportions

ffffffffffffffffffff

Chi-Square 3.9333

DF 3

Pr > ChiSq 0.2688

WARNING: The table cells have expected counts less than 5. Chi-Square may not be a valid test. Sample Size = 15

	Q3	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Strongly agree		4	26.67	4	26.67
Agree		10	66.67	14	93.33
Undecided		1	6.67	15	100.00

Chi-Square Test

for Equal Proportions

ffffffffffffffffffff

Chi-Square 8.4000

DF 2

Pr > ChiSq 0.0150

Sample Size = 15

	Q4	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Strongly agree		9	60.00	9	60.00
Agree		5	33.33	14	93.33
Undecided		1	6.67	15	100.00

Chi-Square Test

for Equal Proportions

ffffffffffffffffffff

Chi-Square 6.4000

DF 2

Pr > ChiSq 0.0408

Sample Size = 15

	Q5	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Agree		4	26.67	4	26.67
Undecided		8	53.33	12	80.00
Disagree		3	20.00	15	100.00

Chi-Square Test

for Equal Proportions

ffffffffffffffffffff

Chi-Square 2.8000

DF 2

Pr > ChiSq 0.2466

Sample Size = 15

	Q6	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Strongly agree		1	6.67	1	6.67
Agree		4	26.67	5	33.33
Disagree		10	66.67	15	100.00

Chi-Square Test

for Equal Proportions

ffffffffffffffffffff

Chi-Square 8.4000

DF 2

Pr > ChiSq 0.0150

Sample Size = 15

	Q7	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Strongly agree		1	6.67	1	6.67
Agree		3	20.00	4	26.67
Undecided		6	40.00	10	66.67
Disagree		5	33.33	15	100.00

Chi-Square Test

for Equal Proportions

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Chi-Square 3.9333

DF 3

Pr > ChiSq 0.2688

WARNING: The table cells have expected counts less than 5. Chi-Square may not be a valid test. Sample Size = 15

Cumulative Cumulative

Q8	Frequency	Percent	Frequency	Percent
Agree	4	26.67	4	26.67
Undecided	2	13.33	6	40.00
Disagree	8	53.33	14	93.33
Strongly disagree	1	6.67	15	100.00

Chi-Square Test
for Equal Proportions

Chi-Square 7.6667
DF 3
Pr > ChiSq 0.0534

WARNING: The table cells have expected counts less than 5. Chi-Square may not be a valid test.
Sample Size = 15

Q9	Frequency	Percent	Cumulative Frequency	Cumulative Percent
0	1	6.67	1	6.67
Agree	2	13.33	3	20.00
Undecided	6	40.00	9	60.00
Disagree	3	20.00	12	80.00
Strongly disagree	3	20.00	15	100.00

Chi-Square Test
for Equal Proportions

Chi-Square 4.6667
DF 4
Pr > ChiSq 0.3232

WARNING: The table cells have expected counts less than 5. Chi-Square may not be a valid test.
Sample Size = 15

Q10	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Strongly agree	7	46.67	7	46.67
Agree	8	53.33	15	100.00

Chi-Square Test
for Equal Proportions

Chi-Square 0.0667
DF 1
Pr > ChiSq 0.7963

Sample Size = 15

Q11	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Strongly agree	1	6.67	1	6.67
Agree	6	40.00	8	53.33
Undecided	3	20.00	11	73.33
Disagree	3	20.00	14	93.33
Strongly disagree	1	6.67	15	100.00

Chi-Square Test
for Equal Proportions
Chi-Square 7.8000
DF 5
Pr > ChiSq 0.1676

WARNING: The table cells have expected counts less than 5. Chi-Square may not be a valid test.
Sample Size = 15

Q12	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Strongly agree	1	6.67	1	6.67
Agree	8	53.33	9	60.00
Undecided	3	20.00	12	80.00
Disagree	3	20.00	15	100.00

Chi-Square Test
for Equal Proportions
Chi-Square 7.1333
DF 3
Pr > ChiSq 0.0678

WARNING: The table cells have expected counts less than 5. Chi-Square may not be a valid test.
Sample Size = 15

Q13	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Strongly agree	3	20.00	3	20.00
Agree	10	66.67	13	86.67
Undecided	1	6.67	14	93.33
Disagree	1	6.67	15	100.00

Chi-Square Test
for Equal Proportions
Chi-Square 14.6000
DF 3
Pr > ChiSq 0.0022

WARNING: The table cells have expected counts less than 5. Chi-Square may not be a valid test.
Sample Size = 15

Q14	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Agree	2	13.33	2	13.33
Undecided	8	53.33	10	66.67
Disagree	1	6.67	11	73.33
Strongly disagree	4	26.67	15	100.00

Chi-Square Test
for Equal Proportions
Chi-Square 7.6667
DF 3
Pr > ChiSq 0.0534

WARNING: The table cells have expected counts less than 5. Chi-Square may not be a valid test.
Sample Size = 15

Q15	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Strongly agree	4	26.67	4	26.67
Agree	7	46.67	11	73.33
Undecided	3	20.00	14	93.33
Disagree	1	6.67	15	100.00

Chi-Square Test
for Equal Proportions
Chi-Square 5.0000
DF 3
Pr > ChiSq 0.1718

WARNING: The table cells have expected counts less than 5. Chi-Square may not be a valid test.
Sample Size = 15

Q16	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Strongly agree	9	60.00	9	60.00
Agree	6	40.00	15	100.00

Chi-Square Test
for Equal Proportions
Chi-Square 0.6000
DF 1
Pr > ChiSq 0.4386

Sample Size = 15

Q17	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Strongly agree	7	46.67	7	46.67
Agree	5	33.33	12	80.00
Undecided	1	6.67	13	86.67
Disagree	1	6.67	14	93.33
Strongly disagree	1	6.67	15	100.00

Chi-Square Test
for Equal Proportions

Chi-Square 10.6667

DF 4

Pr > ChiSq 0.0306

WARNING: The table cells have expected counts less than 5. Chi-Square may not be a valid test.
Sample Size = 15

Q18	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Strongly agree	2	13.33	2	13.33
Agree	4	26.67	6	40.00
Undecided	5	33.33	11	73.33
Disagree	3	20.00	14	93.33
Strongly disagree	1	6.67	15	100.00

Chi-Square Test
for Equal Proportions

Chi-Square 3.3333

DF 4

Pr > ChiSq 0.5037

WARNING: The table cells have expected counts less than 5. Chi-Square may not be a valid test.
Sample Size = 15

Q19	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Strongly agree	3	20.00	3	20.00
Agree	9	60.00	12	80.00
Undecided	3	20.00	15	100.00

Chi-Square Test
for Equal Proportions

Chi-Square 4.8000

DF 2

Pr > ChiSq 0.0907

Sample Size = 15

Q20	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Strongly agree	7	46.67	7	46.67
Agree	8	53.33	15	100.00

Chi-Square Test
for Equal Proportions

Chi-Square 0.0667

DF 1

Pr > ChiSq 0.7963

Sample Size = 15

Q21	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Strongly agree	6	40.00	6	40.00
Agree	6	40.00	12	80.00
Undecided	2	13.33	14	93.33
Strongly disagree	1	6.67	15	100.00

Chi-Square Test
for Equal Proportions
 Chi-Square 5.5333
 DF 3
 Pr > ChiSq 0.1367

WARNING: The table cells have expected counts less than 5. Chi-Square may not be a valid test.
 Sample Size = 15

Q22	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Strongly agree	7	46.67	7	46.67
Agree	6	40.00	13	86.67
Undecided	2	13.33	15	100.00

Chi-Square Test
for Equal Proportions
 Chi-Square 2.8000
 DF 2
 Pr > ChiSq 0.2466
 Sample Size = 15

Management

The CORR Procedure

Variable	N	Simple Statistics					Label
		Mean	Std Dev	Sum	Minimum	Maximum	
Q1	13	2.61538	1.04391	34.00000	2.00000	5.00000	Q1
Q2	13	3.07692	1.18754	40.00000	2.00000	5.00000	Q2
Q3	13	1.76923	0.59914	23.00000	1.00000	3.00000	Q3
Q4	13	1.46154	0.66023	19.00000	1.00000	3.00000	Q4
Q5	13	2.84615	0.68874	37.00000	2.00000	4.00000	Q5
Q6	13	1.69231	0.48038	22.00000	1.00000	2.00000	Q6
Q7	13	3.07692	0.95407	40.00000	1.00000	4.00000	Q7
Q8	13	3.30769	1.03155	43.00000	2.00000	5.00000	Q8
Q9	13	3.53846	1.05003	46.00000	2.00000	5.00000	Q9
Q10	13	1.46154	0.51887	19.00000	1.00000	2.00000	Q10
Q11	13	2.69231	1.10940	35.00000	1.00000	5.00000	Q11
Q12	13	2.61538	0.96077	34.00000	1.00000	4.00000	Q12
Q13	13	2.00000	0.81650	26.00000	1.00000	4.00000	Q13
Q14	13	3.53846	1.12660	46.00000	2.00000	5.00000	Q14
Q15	13	1.92308	0.75955	25.00000	1.00000	3.00000	Q15
Q16	13	1.46154	0.51887	19.00000	1.00000	2.00000	Q16
Q17	13	1.92308	1.25576	25.00000	1.00000	5.00000	Q17
Q18	13	2.69231	1.18213	35.00000	1.00000	5.00000	Q18
Q19	13	2.00000	0.70711	26.00000	1.00000	3.00000	Q19
Q20	13	1.61538	0.50637	21.00000	1.00000	2.00000	Q20
Q21	13	1.92308	1.11516	25.00000	1.00000	5.00000	Q21
Q22	13	1.69231	0.75107	22.00000	1.00000	3.00000	Q22

Cronbach Coefficient Alpha
 Variables Alpha
 Raw 0.761474
 Standardized 0.635482

Cronbach Coefficient Alpha with Deleted Variable

Deleted Variable	Raw Variables		Standardized Variables		Label
	Correlation with Total	Alpha	Correlation with Total	Alpha	
Q1	0.540420	0.734783	0.533769	0.586375	Q1
Q2	0.802900	0.707492	0.806729	0.551085	Q2
Q3	-.523771	0.788604	-.583002	0.706915	Q3
Q4	-.405968	0.786480	-.470958	0.696410	Q4
Q5	0.201192	0.758943	0.224191	0.623486	Q5
Q6	-.563322	0.784354	-.517273	0.700792	Q6
Q7	0.474144	0.741066	0.463976	0.595007	Q7
Q8	0.570111	0.732547	0.525044	0.587463	Q8
Q9	0.477991	0.739805	0.334419	0.610618	Q9
Q10	-.308025	0.777394	-.255347	0.675252	Q10
Q11	0.691428	0.720458	0.577322	0.580909	Q11
Q12	0.332433	0.751295	0.320923	0.612213	Q12
Q13	0.480069	0.742515	0.425386	0.599712	Q13
Q14	0.373389	0.748230	0.272095	0.617940	Q14
Q15	0.561032	0.738726	0.552654	0.584013	Q15
Q16	0.309572	0.754836	0.410320	0.601536	Q16
Q17	0.623783	0.724094	0.671082	0.568932	Q17
Q18	0.586109	0.728832	0.446576	0.597134	Q18
Q19	-.101614	0.774071	-.039241	0.652752	Q19
Q20	0.031469	0.765092	0.088740	0.638792	Q20
Q21	0.271637	0.756644	0.207185	0.625439	Q21
Q22	0.138684	0.762510	0.159755	0.630837	Q22

ANNEXURE B:

Analysis of variance

NOTE: Variables in each group are consistent with respect to the presence or absence of missing values.

Dependent Variable: Q1 Q1

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	0.24628188	0.24628188	0.32	0.5746
Error	72	55.76723164	0.77454488		
Corrected Total	73	56.01351351			
	R-Square	Coeff Var	Root MSE	Q1 Mean	
	0.004397	36.38329	0.880082	2.418919	
Source group	DF	Anova SS	Mean Square	F Value	Pr > F
	1	0.24628188	0.24628188	0.32	0.5746

Dependent Variable: Q2 Q2

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	6.06046725	6.06046725	6.41	0.0135
Error	72	68.10169492	0.94585687		
Corrected Total	73	74.16216216			
	R-Square	Coeff Var	Root MSE	Q2 Mean	
	0.081719	39.98268	0.972552	2.432432	
Source group	DF	Anova SS	Mean Square	F Value	Pr > F
	1	6.06046725	6.06046725	6.41	0.0135

Dependent Variable: Q3 Q3

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	4.16069629	4.16069629	3.72	0.0576
Error	72	80.43389831	1.11713748		
Corrected Total	73	84.59459459			
	R-Square	Coeff Var	Root MSE	Q3 Mean	
	0.049184	46.55601	1.056947	2.270270	
Source group	DF	Anova SS	Mean Square	F Value	Pr > F
	1	4.16069629	4.16069629	3.72	0.0576

Dependent Variable: Q4 Q4

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	1.04816002	1.04816002	1.96	0.1653
Error	72	38.41129944	0.53349027		
Corrected Total	73	39.45945946			
	R-Square	Coeff Var	Root MSE	Q4 Mean	
	0.026563	42.89675	0.730404	1.702703	
Source group	DF	Anova SS	Mean Square	F Value	Pr > F
	1	1.04816002	1.04816002	1.96	0.1653

Dependent Variable: Q7 Q7

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	1.97892808	1.97892808	1.82	0.1814
Error	72	78.23728814	1.08662900		
Corrected Total	73	80.21621622			
	R-Square	Coeff Var	Root MSE	Q7 Mean	
	0.024670	38.95894	1.042415	2.675676	
Source group	DF	Anova SS	Mean Square	F Value	Pr > F
	1	1.97892808	1.97892808	1.82	0.1814

Dependent Variable: Q10 Q10

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	0.04289204	0.04289204	0.07	0.7870
Error	72	41.97062147	0.58292530		
Corrected Total	73	42.01351351			
	R-Square	Coeff Var	Root MSE	Q10 Mean	
	0.001021	48.28946	0.763495	1.581081	
Source group	DF	Anova SS	Mean Square	F Value	Pr > F
	1	0.04289204	0.04289204	0.07	0.7870

Dependent Variable: Q12 Q12

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	0.14367079	0.14367079	0.16	0.6892
Error	72	64.14011299	0.89083490		
Corrected Total	73	64.28378378			
	R-Square	Coeff Var	Root MSE	Q12 Mean	
	0.002235	38.58795	0.943841	2.445946	

Source	DF	Anova SS	Mean Square	F Value	Pr > F
group	1	0.14367079	0.14367079	0.16	0.6892

Dependent Variable: q25

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	0.45700107	0.45700107	0.93	0.3382
Error	72	35.39435028	0.49158820		
Corrected Total	73	35.85135135			

R-Square	Coeff Var	Root MSE	q25 Mean
0.012747	41.50710	0.701134	1.689189

Source	DF	Anova SS	Mean Square	F Value	Pr > F
group	1	0.45700107	0.45700107	0.93	0.3382

Level of group	N	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev
Management	15	2.53333333	0.99043040	3.00000000	1.13389342	1.80000000	0.56061191	1.46666667	0.63994047
Students	59	2.38983051	0.85130628	2.28813559	0.92942042	2.38983051	1.14495820	1.76271186	0.75060856

Level of group	N	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev
Management	15	3.00000000	0.92582010	1.53333333	0.51639778	2.53333333	0.91547542	1.53333333	0.51639778
Students	59	2.59322034	1.06865439	1.59322034	0.81195048	2.42372881	0.95056045	1.72881356	0.73883665

Dependent Variable: Q5 Q5

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	0.61106912	0.61106912	0.61	0.4368
Error	71	70.95057471	0.99930387		
Corrected Total	72	71.56164384			

R-Square	Coeff Var	Root MSE	Q5 Mean
0.008539	36.30576	0.999652	2.753425

Source	DF	Anova SS	Mean Square	F Value	Pr > F
group	1	0.61106912	0.61106912	0.61	0.4368

Level of group	N	Mean	Std Dev
Management	15	2.93333333	0.70373155
Students	58	2.70689655	1.05976861

Dependent Variable: Q6 Q6

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	0.81734054	0.81734054	0.86	0.3582
Error	71	67.84019370	0.95549569		
Corrected Total	72	68.65753425			

R-Square	Coeff Var	Root MSE	Q6 Mean
0.011905	50.60788	0.977495	1.931507

Source	DF	Anova SS	Mean Square	F Value	Pr > F
group	1	0.81734054	0.81734054	0.86	0.3582

Level of group	N	Mean	Std Dev
Management	14	1.71428571	0.46880723
Students	59	1.98305085	1.05848828

Dependent Variable: Q8 Q8

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	4.14374114	4.14374114	5.82	0.0184
Error	71	50.51379310	0.71146187		
Corrected Total	72	54.65753425			

R-Square	Coeff Var	Root MSE	Q8 Mean
0.075813	28.77298	0.843482	2.931507

Source	DF	Anova SS	Mean Square	F Value	Pr > F
group	1	4.14374114	4.14374114	5.82	0.0184

Level of group	N	Mean	Std Dev
Management	15	3.40000000	0.98561076
Students	58	2.81034483	0.80474245

Dependent Variable: Q9 Q9

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	5.59821221	5.59821221	8.45	0.0049
Error	71	47.05932203	0.66280735		
Corrected Total	72	52.65753425			

R-Square	Coeff Var	Root MSE	Q9 Mean
0.106314	27.77172	0.814130	2.931507

Source	DF	Anova SS	Mean Square	F Value	Pr > F
group	1	5.59821221	5.59821221	8.45	0.0049

Level of group	N	Mean	Std Dev
Management	14	3.50000000	1.01904933
Students	59	2.79661017	0.76066353

Dependent Variable: Q11 Q11

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	0.52983032	0.52983032	0.56	0.4580
Error	70	66.58128079	0.95116115		
Corrected Total	71	67.11111111			

R-Square 0.007895 Coeff Var 37.35095 Root MSE 0.975275 Q11 Mean 2.611111

Source group	DF	Anova SS	Mean Square	F Value	Pr > F
	1	0.52983032	0.52983032	0.56	0.4580

Level of group	N	Mean	Std Dev
Management	14	2.78571429	1.12171376
Students	58	2.56896552	0.93868271

Dependent Variable: Q13 Q13

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	2.66447368	2.66447368	3.57	0.0629
Error	70	52.21052632	0.74586466		
Corrected Total	71	54.87500000			

R-Square 0.048555 Coeff Var 36.36356 Root MSE 0.863635 Q13 Mean 2.375000

Source group	DF	Anova SS	Mean Square	F Value	Pr > F
	1	2.66447368	2.66447368	3.57	0.0629

Level of group	N	Mean	Std Dev
Management	15	2.00000000	0.75592895
Students	57	2.47368421	0.88852332

Dependent Variable: q23

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	1.12248465	1.12248465	2.37	0.1281
Error	71	33.61724138	0.47348227		
Corrected Total	72	34.73972603			

R-Square 0.032311 Coeff Var 41.85945 Root MSE 0.688100 q23 Mean 1.643836

Source group	DF	Anova SS	Mean Square	F Value	Pr > F
	1	1.12248465	1.12248465	2.37	0.1281

Dependent Variable: q26

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	0.00629822	0.00629822	0.01	0.9136
Error	71	37.74712644	0.53164967		
Corrected Total	72	37.75342466			

R-Square 0.000167 Coeff Var 43.27435 Root MSE 0.729143 q26 Mean 1.684932

Source group	DF	Anova SS	Mean Square	F Value	Pr > F
	1	0.00629822	0.00629822	0.01	0.9136

Level of group	N	Mean	Std Dev	Mean	Std Dev
Management	15	1.40000000	0.50709255	1.66666667	0.72374686
Students	58	1.70689655	0.72568469	1.68965517	0.73046240

Dependent Variable: q24

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	0.05296804	0.05296804	0.06	0.8133
Error	71	66.93333333	0.94272300		
Corrected Total	72	66.98630137			

R-Square 0.000791 Coeff Var 48.88177 Root MSE 0.970939 q24 Mean 1.986301

Source group	DF	Anova SS	Mean Square	F Value	Pr > F
	1	0.05296804	0.05296804	0.06	0.8133

Level of group	N	Mean	Std Dev
Management	15	1.93333333	1.22279929
Students	58	2.00000000	0.89834155

ANNEXURE C:
Students

Q1(Q1)	Q2(Q2)			
Frequency				
Percent				
Row Pct				
Col Pct	Agree	Undecide	Disagree	Total
		d		
Agree	33	4	3	40
	55.93	6.78	5.08	67.80
	82.50	10.00	7.50	
	80.49	44.44	33.33	
Undecided	5	1	4	10
	8.47	1.69	6.78	16.95
	50.00	10.00	40.00	
	12.20	11.11	44.44	
Disagree	3	4	2	9
	5.08	6.78	3.39	15.25
	33.33	44.44	22.22	
	7.32	44.44	22.22	
Total	41	9	9	59
	69.49	15.25	15.25	100.00

Statistics for Table of Q1 by Q2

Statistic	DF	Value	Prob
Chi-Square	4	15.0236	0.0047
Likelihood Ratio Chi-Square	4	12.9152	0.0117
Mantel-Haenszel Chi-Square	1	9.7924	0.0018
Phi Coefficient		0.5046	
Contingency Coefficient		0.4505	
Cramer's V		0.3568	

WARNING: 44% of the cells have expected counts less than 5. Chi-Square may not be a valid test.

Sample Size = 59

Management

Q1(Q1)	Q2(Q2)			
Frequency				
Percent				
Row Pct				
Col Pct	Agree	Undecide	Disagree	Total
		d		
Agree	6	2	3	11
	40.00	13.33	20.00	73.33
	54.55	18.18	27.27	
	85.71	66.67	60.00	
Undecided	1	0	0	1
	6.67	0.00	0.00	6.67
	100.00	0.00	0.00	
	14.29	0.00	0.00	
Disagree	0	1	2	3
	0.00	6.67	13.33	20.00
	0.00	33.33	66.67	
	0.00	33.33	40.00	
Total	7	3	5	15
	46.67	20.00	33.33	100.00

Statistics for Table of Q1 by Q2

Statistic	DF	Value	Prob
Chi-Square	4	4.0952	0.3933
Likelihood Ratio Chi-Square	4	5.6053	0.2306
Mantel-Haenszel Chi-Square	1	1.8966	0.1685
Phi Coefficient		0.5225	
Contingency Coefficient		0.4631	
Cramer's V		0.3695	

WARNING: 89% of the cells have expected counts less than 5. Chi-Square may not be a valid test.

Sample Size = 15

Students

Variable	N	Simple Statistics					Label
		Mean	Std Dev	Sum	Minimum	Maximum	
Q1	59	2.38983	0.85131	141.00000	1.00000	4.00000	Q1
Q2	59	2.28814	0.92942	135.00000	1.00000	4.00000	Q2

Pearson Correlation Coefficients, N = 59

Prob > |r| under H0: Rho=0

	Q1	Q2
Q1	1.00000	0.42215
Q2	0.42215	1.00000

Spearman Correlation Coefficients, N = 59

Prob > |r| under H0: Rho=0

	Q1	Q2
Q1	1.00000	0.46583
Q2	0.46583	1.00000

Management

Variable	N	Simple Statistics					Label
		Mean	Std Dev	Sum	Minimum	Maximum	
Q1	15	2.53333	0.99043	38.00000	2.00000	5.00000	Q1
Q2	15	3.00000	1.13389	45.00000	2.00000	5.00000	Q2

Pearson Correlation Coefficients, N = 15

Prob > |r| under H0: Rho=0

	Q1	Q2
Q1	1.00000	0.44522
Q2	0.44522	1.00000

Spearman Correlation Coefficients, N = 15

Prob > |r| under H0: Rho=0

	Q1	Q2
Q1	1.00000	0.40279
Q2	0.40279	1.00000