A Framework for Evaluating an Introductory Statistics Programme at the University of the Western Cape

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A thesis submitted in partial fulfillment of the requirements for the degree of Doctor Philosophiae, in the Department of Statistics, University of the Western Cape

15 May 2009

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KEYWORDS AND PHRASES

1. Culture of Innovation
2. Evaluation and Assessment
3. Framework
4. Interpretive Approach to Programme Evaluation
5. Introductory Statistics Programme
6. Knowledge Environment for Web-based learning
7. Online Testing
8. Process Management
9. Quality of Learning
10. Student Perceptions
11. Grade 12 Profiles
12. Technology
13. Web-based tutorials

ABSTRACT

There have been calls both from the government and private sector for Higher Education institutions to introduce programmes that produce employable graduates whilst at the same time contributing to the growing economy of the country by addressing the skills shortage.

Transformation and intervention committees have since been introduced to follow the extent to which the challenges are being addressed (DOE, 1996; 1997; Luescher and Symes, 2003; Forbes, 2007).

Amongst the list of issues that needed urgent address were the skills shortage and underperformance of students particularly university entering students (Daniels, 2007; De Klerk, 2006; Cooper, 2001). Research particularly in the South African context, has revealed that contributing to the underperformance of university entering students and shortage of skills are: the legacy of apartheid (forcing certain racial groups to focus on selected areas such as teaching and nursing), the schooling system (resulting in university entering students to struggle), the home language and academic language. Barrell (1998), places stress on language as a contributing factor towards the performance of students.

Although not much research has been done on skills shortage, most of the areas with skills shortage require Mathematics, either on a minimum or comprehensive scale. Students who have a strong Mathematics background have proved to perform better compared to students who have a limited or no Mathematics background at all in Grade 12 (Hahn, 1988; Conners, McCown & Roskos-Ewoldsen, 1998; Nolan, 2002).

The department of Statistics offers an Introductory Statistics (IS) course at first year level. Resources available to enhance student learning include: a problem-solving component with web-based tutorials and students attending lectures three hours per week. The course material and all the necessary information regarding the course including teach yourself problems, useful web-sites and links students can make use of, are all stored under the Knowledge-Environment for Web-based learning (KEWL). Despite all the available information, the students were not performing well and they were not interested in the course. The department regards statistical numeracy as a life skill. The desire of the department is to break down the fear of Statistics and to bring about a perspective change in students' mindsets. The study was part of a contribution to ensuring that the department has the best first year students in Statistics in the Western Cape achieving a success rate comparable to the national norm. This

required a continuous upgrading of the quality of the course content to ensure quality delivery, which is congruent with national standards. The initiative for the continuous upgrading of the course quality forced the department to explore the incoming student profile, providing the department with an in-depth understanding of the incoming student quality and equipping the department and eventually the university with measures that could be taken to address the problem.

Having identified the challenges: poor performance, lack of motivation and the high drop-out rate of students taking the Introductory Statistics course at UWC, the department decided to monitor student performance for a period of five semesters to identify patterns with regard to performance in the course using their Grade 12 background. In particular their home language, academic language, Grade 12 profile, mathematics, average symbol and status. Monitoring the performance using these variables assisted the department in observing patterns in the performance and establishing some of the reasons pertaining to the similarities or deviations in these patterns over time. Results from the research would be used to restructure the course offering as well as inform the University on the findings for future planning of the entry requirements specifically for students wishing to pursue statistics as a majoring course.

DECLARATION

I declare that *A framework for evaluating an Introductory Statistics Programme at the University of the Western Cape* is my own work, that it has not been submitted for any degree

or examination at any other university, and that all the sources I have used or quoted have been indicated and acknowledged by complete references.

Full Name: Nomawabo Makapela Date: 15 May 2009

Signed:

ACKNOWLEDGEMENTS

GOD has been my pillar of strength throughout the process. There were times that I was not sure whether to continue or not with the project, but through GOD's will it has become a success. I thank Prof. Danelle Kotze, who has been my mentor since 1999. I do not think I would be where I am today if it was not for her wisdom, inspiration and humbleness. Thank you, Prof, for being such a mentor.

To Prof. Dick Madsen, who was our pillar and assisted us with the data analysis from the University database. Missouri seemed like a stone's throw whenever we needed to consult him. Dr. T. Kotze, for the assistance and guidance he provided to analyze the data.

I truly appreciate the invaluable guidance of Prof Chris Kapp, (University Of Stellenbosch), his expertise and ideas especially from the programme evaluation and education perspective.

I also thank Prof. Renette Blignaut, (Statistics department HOD and co-supervisor) for all the support and input towards the success of the study, thank you.

Bulelwa Mandubu, the UWC Science Faculty Librarian, who was always willing to assist whenever I needed information related to the study.

I finally thank the Introductory Statistics tutors, who assisted in the data collection and management process, in particular David Brown Heymann and Puleng Johannes Makena.

LIST OF ABBREVIATIONS

AARP - Alternative Admissions Research Project

ADM - Anglo-Gold De Beer and Murray Trust

ANOVA – Analysis of Variance

B.A. - Bachelor of Arts

B. Admin - Bachelor of Administration

B. Com. - Bachelor of Commerce

B. Com. General - Bachelor of Commerce General

B.Sc. – Bachelor of Science

CHE - Council on Higher Education

DOE – Department of Education

EMS - Economic and Management Sciences

HE - Higher Education

HG - Higher Grade

HEQC - Higher Education Quality Committee

ICS – Information and Communication Services

IS - Introductory Statistics

KEWL - Knowledge Environment for Web-based Learning

NRF - National Research Foundation

OBE – Outcomes-Based Education

PLATO – Platform for Automated Teaching Operations

S.A. - South Africa

SAHE - South African Higher Education

SAQA - South African Qualification Association

SAS - Statistical Analysis Software

SG - Standard Grade

SPSS - Statistical Package for Social Sciences

SRC - Student Representative Council

STATSSA – Statistics South Africa

STA111 - Statistics 111

STA125 - Statistics 125

STA131 - Statistics 131

STA132 - Statistics 132

UCT - University of Cape Town

UNDP - United Nations Development Programme

UWC - University of the Western Cape

DEFINITION OF STUDY TERMS AND CONCEPTS

- Academic language: Language used to teach at school level.

- Assessment: is used to test the understanding of the course content by the student. Marks are assigned as a measure of performance or rating of the performance of the student. Assessment methods used in the Introductory Statistics are the tutorials, tests and the examinations.

- Course-notes: A book compiled by the department for the Introductory Statistics programme.

- Course outline: Information pamphlet issued to the Introductory Statistics students which outlines the course.

- Curriculum: "A curriculum can be defined as the planned educational experiences offered by a school which can take place anywhere at any time. In the multiple context of the school, e.g. public schools as caring communities", (Todd, 1965).

- Demographic: Demographic in the context of the research are all the physical characteristics of an individual such as age, gender, home language, academic language, examination board and area of residence.

- Diagnostic: In the context of the research, the term refers to the ability to distinctively observe a characteristic or cause of something.

- Drop-out rate: Is defined as the number of students with an examinations mark divided by the number of registered students (UWC in the context of the study).

- Entry-requirement(s): Scores or subjects that qualify a student to study in the institution (UWC in the context of the research).

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- Evaluation: "Is the process of examining a subject and rating it based on its important features. We determine how much or how little we value something, arriving at our judgment on the basis of criteria that we can define", (Kiefer, 2007).

- Exploratory: Exploring is done to give one a general view of something; it is also done by researchers to test hypotheses. In industry or marketing, it can be used to give feedback on whether a particular product or idea will be accepted or not, (Barry, 1995).

- Final mark: Total mark obtained after combining the examination mark and the semester mark, both contribute 50-50.

- Framework: Is the structure used as guide to monitor the Introductory Statistics Programme.

- Grade 12 Average symbol: Combined symbol of all the subjects taken at school level, Grade 12.

- Grade 12 Status: Is the status, indicating whether a student obtained an exemption, age exemption, school leaving certificate.

- Home language: The language used to communicate at home.

- Hot Seat: It is a support system introduced in 2003 within the Statistics Department. The Hot Seat makes use of senior students to assist the Introductory Statistics students with their theory and Introductory Statistics related problems.

- Indicators: Grade 12 background that predicted the overall performance in the Introductory Statistics programme.

- Pass rate: The number of students passing the Introductory Statistics course divided by the number of students who wrote the examination.

- Perception(s): The process of translating impressions with respect to the Introductory Statistics offering.

- Performance indicators: Indicators in the context of the research are signs or clues (in this case, variables from Grade 12 subjects, Grade 12 background and demographics of the students) that inform us as to why the students are performing either excellently or poorly in Introductory Statistics.

- Period: Refers to the data collection time, referred to as semesters in the context of the research.
- Phase: A phase in the context of the research refers to a stage with items that are sequentially run or need to be followed within that phase. The research has four phases.

- Pre-Questionnaire: The questionnaire administered online prior to exposure to the Introductory Statistics Programme.

- Post-Questionnaire: The questionnaire administered online towards the end of the Introductory Statistics Programme.

- Process (es): A process or processes in the context of the research are all the activities intended for the smooth and effective delivery and running of the Introductory Statistics offering (administration, teaching, student-support systems).

- Profiles: In the context of the research, Grade 12 subjects were grouped according to a specific area which is referred to as the student profile. A profile represents the distinct characteristics or features of something or a person.

- Respondent: In the context of the research, the word 'respondent' refers to an individual who has participated in the pre-questionnaire or the evaluation.

- Semester mark: Is the mark made up of the overall tutorial mark and the average mark obtained from the best three tests.

- Stakeholder(s): Anybody who is affected by the decisions or processes implemented by an organization is referred to as a stakeholder, (Lussier, 2003). Stakeholders in the context of the research are the students and the university community.

- Strategic-planning: Process that is followed for the development of a mission and objectives. In the process, it is determined in advance how each of the objectives will be received, (Lussier, 2003).

- Student: A student in the context of the research is an individual who is officially registered for a specific course at the University of the Western Cape.

- Tutorials: The web-based tutorials aimed at enhancing student learning.

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CHAPTER ONE

INTRODUCTION AND OVERVIEW OF THE STUDY

1.1 INTRODUCTION

This dissertation uses Programme Evaluation to monitor an Introductory Statistics (IS) course at the University of the Western Cape (UWC). The study groups are first year IS students. All the processes underlying Programme Evaluation in particular the Application of Programme Evaluation in higher education and IS teaching are looked at in great detail.

The study is retrospective in the sense that the Statistics Department is looking at what it is offering to the student, what the students think of what they are getting from the department and the causes of success or failure of the course given a specific student background. Further, the department is comparing itself to other universities at national level, who teach IS, to see if they are experiencing similar challenges. The study is also looking at the students as the recipients of the course and considers them as clients with specific profiles. This is achieved by exploring the student demographic and Grade 12 background. The aim is to find out if the programme is doing what it is supposed to be doing and if it is failing to achieve the intended outcomes. A single group would not be sufficient to provide the department with information that could assist in picking up trends. Therefore five data collection periods were used to provide suggestions for improvement.

Literature was consulted to expose the researcher to Programme Evaluation, its characteristics, and implementation in Higher Education, South African Higher Education policies and Higher Education transformation. Higher Education policies serve as a guide and inform institutions of the necessary steps to follow when developing and improving existing programmes. Since 1994, there have been vast developments and transformation in South African Higher Education. It was thus necessary for the researcher to study the literature on Higher Education policies and transformation. The study is based on and follows the interpretive approach; using both quantitative and qualitative methods. The researcher believes that quantitative methods are limited and cannot explicitly reveal what qualitative enquiry reveals from a participant's point of view.

1.2 BACKGROUND TO INTRODUCTORY STATISTICS FIRST YEAR CHALLENGES

Students without the necessary mathematical skills often lack an interest in the subject Statistics. These students perceive Statistics to be a waste of time and can seldom comprehend the need of the subject in their field of study (Hahn, 1988; Conners, McCown, Roskos-Ewoldson**,** 1998; Nolan, 2002).

According to Watts (1991), several factors contribute to the perception of Statistics being a difficult subject. These include: Statistics teachers that cannot directly demonstrate or draw a picture of the most fundamental concepts of Statistics; the use of abstract concepts in an Introductory Statistics (IS) course; problem analysis leading to difficulty in interpretation and (to a beginner) very confusing notation and terminology. Attractive methods of teaching Statistics as well as regular improvements therefore need to be implemented to make the subject more interesting and relevant to student's needs perceptions (Bradstreet, 1996).

The Statistics Department at the University of the Western Cape offers several IS courses at first year level. The purpose of these IS courses are:

- to prepare students for a higher level Statistics course, applicable to students who intend to major in Statistics and related fields;
- to prepare students for professional careers (students doing Statistics to enable them to handle, use and interpret data in their content area);
- to help students to understand statistical concepts used outside the classroom (interpretation of charts, graphs, statistical claims and decision-making).

At undergraduate level STA111, STA125, STA131 and STA132 introductory courses are offered. The different codes refer to different semesters or faculties but the basic content of

all the courses is the same. The groups STA111 and STA125 are within the Science Faculty and refer to the first and second semester respectively.

The STA131 and STA132 students come from the Faculty of Economic and Management Sciences (EMS). The EMS Faculty offers the B.Com in Accounting, the B.Admin, the B.Com General degree and a wide range of management diplomas. There are also a few students coming from the Arts Faculty who take the STA131/STA132 course. These are students who intend to upgrade from Arts to some of the EMS courses and are mostly senior students. Most of the students registered for the degrees and diplomas other than the B.Com in Accounting do not have adequate knowledge of computers and, have a poor or non-existent mathematical background. The majority of the students registered have never done Statistics before, and the EMS students, especially those with no mathematical background, perceive the Statistics course to be irrelevant to their field of study. Another challenge is that Statistics is based on Mathematics, which is beyond the easy reach of many of the STA131 and STA132 students.

The academic content of the STA111/131/132/125 courses includes theory and problem-solving. The theory part is composed of the course-notes developed by the department and a prescribed textbook that students can purchase from a bookshop. Students attend lectures for three hours per week. The problem-solving component includes web-based tutorials under the Knowledge Environment for Web-based learning system (KEWL). The tutorials are submitted regularly with monthly cut-off dates. The KEWL environment has the course material and all the necessary information regarding the course including teach yourself problems, useful web-sites and links which students make use of to enhance their understanding of the course. They can communicate with each other or with the lecturer using emails and the chat room. Despite all the available information, the students were performing poorly and were not interested in the course.

It is hoped that this study will be the key information document that will enlighten the department about the IS student body, the type of student registered for the course, the

background of the student, whether the student is doing well, what indicators are similar to successful students, and for those who are not doing well, the parameters determining their poor performance. Are there variables that can predict the success or failure of a student? If attitudes and perceptions of the students are positive, is it easier to acquaint them with all aspects of the course? Change in attitude will be monitored as well.

Other aspects that needed monitoring are the resources that students are using (the course-notes, the laboratory, and the Hot Seat). The Hot Seat is a consulting table that utilizes senior good-performing students in Statistics. Two or more students are allocated to work at the Hot Seat. It is intended for first year students and is functional from 09h00-16h00 on week days. Students consult the Hot Seat for theory and practical related IS challenges. The reasoning behind the introduction of the Hot Seat was that sometimes, students are more relaxed and open to other students and this was another way of enhancing student learning. This is the key information that the department needed to extract from the study, in-order to make decisions about the IS offering (either to improve, adjust or keep as is, to make it a course that is successful, productive, interesting and beneficial to the student and the department).

The final product of the study is a framework that will inform the department about the characteristics of the students that enroll for the Introductory Statistics course using their demographic information, the quality of the students before entering university using their Grade 12 background and the performance of the students given these tracing elements. Through the framework, it will be easier to explore relationships that may exist between the demographic characteristics, the student Grade 12 background and the performance of the students at tertiary level. This information will hopefully result in the department providing effective intervention programmes where necessary. The framework will also inform the department of the relevancy and effectiveness of the services rendered to the students. Feedback from the students using an evaluation form and pre-and post-questionnaires as well as their results (tutorial marks, test marks and final examination marks), are the instruments which will be used to make this possible. In Chapter 4, the system's process model (Figure 4) for monitoring the Introductory Statistics course offering is presented and discussed.

1.3 OVERVIEW OF THE INTRODUCTORY STATISTICS PROGRAMME AT THE UNIVERSITY OF THE WESTERN CAPE

Figure 1 below is the departmental chart which shows the layout of the IS course, the resources used, the stakeholders and how each of them links to the other.

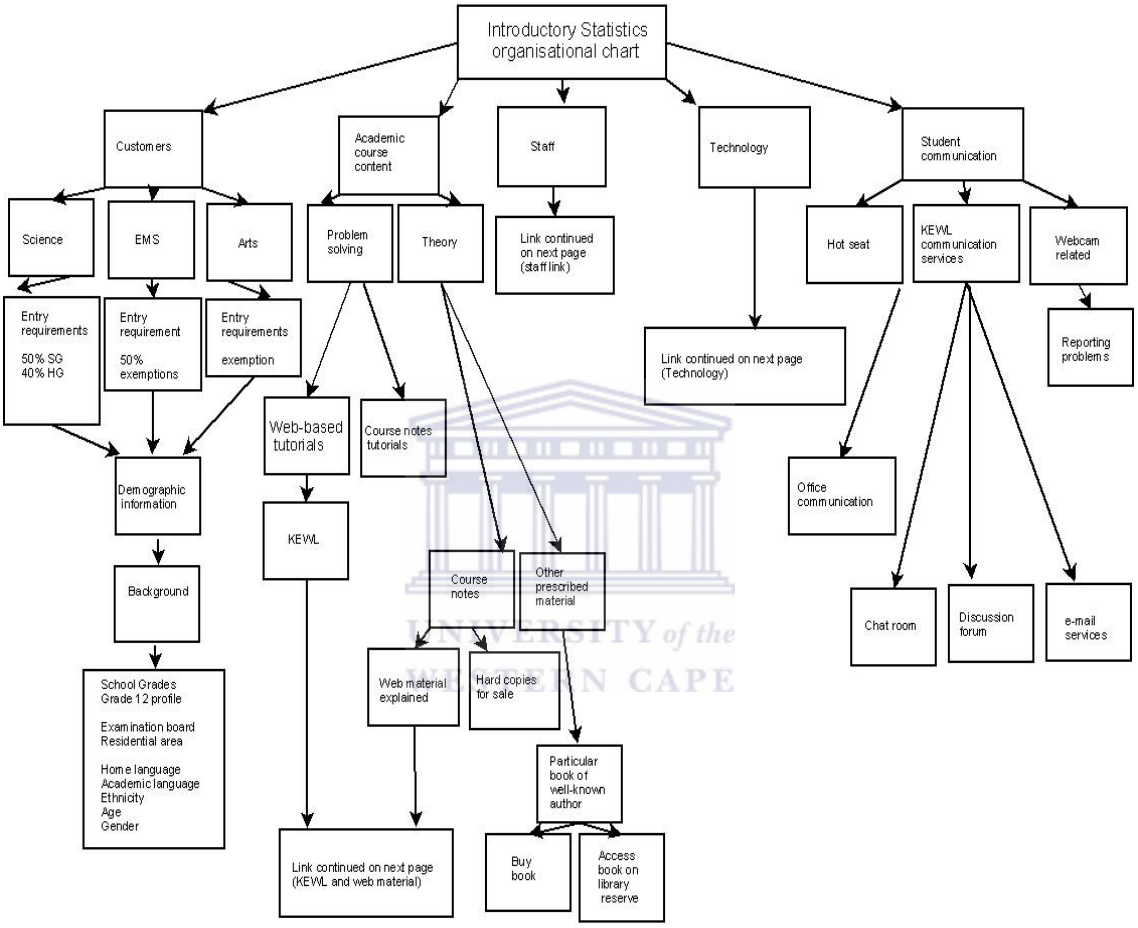

Figure 1: Introductory Statistics Hierarchy Chart

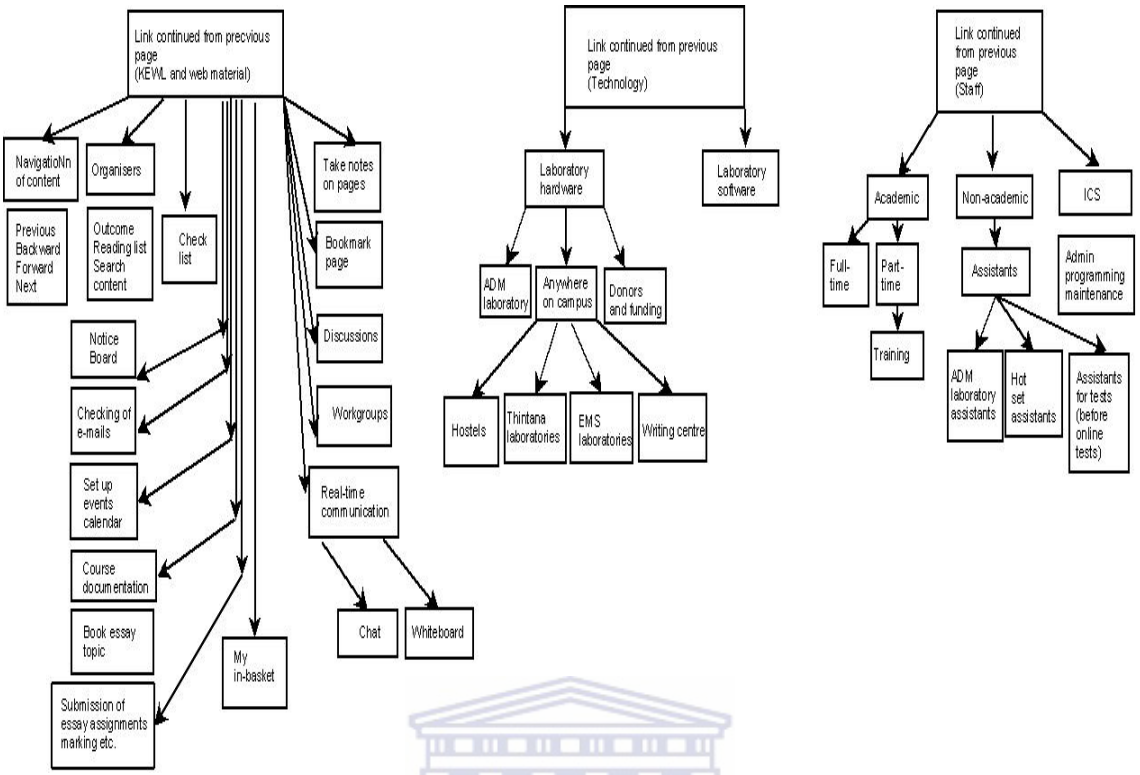

Figure 1: Introductory Statistics Hierarchy Chart (continued)

Figure 1 is a hierarchy diagram which shows the four major components of the IS course: the students, the academic course content, the evaluation and the teaching staff involved in the course offering. The second level in the hierarchy chart is the breakdown of the components (for customers for example the breakdown is Science, EMS and Arts). Students registered for the IS course come from three faculties and each faculty has its own entry requirement.

The academic course content is composed of theory and problem-solving. Contact time for theory is three hours per week. Apart from the three-hour per week teaching time, lecturers have specific consultation times for students. There are 14 weeks of lecturing. Students have a prescribed book that they can use, and the course-notes developed specifically for the IS course.

To expose students to problem-solving, they have to do web-based tutorials which are mainly based at the Anglo-Gold De Beer and Murray Trust (ADM) laboratory and can be done

during specified times (tutors are available to assist) although students can access the tutorials off-campus as well. Access of the tutorials in the ADM laboratory is limited as the laboratory is used for teaching senior students as well. Access at places other than the ADM laboratory is unlimited as registered IS students can access the tutorials whenever they please if they have an internet browser, (see history of the web-based tutorials in Chapter 3, Section 3.3.4). The course reader has additional problems that the students can attempt to engage and expose them to the application of Statistics in the real world situation. There are also website links that are available in KEWL that the students can use to broaden and enhance their knowledge and understanding of the course. Support for the students is also available using the Hot Seat. Trained senior students assist the students with concepts, that they find difficult to understand or that they are struggling with. The Hot Seat query form (see Appendix A8), is used to keep track of students visiting the Hot Seat for consultation. An evaluation form is used to capture both qualitative and quantitative data to further evaluate the success of the Hot Seat.

Assessment methods are the tutorials, the tests and the examinations. The students write four tests from which the best three are selected. The tests contribute 80% towards the semester mark whilst the tutorials make up 20% of the semester mark. The students write one examination. Evaluation methods for capturing and monitoring student perceptions include a pre- and post-questionnaire, end of course evaluation, the ADM laboratory and the Hot Seat query forms. People outside the department involved in the course are the laboratory managers. There is usually a team of four lecturers involved in the teaching of the course.

1.4 REASONS FOR EVALUATING THE INTRODUCTORY STATISTICS PROGRAMME

Students doing the IS course, specifically the majority of those coming from the EMS have little or no Mathematics background. This leaves them with a negative attitude towards Statistics as a course resulting in poor performance and a lack of interest in Statistics.

Chervany et. al (1977) state that IS courses excel in the large student numbers. They also highlight the fact that students taking the IS course are bored, have difficulty in understanding the course, and are only interested in getting it over with, hence the need to evaluate the teaching tools and techniques.

MacNaughton (1999), discusses pedagogical techniques that he thinks are the right mix for teaching an IS course. These include lectures, discussions, exercises, activities, group work and finally multimedia courseware. The goals of these techniques are aimed at giving to the students a lasting appreciation of the vital role Statistics can play in empirical research.

The Statistics Department at UWC was also confronted by similar challenges facing the IS offering worldwide namely: overcrowded classes, little or no Mathematics background, boredom in classes which consequently led to high drop-out rates, few students majoring in Statistics and finally poor pass rates (the pass rate was less than 50% before changes were introduced).

The department decided to embark on a retrospective process in order to gain a deeper understanding of all the issues underlying the IS offering. A strategic exercise examining the first year offering launched the study where the quality and running of the course was evaluated and monitored over time to observe trends and the indicators. The administrative processes, academic content and the tutorial component were evaluated to guide the department and the lecturers to make informed decisions about the course. There are three aspects which were of importance namely: consistency, productivity and attitudes. Programme Evaluation was used to monitor the IS offering over time. The aim was to achieve the following objectives:

- monitoring the quality of the first year component through strategic management of the process;
- monitoring the characteristics of the Statistics student body intake using demographic information;

- monitoring the quality of the Statistics student body intake using Grade 12 information;
- monitoring the first year pass rate which was less than 50% (1999-2002 before the launch of the study). The objective is to have a pass rate of 50% and above;
- monitoring the drop-out rate. The aim is to observe the trend of the drop-out rate over time, with the goal of decreasing this in the future;
- monitoring of student‘s
- perceptions over a two-and-a-half year period using student comments; and
- development of a theoretical framework to evaluate IS programmes.

The stated objectives will provide the Statistics Department staff with the opportunity to:

- achieve better first year results which can lead to a better pool of students majoring in the subject;
- create an environment in which both staff and students can learn by doing and reflecting while supporting each other; and
- identify problem areas quickly.

If the objectives are not met, the study minimally would hope to extract from the data, indicators for the poor performance/results. A study of this form has never been done in the institution. The framework which will be the final product used to inform the department, will not only be a tool used by the department, but could inform other departments and hopefully, the entire institution. The results will hopefully enable the institution to understand the students better, to continuously serve as a checklist of assessing the effectiveness of the services and hence the effectiveness of programmes offered through the immediate feedback obtained from the student final year results and the evaluations and questionnaires that departments will develop to meet their specific settings. The institution will also be able to set

up support systems or intervention programmes based on the information revealed by the tools used in the study.

1.5 BENEFITS OF THE STUDY

Student attitudes can impact on the learning process of a student. If the attitude or perception is negative, the learning process can be hindered. If the attitude is positive, the learning process can be enhanced. The department regards statistical numeracy as a life skill. The desire of the department is to break down the fear of Statistics and to bring about a perspective change in students.

The study will hopefully provide a contribution to ensure that the department has the best first year students in Statistics in the Western Cape that achieve a success rate comparable to the national norm. This requires a continuous upgrading of the quality of the course content to ensure quality delivery, which is congruent to national standards.

Students entering university from school seem not to be sufficiently prepared. Barrell (1998) identifies a difference between high school and tertiary English, and a need for skilled teachers to teach the subject. The type of high school, government or non-government organization, also creates a gap and affects the performance of students at university. Students from the private schools tend to perform better at university compared to groups from state schools (Birch & Miller, 2003). The department wishes to investigate the indicators leading to this gap looking at Grade 12 background and aiming to bridge it properly.

The framework employed will be a replicable Programme Evaluation model that can be used to guide the evaluation of a programme. It will be a tool that will make it possible for the department to continuously upgrade the course quality thus forcing the department to explore the incoming student profile to easily identify weak students hence equipping the department

and eventually the university with measures that can be taken to address the problem. It is also trusted that the study will contribute towards satisfied end-users, happy and satisfied students and well-motivated staff.

A process management model was used to revisit all the processes used in the IS offering. The model is made up of four components, the inputs, the processes used to transform the inputs, instruments used to assess the effectiveness of the programme and the indicators that may or may not contribute towards the effectiveness of the programme. It is through the process management, that the department was able to develop a theoretical framework, which could serve as a guide to evaluate programmes. This makes the study unique, as the framework contributes towards the teaching and enhancement of Introductory Statistics programmes.

The tutorials serve as an enhancement to the learning. The department believes that giving a student many chances to repeat the tutorials will result in improvement in understanding the concepts better, thus an improvement in performance and consequently good results. This is another aspect contributing towards the uniqueness of the study.

The department is committed to providing the best affordable quality programme to its students with the aid of an adequately qualified and committed team. It is hoped that through the study:

- the department will be able to recruit quality students;
- the department will view students as valued clients;
- an opportunity to understand the demography of students is created;
- an effective working environment is established;
- the application of new technology is made possible;
- innovative/relevant/modern materials design will take place;

- continuous recording of errors (planning and organization) and responding to these issues will follow;
- continuous training and development of staff will happen;
- feedback will be obtained and given to end-users;
- continuous cash flow (sufficient funding) will be ensured;
- possible restructuring of the IS offering may follow.

1.6 STUDY DESIGN AND METHODOLOGY

1.6.1 DESIGN

There are three types of paradigms namely, the positivists, interpretive and the critical perspective. The researcher used the interpretive approach as the focus was on monitoring the IS offering processes and see how the students interpreted and viewed the IS offering and all the processes around it. The end of course evaluation, pre- and post-questionnaires, Hot Seat and the ADM query forms assisted the researcher in capturing the necessary feedback from the students. The researcher was able to analyze the demographic data and Grade 12 information, link them to the student's performance in IS and through the interpretation of the results, the characteristics of the students registered for the IS course, the quality of the students registered for the IS as well as the performance of the students, given that they had taken specific courses in Grade 12 could be understood.

1.6.2 Methodology

The department would like to make the teaching and learning process more effective and as enjoyable as possible hence the decision to embark on the study. This is a four phase study aimed at monitoring the quality of the IS course through Programme Evaluation in order to ensure quality. Both formative and summative evaluation will be used in the study. This might mean frequent revision, updating of course material and management of the process where necessary. The discussion of summative and formative evaluation methods as well as the differences between the two types of evaluation is dealt with in Chapter 2. This is also a mixed model Programme Evaluation since it uses qualitative (mainly students' comments,

meetings and documents) and quantitative (tutorials marks, Grade 12 results, university results, pre-questionnaire, post-questionnaire and the evaluation) data collection methods.

The study consists of four phases. Phase 1 is the planning phase, composed of five steps, an overview of the IS course, the reasons for implementing Programme Evaluation, the study questions and objectives, the instruments used to collect data and the evaluation methods which are used in monitoring the entire process. The 2003 STA132/125 data were used in the strategic planning exercise discussions at the end of 2003.

In Phase 2 data were collected for a period of two years: first semester 2004 (STA111/131); second semester 2004 (STA125/132), first semester 2005 (STA111/131) and second semester 2005 (STA125/132). There were no structural changes in the tutorials and the tests for the period of two years, although the online test writing system was introduced for the STA125 group in 2004. The online testing system was introduced to all IS groups in 2005. Because it is difficult to keep the examination the same, it was ensured that the level of difficulty of questions as well as the structuring of questions did not deviate that much during the data collection phase. The aim is to see whether the different groups follow the same pattern over time. If there are differences, reasons leading to the differences will be investigated. Both qualitative and quantitative data collection methods were used. Qualitative data were in the form of comments from the students, meetings and other documents. Quantitative data collected are the student results (Grade12 results, tutorial marks, test marks, final examination marks, pre-questionnaire, post-questionnaire and end-of-course evaluation ratings). The researcher decided to mix the two methods to obtain in-depth understanding of the students as one approach is not always enough to capture or give a clear view of a situation. It is for this reason that, apart from the quantitative data collected from tutorials, tests and examinations, there were meetings, query forms (ADM and Hot Seat), and student comments obtained from the evaluation.

The analysis was done in Phase 3. A mixed-method model (qualitative and quantitative) was used to analyze the data. Quantitative methods employed in the study are descriptive and in

the form of tables, correlations, mixed model method and hypothesis testing (t-test). The methods are explorative, descriptive, predictive and inferential whilst qualitative analysis focuses on the perceptions, experiences and perceptions of individuals. A full explanation of the rationale for using both the qualitative and quantitative methods is discussed in Chapter 3.

Phase 4 was the report writing phase and has several steps encompassing the conclusions and recommendations. Programme modifications were discussed in this phase. The processes used as tools for the success of the study may need to be reviewed and improvements may be necessary at the end. Figure 2 is a pictorial representation of the model used to make the study a success.

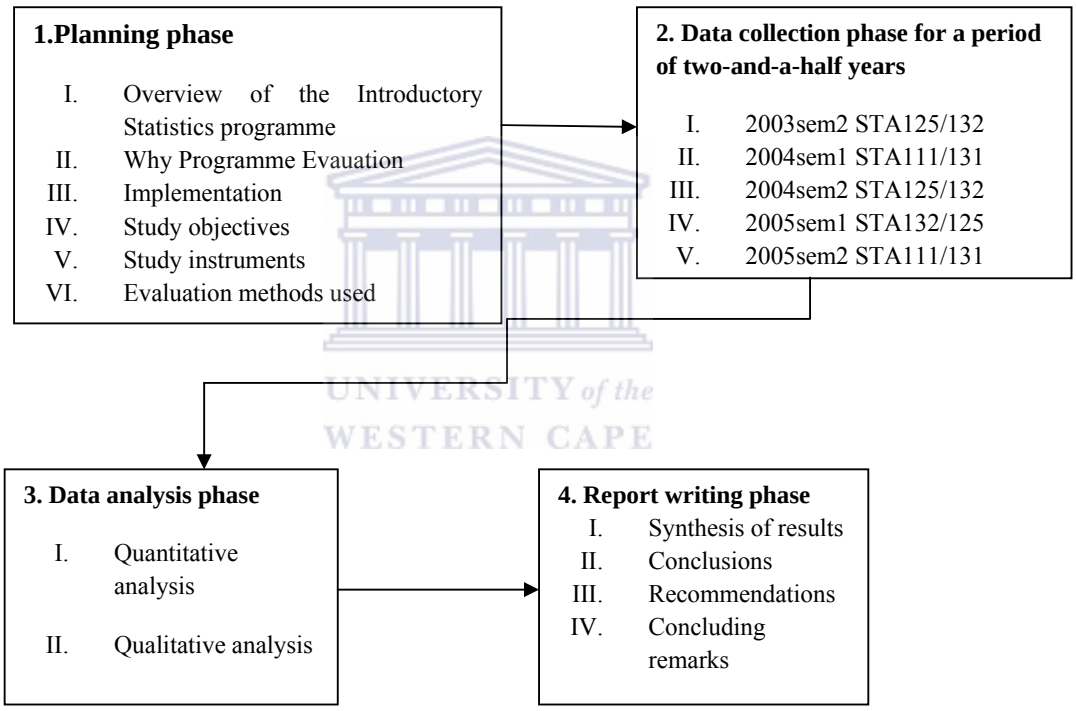

Figure 2: The University of the Western Cape Introductory Statistics Programme Evaluation Model

1.6.3 RESEARCH INSTRUMENTS

Section 1.7.2 discusses the research instrument used in the study, how each instrument will be used in the study to capture data, the demographic information, the pre- and post-questionnaires, the Hot Seat query form, the ADM query form, end of course evaluation and student results.

(i) Demographic information

Prospective students complete and submit an application form prior to acceptance by the university. The application form data contains Grade 12 information, parent information, financial status of parents and residential information. The Grade 12 data which included results, subjects done, the symbols that the student obtained and the examination board enabled the researcher to measure the impact of the performance of the student given their Grade 12 background.

(ii) Pre- and Post- Questionnaires

The pre- and post- questionnaires were administered online prior to doing the first tutorial and before doing the last tutorial. Data in the pre-questionnaire consisted of demographic information, computer literacy, and mathematical background, the extent to which the student was familiar with Statistics and how a student viewed Statistics as a subject. The pre-questionnaire thus observed student perceptions and attitude before gaining exposure to the course. The post-questionnaire constructed to investigate whether student perceptions had changed or remained the same after gaining exposure to the IS programme.

(iii) Hot Seat query form

The department arranged for a Hot Seat in the department. The Hot Seat can be defined as a source where students go to have their queries answered. Senior students who have been trained for the task assist at the Hot Seat. A special guide to solving queries was also developed to identify problem areas for despondent students. Student queries in the Hot Seat included: course content related (students with difficulties with the course content or concepts) questions and information about marks, test dates and lecture venues. The students are supposed to leave the Hot Seat as satisfied as possible. A Hot Seat query form was developed to assess its effectiveness. Information gathered included: date, time, student assistant at the time of query, type of query and method of attending to the student query.

(iv) Anglo-Gold, De Beers and Murray Trust Laboratory query form

The first year students completed and submitted tutorials on a monthly basis. The tutorials were web-based. The students use the ADM laboratory to access computers. The KEWL learning management tool was used to provide further access to course material, tutorials and electronic communication and supplies. The tutorials comprised twenty percent of the student's course work. There are laboratory assistants in the ADM computer laboratory trained in all aspects of the course. The student assistants receive ongoing training for the task. Disasters such as system failures, power failures, password problems and problems within the programme itself do occur. It is the department's aim to minimize these problems. A query form was completed by each student experiencing problems in the ADM laboratory so that all incidents were properly documented. The query form is similar to the one developed for the Hot Seat but addresses laboratory related queries.

Both the Hot Seat and ADM computer laboratory query forms had student contact details. The department was also interested in determining the effectiveness of the processes being used. Data collected from these two sources were also used to evaluate or measure the success of the online work.

(v) End of Course Evaluation

The first year Introductory Statistics students complete an evaluation form at the end of each semester (14 weeks of lecturing). The evaluation was used to explore students' perceptions and satisfaction with the course content, resources, lecturers and support systems.

(vi) Introductory Statistics final results

This included the monthly tutorials that the students submit, test marks, their semester mark, and final mark.

(vii) Grade 12 results

The results were part of the application form. They include the subjects completed at Grade 12 level, the Grade 12 symbol obtained and the Grade 12 overall symbol.

1.6.4 TARGET GROUP

The study groups are IS STA111/131 students in the first semester and STA125/132 students in the second semester. The data used in the study were collected over thirty months, six months making a semester, from the second semester of 2003 to the second semester of 2005. Data collected in 2003 served as the baseline for the study. Students registered for STA111/131 in the first semester of 2004 formed the first group. The next study group came from the second semester STA125/132 of 2004 students. The third data collection period was the first semester of 2005:STA111/131 and the last group were STA125/132 second semester of 2005 students. It was necessary to follow these groups over the two and a half year period to see if the results revealed a similar trend or pattern and to identify the reasons pertaining to the differences or similarities to provide the department with an in-depth understanding of the groups.

1.6.5 DATA ANALYSES

Data collected was both qualitative (queries, documents and comments) and quantitative in nature (tutorial marks, test and examination marks). Baseline results consisted of all possible data from the first year student groups prior to the initiation of the phases. Subsequent

analysis can then be used to improve on baseline studies. Statistical packages to be used are EXCEL, Statistical package for Social Sciences (SPSS), (Statistical Analysis Software (SAS) and SAS Enterprise miner.

1.7 ETHICS

The names and student numbers of the IS students involved in the study are not identified and the information used is solely for the purposes of this study.

1.8 LITERATURE REVIEW

There has been a need for institutions, particularly educational institutions to explore different pedagogical environments, different teaching methods and development of innovative curricular to enhance student learning for better or optimized outcomes (Inam & Caso, 2002). There has also been a cry from government to emphasize and encourage students to focus on Science and Technology related subjects/courses. Apart from a shortage of Science and Technology personnel, the subjects are seen as potential contributors to the growth of the economy of the country (Asseffa, 2008). The Statistics Department felt that there was a need to embark on Programme Evaluation to investigate, explore, understand and improve the processes used in the offering of the IS course where necessary.

According to Zuber-Skerrit and Perry (2002) there used to be a gap between graduate study and professional or organizational learning. The material that the students received was not relevant enough to equip them to meet the demands of the real business or organizational world. The aims of organizational learning are to solve complex problems, to achieve change whilst at the same time improving performance at individual, team and organizational level. The individual might be the student who initiated the study, the team might be all the people participating in the study and this can lead to a chain, which forms the organization.

Hambrecht and Co (2000) indicated that education is changing and that there is a high demand for highly skilled students in business. Higher Education institutions are forced or pressured to look for better and more effective methods of delivering education to the student. It is important to evaluate these methods to see the impact they are having on improving teaching and learning in the tertiary context so that it is more effectively focused on the business and organizational worlds.

1.8.1 THE LITERATURE COVERAGE

The aim of doing the literature review particularly on Programme Evaluation was to enhance the understanding of Programme Evaluation and its processes as well as deepening the researcher's knowledge on the issues underlying Programme Evaluation. The literature assisted the researcher in finding out what important aspects or steps one has to follow when developing a Programme Evaluation model.

The first part of the literature review covers theories of education both nationally and globally. The South African constitution and Higher Education are reviewed in great detail. The University of the Western Cape as a tertiary institution and its philosophy are reviewed as well as similarities and differences in philosophy between UWC and other South African universities.

The second part of the literature review defines Programme Evaluation, its goals and the types of Programme Evaluation used. The characteristics of the programme and the environments in which Programme Evaluation is applied are also discussed in the literature. Another focus is the application of Programme Evaluation in education, specifically the need for Programme Evaluation in Higher Education. Literature studied is by Cherin & Meezan, (1998); Koplan, (1999); McLaughlin, (2003); Monsen & Haug, (1997). The application of Programme Evaluation projects in education reviewed include: the Norwegian Educational reform 97 (Monsen & Haug, 1997), the evaluation of the South African curriculum for

Computer Studies (Britz, 2004) and the evaluation of the success of the Augmented programme for the National Diploma at the ML Sultan Technikon (Timm, 2005).

Programme Evaluation is aimed at answering questions as to whether there is any need for social programmes, the likelihood of the programmes to be used and their effectiveness when used (Terre Blanche & Durrheim, 1999).

Evaluation types include formative evaluation: needs assessment, implementation evaluation and process evaluation (Indelicato, 2003; Bushney, 2005; McLaughlin, 2003; Mamburu, 2004) and summative evaluation: outcomes evaluation, impact evaluation cost effectiveness, secondary analysis and meta - analysis (Britz, 2004; Forbes, 2007; Robinson and Latchem, 2003)

Chervany et al. (1977) emphasize the necessity and urgent need to evaluate teaching tools and techniques in the IS course, although the process can be costly. The monitoring and evaluation of the IS at UWC was mainly about making sense of the information flowing in and out of the department to discover, refine and utilize where necessary to aid the department in achieving good quality delivery both to students and to the university. A summary-matrix of the proposed objectives, analyses methods, instruments and outcomes is presented in Table 1.

Table 1: Table of plans and implementation of the Introductory Statistics data

Objective	**Analysis**	**Instrument/method**	**Outcome**
Monitoring the quality of the first year Introductory Statistics offering through process management	Qualitative	Course-notes Meetings with IS students Meetings with tutors Meetings with ADM managers Meetings with ICS personnel	To be able to monitor customer satisfaction and service delivery
Monitoring the characteristics of the student body intake using demographic information	Quantitative	Age Area of residence Ethnicity Home language Academic language Examination board Gender Grade 12 profile	To understand the demographical composition of students registered for the course To understand the Grade 12 background of the student registered for the course

Table 1: Table of plans and implementation of the Introductory Statistics data (continued)

Objective	**Analysis**	**Instrument/method**	**Outcome**
Monitoring the quality of the Introductory Statistics student intake	Quantitative	Entry requirements	To see if meeting the requirements is an indicator of performing well in the course. There is a possibility of either adjusting the requirements or introducing a new course for the under achieving students
		Course-notes evaluation	It is the wish of the department to provide students with notes that are handy and beneficial for knowledge enhancement
		Web-based tutorials – evaluation & tutorial marks	Expose students to real world cases and problem-solving skills. To trace if the tutorials are serving the purpose for which they were intended
		Online tests-evaluation & results	Theoretical and application. To assess the understanding of the course material. To prepare students for the examination. To expose them to technology
		Grade 12 status	To understand the Grade 12 status over time

Table 1: Table of plans and implementation of the Introductory Statistics data (continued)

Objective	**Analysis**	**Instrument/method**	**Outcome**
Monitoring pass-rate	Quantitative	End of year results (final marks)	To see if there is a pattern followed over time. The wish is to have an increasing pass-rate over time
Monitoring drop-out rate	Quantitative	Final results	To follow students who discontinue with the course so that it is minimized
Monitoring performance by Grade 12 information	Quantitative	Final results and Grade 12 status	To see if the Grade 12 status impacts on the performance of the student
		Final results and Grade 12 symbol	To see if the Grade 12 average symbol impacts on the performance of the student
		Final results and home language	To see if the home language impacts on the performance of the students in IS
		Final results and academic language	To track performance in Statistics given the Grade 12 academic language
		Final results and Mathematics	To track performance in Statistics over time given the Mathematics at school level
		Final results and examination board	To track performance of the students in Statistics given the examination board
		Final results and gender	To track performance of the students by gender

Table 1: Table of plans and implementation of the Introductory Statistics data (continued)

Objective	**Analysis**	**Instrument/method**	**Outcome**
Monitoring the drop-out rate	Quantitative analysis	Final results	To try to track the students who do not finish the course over time
Monitoring student perceptions	Qualitative	Comments Evaluation	To see what the students think about the course offering, the material they are using as well as the resources they are using (ADM computer lab). To also see if the student perceptions are similar or follow a pattern over time
		Pre-questionnaire	Perceptions of the students before gaining exposure to the course. To identify patterns over time
		Post-questionnaire	Student perception after gaining exposure to the course.

1.9 CHAPTER OUTLINE

Chapter 1 discusses the background of the study, the objectives and the need for Programme Evaluation in the Introductory Statistics offering at UWC. The literature review is captured in Chapter 2. Chapter 3 discusses the study design and methodology. In Chapters 4 and 5, the presentation of the results, analysis and implementation are covered. Chapter 4 deals with quantitative data and Chapter 5 qualitative data. Chapter 6 covers the study summary, limitations of the study, recommendations and concluding remarks.

CHAPTER TWO

REVIEW OF THE LITERATURE

2.1 INTRODUCTION

The perception of the value for conducting the literature review is the ability at the end of the exercise to have a broad knowledge of the subject and knowing what has already been done to avoid repeating what already exists. The literature also provides guidelines on the feasibility of the study.

After conducting the review of the literature, one is able to identify authors who have contributed to the research in progress, or to be conducted. Similar theories, differing theories and gaps are also identified through the existing literature. Chapter 2 discusses the literature review covered, the purpose and usefulness in making the Introductory Statistics study project successful. The focus of the literature is on Higher Education and the Programme Evaluation presented in the literature framework, Figure 3.

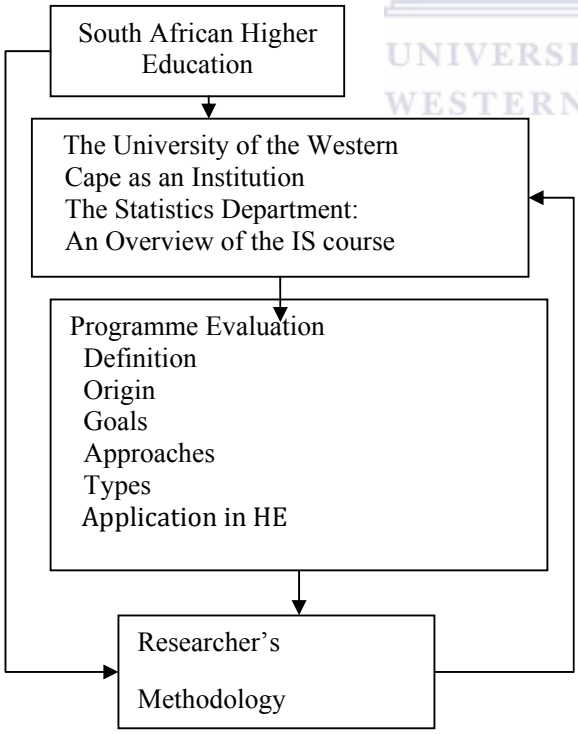

Figure 3: Framework and organization of Chapter 2

2.2 SOUTH AFRICAN HIGHER EDUCATION

Higher Education in South Africa has a history associated with apartheid-related issues, hence the need to restructure Higher Education in the early 1990s. The then apartheid-led government believed that certain ethnic groups had limited potential and were only permitted to study in specific programmes and selected courses. (This applied to gender as well). The pre-apartheid institutional setting instilled certain racially-based beliefs which will take decades to trancend (Swartz & Foley, 1996; HEQC, 2006; DOE, 1996).

The release of Mandela in 1990 marked and pressed the need to change Higher Education. Although much had been done in the early 1980s, the then Whites only universities gradually started to accept Black students, based on academic performance: this was like a drop of water in the ocean and 'much' was not sufficient enough (Boughey, 2007). Black students came from disadvantaged backgrounds the language problem, the gender issues (some cultures could not understand the worth of educating a female), the financial background, the geographical location and the limited scope that was covered by the then Bantu Education Act, and the fact that the Black urban and rural schools were under-resourced. For example, Black and rural schools had no laboratories and there were minimum or no funds to assist them to buy the necessary resources needed to optimize the quality of the education they were receiving. A plan had to be made that would eliminate the gap and at the same time put a disadvantaged student on the same level as their peers. Educators needed to come up with a system, aimed at empowering students and a system that ensured that students after education were skilled and productive enough to contribute to the growth of the South African economy (Boughey, 2007).

Swartz and Foley (1996) give a picture of the situation in the South African Higher Education as a result of the legacy of apartheid. In their debate, they discuss the damage that the system caused: the fact that Black students were categorized as fit to follow specific careers such as the Social Sciences, Religious Education and Teaching has created a backlog in the sense that in 1996 there were only 65 Black chartered accountants out of a total of 14 000 in South Africa. In Technikons, 31% were White students whilst only 2.6% were Blacks. The two authors also mentioned that the statistics of White students graduating could be

compared to developed countries like Canada and the USA, whilst the statistics of Blacks graduating had a greater similarity to countries with developing economies. The article further discusses the importance of Higher Education in contributing to the economy of the country. Higher education institutions can contribute to the growth of the country's economy by ensuring that skilled, innovative and creative graduates are produced.

Some of Boughey's (2007) arguments are obvious especially in rural areas. Many of the changes are more easily implemented in urban areas than rural areas. For example, there are students, especially from rural areas, who complete their schooling in Mathematics and Science subjects who do not have a clue of what a microscope looks like. They had to visualize or trust the information they get from the educator. Some of the areas have no laboratories at all which can enhance and assist the students in better understanding of the theoretical concepts.

Fiske and Ladd (2004), indicate that funding also contributed to the under-development of Black schools and tertiary institutions as more funds were allocated to White schools resulting in limited resources, poor quality in educators and as a result detoriation in teaching quality which consequently resulted in poor pass rates.

As part of the transformation in Higher Education, the Higher Education Quality Committee (HEQC) was formed in the late 1990s. Its function was to ensure that Higher Education institutions operate within specified standards and that there is equality across South Africa. In partnership with the South African Council on Higher Education (CHE), the HEQC developed a set of self-evaluation instruments with the purpose of managing the quality of service learning. Service learning is designed to promote learning enhancement. This means that students after exposure to service learning are able critically examine their experiences and can in the end tell whether they have obtained the intended or necessary outcomes. This development promoted the need for programmes to be evaluated not only to ensure quality, but also to inform government and personnel involved in the planning process, of the status of progress being made towards South African Higher Education (SAHE) reform.

Ndebele (2004), Vice-Chancelor of the University of Cape Town (UCT), observed the current state of the South African Higher Education. He agreed that the system had not changed yet, but was still in the process of change and transformation. He believes that having Black students in tertiary institutions is rarely identified or attributed to South African HE transformation. He is concerned about the internalization of the status of the SAHE and advises this could be remedied by a global comparison. He also touches on the gap between the schooling system and tertiary systems and advises that a strategy be developed to bridge the gap between the two.

Although institutions are trying to correct and improve the status of Higher Education, through the creation of viable programmes, support systems for the students and initiatives like the CHE and South African Qualifications Association (SAQA) to observe the status of SAHE. However there is a lot of work that still needs to be done in order to place the SAHE system on the global competition. If the schooling system supplies tertiary institutions with students and there is a significant gap between the two, this threatens throughput as it is questionable whether students from all schools are prepared for tertiary education. Government on the other hand, is pushing tertiary institutions for throughput and the new funding formula is based on the number of students achieving their degrees in the minimum period required

Institutions are trying their best to identify existing gaps between the schooling and tertiary systems. Testing programmes [Alternative Admissions Research Project (AARP) test initiated by UCT and also administered to prospective UWC students in the EMS faculty] is currently used to assess the preparedness of learners who want to enroll at university with regard to their Mathematics skills and language proficiency. There have been support systems and structures put in place by institutions for underachieving students. UWC has introduced a four year programme for students who do not meet the entry requirements with a focus on Mathematics. Continuously evaluating them will inform the developers on whether they are successful or not in helping and improving the situation in SAHE.

John and Catherine (2008) admit that there has been an improvement in the South African Higher Education system. Amongst the improvements they have listed are gender issues in the entire system: between 1993 and 2000 female student enrollments have increased from 43% to 53%. Much is still to be done as females seem to register for social programmes like education rather than in science, engineering and technology-related programmes. Their article shows that there has been an increase in the number of Black students who study at tertiary level from 30% in 1993 to 60% in 2000. Of importance and challenging in South African Higher Education is the production of graduates that will contribute to the growing economy and development of South Africa. Programmes introduced by HE institutions to students need to ensure that there is no shortage of skills and SAHE institutions must ensure that these programmes meet the standards and quality of education globally.

It is for these reasons and challenges that structures like the CHE have been put in place. In 2004, a discussion document providing a framework for the monitoring and evaluation of the South African Higher Education was released. The CHE mission as stated in the document is "To contribute to the development of a Higher Education system characterized by equity, quality, responsiveness and effective and efficient provision and management" (CHE, 2004). This means revisiting existing programmes and assessing their quality, effectiveness and their contribution to the growing demands of the South African economy. The purpose is to ensure that institutions meet the standards set by the CHE and all the other structures involved in the transformation and assessment of SAHE processes. Programme evaluation will and has contributed towards Higher Education reform in South Africa. For educational institutions to know where they are, the institutions have to know where they started. Further, they have to know where they are going through effective planning. Institutions have to look for achievements, progress and short-comings and based on the listed concepts, decide what they have to do in order to improve and bridge existing gaps. This makes programme evaluation an essential ingredient of Higher Education. Not only is it retrospective in nature, it also plays a valuable part in assessment.

In the previous section, the South African Higher Education challenges, new developments and transformation processes prior and post 1994 were discussed. Critical challenges that are

confronting the SAHE are as with all the other Higher Education institutions; to produce good and compatible students to other globally trained students, despite the challenges. It was necessary for the researcher to highlight and inform the reader of these challenges, as the researcher believes that many of the challenges that are facing Higher Education were as a result of the past. The researcher acknowledges the improvement and developments introduced into South African Higher Education, although a lot still needs to be done. UWC (history mission and development of the institution), the Statistics Department (overview of the IS and reasons for embarking on evaluating the course) are discussed in Section 2.3.

2.3 THE UNIVERSITY OF THE WESTERN CAPE AS AN INSTITUTION

According to the researcher, there is a need to include the University of the Western Cape (UWC) in the literature, to help the reader in understanding the history of the institution as well as expose a broad view of UWC as an institution. It is difficult for the researcher to cover programmes in the Statistics department without highlighting their viability and how they fit into the mission and vision of UWC. It is also imperative to bring about awareness in terms of the growth of UWC as an institution. This section covers the history of UWC, how the institution has evolved over time to make education accessible to everybody including the disadvantaged. The use of Programme Evaluation in the institution is also discussed in the section.

The University was initially a college intended for 'Coloured' people and became operational in 1966 with 166 students. It was then upgraded to a university in 1970. As it was introduced in the apartheid era, it had its struggles and has played a significant role in South Africa bringing about change and contributing towards a dynamic nation.

In his speech during the March graduation 2003, Dr Mokhele, the then National Research Foundation (NRF) president, stated "The developments in this institution had a major influence on the Higher Education transformation discourse that reverberated throughout this country in the late 1980's and early 1990's. It was no wonder then that alumni of this institution occupied key positions in the post- 1994 South Africa". Two alumni that can be

listed are: former Rector, Prof. Jakes Gerwel, Chairperson of the Nelson Mandela Foundation and current UWC Rector and Vice Chancellor, Prof. Brian O'Connell, was president of UWC's student representative council (SRC) in 1969. Doctor Mokhele's speech cannot be underestimated as because of its history and contribution towards Higher Education in South Africa, UWC was one of the few institutions that were minimally affected by the merger process. It was under the leadership of Professor Gerwel as the rector of UWC, that curriculum renewal, out-reach projects and social and political issues were given attention.

The institution strives for quality and growth. The aim is the achievement of excellence in teaching, research and learning, by developing curricula and research programmes to meet and accommodate the cultural diversities of the democratic and changing South Africa. There has been ongoing review of programmes since the 1990's, aimed at producing skilled graduates who are able to meet and contribute towards the growing economy of the country. To name a few, programmes like lifelong learning, and gender equity-related studies were introduced. However emphasis has been more on the growing demand for the need for Science and Technology nationally.

The majority of students in the institution come from historically disadvantaged schools and backgrounds; among other factors home language, academic language and socio-economic conditions that may impact on the performance of a student at tertiary level.

The institution has grown over time. In the late 1990's, the Faculty of Education was allowed to function as a faculty with the main focus on teaching, research and development of existing programmes. These were evaluated to ensure quality, thus making a contribution towards education that is facing numerous challenges (UWC, 2001). The Science Faculty introduced technology-oriented programmes among these programmes were the Biodiversity and Conservation Biology, Biotechnology and Medical Biosciences in response to the government's call towards a technology-and-science-oriented focus.

In November 2001, the institution released a strategic plan for the period 2001-2005. The areas needing focus included: teaching and learning, research and research development and enrolment management and student development, specifically looking at excellence, efficiency and effectiveness. Linked to the focus areas were preset goals, critical outcomes, objectives and strategies to achieve them. Terms used in the strategic plan include monitoring of achievement, clarifying mandate, accountability and performance expectations. Not only does the strategic plan discuss the concepts listed, it further states the essentiality of reviewing the outcomes through the use of a mixed model to assess the extent to which progress has been made in achieving the preset outcomes.

The strategic plan for the period 2001 to 2005 proves the commitment of the institution to strive for success and excellence. The strategic plan emphasizes the importance of monitoring achievements to measure the extent to which these have been achieved. It also stresses the importance of achieving these goals for accountability and to track performance, (UWC, 2000).

In September 2007, the HEQC launched an audit at UWC which included the following areas: promotion of confidence in the quality of Higher Education, assessment of the extent to which UWC as an institution operates in terms of national policies, diversity, continuous improvement of the quality of teaching and research, success rates and research outputs. All of the above mentioned areas force institutions to evaluate and assess their programmes on a continuous basis, to be compatible and to adapt to change. All of the above also change the face of programme evaluation from the view of being critical to that of being a vehicle for change, as an information source that promotes growth for the benefit of the individuals and the funders engaged in the process.

2.4 PROGRAMME EVALUATION: AN OVERVIEW OF THE INTRODUCTORY STATISTICS COURSE AT THE UNIVERSITY OF THE WESTERN CAPE'S STATISTICS DEPARTMENT

Higgins (1999) highlights the challenges facing Statistics as a course and a discipline. He further argues that Statistics has been shadowed by other courses due to the fact that it has always been coupled with other courses, either with Mathematics or Physics. This has resulted in Statistics gaining minimum recognition. He further encourages that emphasis should be put on the non-mathematical aspects of Statistics and the important role these aspects play in communities, particularly if the aim is to bring statistical awareness to people with minimum or no Mathematics background. Higgins divides non-mathematical areas of Statistics into three categories, Planning and Managing Scientific Studies, Computer Science and Data Management, Management and Communication Skills.

The existing literature has revealed that students have a fear of Statistics as a course, due to the mathematical part, the fear of numbers to some, the language that is used and to some extent the inability of the Statistics teachers to transfer and communicate the knowledge they have in a language that can be easily understood by students. This has to some extent resulted in few students majoring in Statistics and consequently, a shortage of statisticians.

The 21st century is an era where Statistics is needed globally. South Africa is growing and developing in every aspect including the economy and consequently the many challenges that developing countries are confronted by. Statistics plays an important role in informing government and the people with useful information such as risks, prediction of the future and the general summary of the current situation.

The recent energy shortage in SA (since January 2008) is an example that indicates the need to declare Statistics as one of the scarce skills. The state president, in his February 2008 address repeatedly highlighted the role Statistics plays in the development of the economy of SA as a developing country (Government, 2008). An important example is that of a census, where the importance of accuracy in estimating the population growth and how the information gathered through Statistics can be used in the planning and making of future decisions for sound and effective running of the country. On the other hand, Statistics South Africa (STATSSA) one of the organizations responsible for supplying the country with

Official Statistics and data has had more than 200 vacant positions on a quarterly basis since 2007. This example confirms the shortage of Statisticians in the country.

The department's vision includes the training of students to be skilled Statisticians at the completion of their degrees. Statistics as a course is offered at all levels of study. The Introductory Statistics course is meant for first year students, although a few senior students register for it. The course consists of theory covering descriptive statistics, probability theory, inferential statistics, regression analysis, index numbers and time series. It is a semester course with two terms within the semester (seven weeks each). Students on completion of the course are expected to be able to perform simple analysis like descriptive statistics, to compare data sets using statistical methods, to be able to do estimation as well as do simple time series analysis using real data.

As part of the course requirements, students submit online tutorials (16) and write four tests of which the best three test scores are taken. Online tutorials are submitted on due dates (see course outline, Appendix A10). All the students registered for the Introductory Statistics course can access the tutorials anytime anywhere. There is, however, a laboratory that they can use with specific times allocated to the Introductory Statistics students. Although not all of the students have computers, and those that have computers might not have internet at home, accessing the tutorials anywhere at anytime has proved to be useful to students, particularly part-time students. The continuous evaluation mark is calculated by taking 20% of the online tutorials and 80% of the best three test marks. Students write a two-hour examination at the end of the semester. The continuous evaluation mark and the final mark have a 50-50 split towards the final mark.

There is a variety of students registered for the course; some have a sound mathematical background, some have limited Mathematics and some have no mathematical background. Several of the students are from disadvantaged backgrounds and have no or limited knowledge of computers. Almost all of the students are doing Statistics for the first time. Statistics as a course on its own is challenging: the notation and the language and to students

with no mathematical background, can be overwhelming Hahn (1988); Conners et al. (1998); Nolan (2002).

Until the end of 2002, the pass rate of the course was below 50% and the drop-out rate was high as students were not motivated.

The IS programme needed to be evaluated to see if the course objectives were being met. If the course objectives were not being met, the department needed to find the indicators for not meeting the course objectives in order to improve the Statistics course offering. Evaluating the course for a period of two-and-a-half years (five semesters with five groups of students) would give the department the opportunity to track performance measures using pass rates, drop-out rates, student-profile patterns and student perceptions over time. This information would be of great value in the modification of the course where needed.

There was a need for the researcher to give the reader a broad overview of the Statistics Department hence its inclusion in the literature review chapter. The challenges faced by UWC's Statistics Department are not unique, but are challenges all institutions offering Mathematics and Introductory Statistics courses face Yesilcay (2000); Bryce,(2002); Hogg (1999).

2.5. DEFINITION OF PROGRAMME EVALUATION

"Programme evaluation is a systematic study, examination and observation of a programme through scientific methods to assess either the design, implementation or improvement of a programme" McLaughlin(2003); Puett (2000); Stake(2000); Miller(2000).

Programme Evaluation (PE) in a social context is the use of social research procedures to assess the effectiveness of an intervention, MacDonald (2007) and Mamburu (2004).

Walberg and Haertel cited by Miller: 2000, define PE as a thorough examination of an educational curriculum, institution or organization. Emerging from the definitions, Programme Evaluation is systematically used to assess the effectiveness or value and worth of programmes.

The researcher defines PE in the context of the study as the periodic monitoring and systematic examination of a programme through the collection, observation and analysis of data to determine the success or failure of a programme and indicators leading to this and, to make informed decisions that may lead to either the modification or improvement of the programme.

Section 2.5 defined PE as cited by different authors in the literature. The last definition is that of the researcher and is in the context of the study.

Terms that keep on emerging from the definitions are: systematic, collection of methods, rigorous, success, decision making, social, performance, improvement, impact and process.

The researcher views PE from the listed terms as a systematic process, or a collection of methods, used in social programmes with the aim of improving performance or success of the social programmes or to observe the impact of the social programme to make decisions about the programme.

2.5.1 ORIGIN OF PROGRAMME EVALUATION

The origin of Programme Evaluation (PE) goes as far back as the 1960s, in the United States of America (USA) and was mainly conducted by outsiders (evaluators were people outside the organization/institution), hence the negative perception about it. People did not trust

outsiders and they often did not release information needed by the evaluator freely due to insecurity and lack of trust. Originally, PE was used to measure or monitor success of programmes and to give feedback to funders as to whether they should continue sponsoring projects or not. This resulted in PE and its results being under utilized (Potter, 1996; Cherin and Meezan, 1998). Popular cited authors in PE are Patton, Scriven, Rossi, Stake and Cronbach. All the above authors support the interpretive approach to PE. The literature covers the philosophy of each of the listed authors and tries to highlight some of the Higher Education work implementing the different approaches.

Scriven (1979) supports the interpretive evaluation approach and his articles criticize evaluation approaches based on hypotheses. He indicates that quantitative approaches to evaluation limit the effectiveness of evaluations as human behaviour and perceptions can be difficult to quantify. He is one of the authors that has made a clear distinction between formative and summative evaluation Shadish et al.(1991); Douglah (1998); Stecher and Davids (1987); Mouton(2005) and Scriven(2001).

Patton (1990, 1980) supports action-driven PE and has written on formative and summative PE citing the differences between the two, the limited utilization of PE and the fear for organizations and institutions in conducting PEs. He is cited by many authors including Mouton (2005) and Konstantinos and Efrosini (2003).

Cronbach supports a critical approach to PE and is cited by authors including Barley and Jenness(1988); Bloom (2004); Stake(1975); Mouton (2005) and Hood (2004).

Stake (1975) on the other hand supports the responsive evaluation approach particularly in educational evaluation. He thinks that a response is something that emerges naturally since people are inclined to observe and react based on the observations. He lists some of the concepts that qualify an evaluation to be responsive as revolving around the programme itself not the programme intents, observing the programme audience to see if their needs are met by

the programme and emphasizes the importance of the participant's feedback in-order to measure the success or failure of the programme. Stake (1975) also supports participatory and practitioner evaluation approaches.

It was during the 1990s that PE showed a growing trend in South Africa. The pressure to change, to grow economically, the shortage of skills and competition globally, resulted in ongoing use of PE in the country. Mouton (2002) is one of the South African authors that have contributed to the application of PE in Higher Education.

Programme Evaluation is an essential tool to measure success, to critically observe and monitor programmes and businesses whilst at the same time force one to maintain and improve standards in education and the private and public sectors.

Section 2.5.1 covered the origin of PE. Some of the most cited authors are also discussed in the section. The discussion of the cited authors covers the author name, the approach that the author uses and authors that support or approve of the author's approach. The section ends with a brief discussion of PE and its importance in both the public and private sectors.

2.5.2 GOALS OF PROGRAMME EVALUATION

McLaughlin (2003) outlines amongst the goals of PE as increasing understanding whilst at the same time minimizing uncertainty. We are living in an ever changing era filled with competition which is technology driven. Companies are looking for highly skilled employees. It is every institution's dream to develop programmes that are viable in order to produce students that are highly skilled, useful and innovative, to make a contribution towards the growing economy whilst keeping up with the changing technology. Because of the retrospective nature of PE, and because some programme evaluations are goal set, institutions are able to measure the success or failure of their programmes. They are able to learn from their mistakes, and they are sure that through the pre-set outcomes, their programmes will certainly bring the desired outcomes.

Programme Evaluation also assesses the effects and effectiveness of programmes and tries to answer specific practical questions about social programmes, about their development and further informs programme developers on whether to continue with a specific programme or not (Mamburu, 2004:261).

The goals of Programme Evaluation vary from programme to programme but overall, encompass improvement, understanding short falls of a programme, research, and serve to assess the effectiveness of a programme, are mainly about the success or failure of a programme, are also about informing parties involved to make decisions precisely. (Mamburu, 2004) recognizes the goals as necessary and important for any organization that is eager to prosper. The goals also indicate that PE is for people that have a vision and are goal oriented. For any company to be successful, there must be a vision and mission, and for that mission to be accomplished, the organization needs to know where it is and based on that need formulate a means to get to the next level. Success needs to be measured in order to establish extent to which the mission is being accomplished. The goals discussed in the section, as seen by the researcher seem to fit these organizations.

2.5.3 APPROACHES TO PROGRAMME EVALUATION

The literature covered in the study discusses the positivist, interpretive and emanicipatory approaches, Mamburu (2004).

2.5.3.1 POSITIVIST APPROACH

Laraine (1980) discusses the positivist approach to PE as one revolving around experiments. The objectives need to be predetermined before the implementation or exposure of the participants to the intervention. The predetermination of the objectives helps in quantifying the extent to which the programme has been effective. Laraine further describes the

limitations and disadvantages of this approach which include: the difficulty of predetermining the objectives and the costs and time involved.

Potter (2006) lists and describes some of the evaluation approaches used by positivists. These include needs assessment, programme planning and formative and summative PE. The detail and definition of these approaches are discussed in Section 2.5.3.

The positivist approach is used in a variety of environments: Higher Education, health-sector programmes are both using non-experiments and experimental methods. See popular cited authors that implement this approach in Section 2.5.

2.5.3.2 INTERPRETIVE APPROACH

The literature cites the interpretive approach as more flexible than the positivist approach which is limited due to its systematic and measurement-based nature. Potter,(1996, 2006) lists the strengths and features that make the interpretive approach preferable to the positivist approach. These include the involvement of the evaluator who becomes part of the programme rather than being an outsider who comes to evaluate the programme. The continuous discussions between all the parties involved in the programme leads towards the involved parties ultimately coming to a consensus. The value of the interpretive approach lies in the combination of both quantitative and qualitative methods to try to get as much information or insight as possible. Some of the authors, Scriven (1972); Eisner (1975, 1977) and Guba and Lincoln (1989) refer to the interpretive approach as a "responsive programme evaluation" approach.

Methods used in interpretive evaluation include case studies, Simons (1987) goal-free evaluation, (Scriven, 1972) connoisseurship Eisner (1975, 1977) and responsive constructive evaluation, Guba and Lincoln, (1989).

Interpretive approaches to evaluation are also used in education,Graham and Zungu (1987); Mazibuko(1990) and community development programmes, Meyer and Pinto (1982).

2.5.3.3 EMANCIPATORY APPROACH

Both the positivist and the interpretive approaches are not considered sufficient by some of the people involved in evaluation research, Habermas (1971; Freire (1970; Fay (1987). Whilst the positivist approach was criticized for its narrowness through the sole dependence on numbers, the interpretive approach was also criticised due to its lack of involvement in social issues. The third type, emancipatory Programme Evaluation, also referred to as critical evaluation, is hoped would bridge the gap left by both methods. Emancipatory PE is aimed at bringing awareness to the people involved in the programme or project. This type of PE empowers the participants as they themselves are able to identify the problems and are also actively involved in the problem resolution. The process involves team work and the evaluator acts as part of the team rather than an outsider who comes in with the aim of criticizing everything, Habermas (1971); Freire (1970); Fay (1987). There are three types of critical PE: action research, the democratic approach and empowerment PE, Fetterman (1993, 1994).

The United Nations Development programme (UNDP) utilizes the democratic approach to evaluate the effectiveness of programmes used by countries. The main focus of the UNDP is the enhancement of its development programmes in assisting people towards a better life and to bring about accountability and learning using evaluation and implementing it as a team.

Evaluations conducted by the UNDP include: the second regional cooperation framework whose focus areas are relevance, effectiveness, efficiency and sustainability. The Asia based evaluation results proved effective and relevant in terms of raising HIV/AIDS awareness and measuring the quality of democracy. Africa related evaluations were found effective in terms of uniting countries. All these evaluations were conducted in 2007.

The action research approach to PE is based on cycle planning, acting, observing and reflecting, and usually has a starting point called the baseline to which the success of the intervention can be compared in order to measure the success of the programme. Action research is solely aimed at improving the performance of programmes or people. The uniqueness and power of action research lies in the fact that all the stakeholders involved agree that there is a problem, embark on the discussions towards solving the problem and implement action research methods to solve the problem. Some of the popular action researchers are Guba and Lincoln (1989) and Dick (1999).

2.5.4 TYPES OF PROGRAMME EVALUATION

This section summarises Programme Evaluation types which include needs assessment, outcomes evaluation, impact evaluation, cost-effectiveness, programme planning, process evaluation, formative evaluation, summative evaluation and the interpretive approach to programme evaluation. The study focuses on the interpretive approach especially as it is applied in Higher Education.

2.5.4.1 NEEDS ASSESSMENT

According to Potter (1996), needs assessment involves surveys in the form of questionnaires, interviews and usually incorporates use of existing data/information and research to investigate the need or the possibility of introducing an intervention to the area in need.

2.5.4.2 OUTCOMES EVALUATION

This type of evaluation, according to Puett (2000), assesses the extent to which the programme achieves both short-term and long-term outcomes. It is retrospective since it goes beyond looking at the objectives but also looks at the reasons why the programme fell short in achieving the desired goals. Improvement of the quality of the programme is also addressed.

- McNamara (2002), identifies PE as beneficial to the student or participants in the programme and important for nonprofit organizations. It helps one in observing whether the right programme activities are being conducted to bring about the results believed to be needed by participants. Outcomes evaluation is mostly needed by funders and help in making decisions on whether to continue funding the project or not. Through outcomes evaluation, knowledge enhancement and changes in perceptions and growth can be obtained. McNamara lists the steps required in conducting a successful outcomes evaluation project. These include:

- Reflecting on the programme mission and identifying things that will affect the success of the programme either negatively or positively.

- Programmes have specified outcomes. Prior to the evaluation, outcomes must be prioritized according to their importance, whilst at the same time keeping in mind the money and resources available. Its focus should be based on the money and resource availability which must be one of the most important outcomes.

- There must be measurable indicators for each of the specified indicators, to inform the process on whether the programme is achieving the desired outcomes or not.

- The target goals of the programme need to be specified.

- Information needed to expose the behaviour of the specified indicators needs to be identified. The decision to be taken after observing the behaviour of the indicators needs to be specified. The final step is the analysis, report writing and recommendations.

2.5.4.3 IMPACT EVALUATION

Impact evaluation looks at the change brought by the programme. The positive and negative impact of the programme is investigated. Depending on the evaluator, the changes can be either immediate or can take quite some time to be noticed (Puett, 1997). Impact evaluation is also about measuring the magnitude of the change. Mouton (2005) lists and discusses the

important characteristics of impact evaluations which include sufficiently and well defined objectives to make it possible for the evaluators to ensure the success or failure of the programme and the efficient implementation of the programme.

2.5.4.4 COST EFFECTIVENESS

Most of the literature studied indicates that cost effectiveness is widely used in health organizations or businesses. It is used mainly to evaluate the fairness of the cost of an intervention. Decision makers use cost analysis to compare the different health care technologies so that the best with minimum costs is selected, (Christopher et al. (2007) Veenstra et al.,(2000; McLaughlin, (2003), define cost effectiveness as a vehicle used to compare different methods given the same cost and resources.

2.5.4.5 PROGRAMME PLANNING

Programme planning focuses on programme theory – given the programme context, is it reasonable to expect that the proposed activities will yield required changes? Is the programme conceptually sound? (McLaughlin, 2003).

Programme planning focuses on the process of programme conceptualization and on the feasibility of the programme plans. It usually examines aims and purposes to determine whether these relate to needs, to programme policy and whether the intervention as planned is feasible (Potter, 1996).

2.5.4.6 PROCESS EVALUATION

Process evaluation is also extensively used to trace or monitor service delivery. It examines if the programme is administered as planned by documenting the daily procedures and operations of the programme. This evaluation enables programme developers and users to

identify ways of improving the programme whilst at the same time discovering new approaches and quick methods of obtaining speedy results. Feedback from clients and revisiting existing documents or analysis of the current status may be important towards the programme improvement (Puett & Trochim, 1999; McLaughlin, 2003; Mouton, 2005). Process evaluations are geared to fully understand how a programme works. These evaluations are useful when long-standing programmes have changed over the years, when employees or customers report numerous complaints about the programme, or when there appear to be inefficiencies in delivering programme services. They are also useful for accurately portraying to outside parties how a programme truly operates (McNamara, 2002).

2.5.4.7 FORMATIVE EVALUATION

Formative evaluation is used and focuses more on the improvement of the programme being evaluated and is diagnostic in nature. Formative evaluation is a form of assessment that is used to follow progress during learning, (Terre Blanche, 1999). It is used to give feedback to students and is also a tool of capturing areas that need improvement. Ippolito (2002) summarizes formative evaluation as a form of assessment that is process-aligned since from it, indicators of success or failure can be made visible. He identifies common tools used in formative evaluation as scores obtained from examinations, tests and tutorials.

Potter (2006) describes formative evaluation as a type of evaluation, focusing on the process of programme implementation. It usually incorporates a process of programme monitoring to establish whether the intervention is being implemented as planned. The evaluator attempts to identify aspects of the programme that are working well, aspects of the programme which are problematic, and aspects of the programme requiring modification or improvement.

2.5.4.8 SUMMATIVE EVALUATION

Summative evaluation looks at the effectiveness of the programme. It seeks to find out if the programme meets the desired outcomes. Frew (2002) describes summative evaluation as being useful in decision-making, for audit purposes and for cost benefit decisions.

Ippolito (2002) states that summative evaluation is intended to assess the student's knowledge, skills and attitude which are essential in working environments. He summarizes summative evaluation as a form of assessment that is product-based. In Potter (1996), summative evaluations examine evidence relating to indicators of programme effectiveness, and for this reason often incorporate quasi-experimental or ex-post facto research, as well as some form of cost-effectiveness or cost-benefit analysis.

Scriven (1967), states the benefits of summative evaluation as that of an external and decision maker. The Statistics department aims to use the summative evaluation results for both decision making, as well as to inform the UWC management (external to the Statistics department), about the results of the study. The results of the summative evaluation will be beneficial to the students, the department and the University since after the evaluation, the department might discover that entry requirements are not sufficient for the students to cope with the IS course. The University, after sharing the study results might decide to either upgrade the entry requirements or provide support systems that might help weak students to do better in Statistics as a subject, and consequently, in other courses.

2.5.5 Application of Programme Evaluation in Higher Education

There are benefits in the use of PE in Higher Education (HE) as it can be used for making decisions. The degree with which institutions use resources as well as the need for resources, buildings and everything that can assist in the successful running of HE vary geographically and economically. Urban area located institutions for instance would require more assistance and resources compared to rural- located institutions. This might be due to the fact that more students would tend to research at universities that are more in the urban areas compared to those in the rural areas. Programme evaluation informs one on how to go about allocating resources, whether to increase or decrease existing resources based on the information provided. Funders are also able to get motivation from the evaluation results.

Higher Education institutions strive for excellence; as a result they are into the development of programmes that will credit them both with respect to student enrollments and outputs and to funding. Institutions have missions and under the missions, there are goals that they set as a measure of the success of the programmes. Programme evaluation serves as a guide in monitoring and tracking the realization of the goals and the modification of the programmes to achieve the pre-set goals.

2.5.6 RESEARCHER'S APPROACH AND IMPLEMENTATION IN THE RESEARCHER'S ENVIRONMENT

The study uses both formative and summative evaluation methods to monitor and observe trends in an Introductory Statistics course at the University of the Western Cape. Analysis is both qualitative and quantitative. The approach used is interpretive (see Chapter 3 for a detailed discussion of the methodology).

The interpretive approach to PE incorporates both qualitative and quantitative methods. The researcher decided that it would not be enough to use a single method as it was necessary to gain as much knowledge about the IS course as possible from the data gathered during the process which would not be possible with the sole use of quantitative study.

Moss (1996) describes the interpretive approach as context constrained and hence the need to understand the behaviour of the individual cases in their respective context.

As indicated in Chapter 1, the quantitative analysis could not be sufficient to provide the researcher with all the evidence and knowledge it needed. Quantitative data approaches although precise, are most of the time based on pre-set assumptions and hypotheses and that was not the main intent and focus of the study. The aim of the study was to observe and monitor the Introductory Statistics course offering. The processes involved the Grade 12 information, the demographic information and the student performance. The marks, grades

and pass rate would provide quantitative evidence of the enquiry. More was needed to give the department in-depth information and knowledge. For this reason qualitative data from the student comments, meetings, Hot Seat and ADM was generated. Revisiting the course structure during the departmental strategic planning that took place end of 2003 assisted the department in interpreting the processes and the course offering. The strategic planning exercise further assisted the department to obtain insight and the strengths and weaknesses of the programme.

The meetings with the students and the interpretation of the contents and proceedings of the meetings contributed to giving the department further insight on the success and failure of the course offering. Overall insight about the state of progress was possible and made through the interpretation of the information gathered from the interviews with the students, the meetings with the laboratory managers, the meetings with tutorial assistants and the departmental meetings assisted the department to achieve the purpose it set out to achieve (see Appendices A1, A2, A3 and A4 for the strategic exercise, meetings and planning documents). It would have been difficult and almost impossible to obtain the information needed through the sole use of quantitative methods.

The aim of assessing students is to monitor their understanding through grades (marks). Quantitative methods are needed as a result as the information gathered is quantitative and is assumed to be precise if used efficiently. Theoretically, good marks or good performance is an indication of mastery of the course under observation, and it is the wish of every institution to have a high success rate in tutorials, tests, examinations and ultimately completion of a degree. Under-performing or failing tests and examinations do not necessarily mean that a student does not master the subject; there might be other factors prohibiting the intended success. It is for this reason that the department decided to further link performance with the background of the student specifically Grade 12, and see whether this contributed to the success or failure in performance.

Forms of assessments used in the IS are tutorials, tests and examinations. Students submit a set of four tutorials, each set linked to a test which is usually written after the submission of the tutorial. As discussed in Chapters 1 and 4, the aims of the tutorials are to expose students to real world problems, enhance problem-solving skills and learning, expose them to technology since they are computer based and, to prepare them for the tests and examinations. This is not far removed from the university e-learning strategy whose strategic objective is "to provide and promote the technology to enable UWC to produce graduates who are able to use technology to find, understand, apply, analyze, synthesize, evaluate and report on information from a wide variety of sources and who are competitive for twenty-first century careers" …"Students will have the necessary skills, attitudes and resources to use technology creatively in taking responsibility for their own learning and becoming independent learners" (UWC, 1999:2).

It is assumed that by doing the tutorials repeatedly enables the students to gain mastery of the subject. The students get a different dataset every time they choose to repeat the tutorial. This minimizes the chances of copying whilst at the same time ensures that the student does not memorize the answers but tries to apply the problem-solving skills learnt on the first or preceding attempts.

Although the setting of the tests and tutorials is not exactly the same, (students do the tutorials in their free time, can consult tutors and can hold discussions with peer students in the laboratory, whilst in the tests, examination rules apply. Students are prohibited from talking to each other in the venue and the marks obtained are solely their attempts and only one attempt per student is allowed), the hypothesis made by the department is that a student with good tutorial marks will perform well in the tests and consequently in the examination.

The tests are linked to a set of tutorials. As discussed in the previous paragraph, the tests also attempt to assess student's understanding or mastery of the subject, in terms of knowledge and skills. Linking the tests to a set of tutorials was aimed at picking up difficult sections over time. It can be argued however that poor performance does not mean that one is not skilled nor does it mean that one does not have knowledge of the subject. Obtaining low marks does

not necessarily mean that students do not have mastery of the subjects as well. The tutorials and tests thus served as some form of formative evaluation instrument.

The Hot Seat query form (see Appendix A8 for the format of the Hot Seat query form), also served as a formative assessment instrument as its aim was to follow the effectiveness of the Hot Seat on a weekly basis. The examination on the other hand, was used to observe the overall performance of the students at the end of the IS course. The examination thus served as a summative evaluation tool.

The perceptions of the students collected using evaluation forms, the pre- and the post-questionnaires also served as summative instruments that evaluated the course over time. The instruments used qualify the study as an interpretive approach to PE.

2.6 CHAPTER TWO SUMMARY

The chapter explored Higher Education in South Africa, the changes that took place since 1994 and the progress made. The fact that South African education is confronted by challenges due to cultural diversity, the skills shortage and under-performance as a result is covered in detail. Structures aimed at monitoring, evaluating and assisting SAHE in achieving its goals are also covered in Chapter 2. Programme Evaluation, its origin and implementation in HE as well as its value as a tool of monitoring success or failure of programmes highlighted. Approaches to PE and the differences and theoretical settings of the listed approaches are also discussed in detail. Finally, the researcher discusses the approach applied to achieve the study's purpose and links the approach to the study.

CHAPTER THREE

STUDY DESIGN AND METHODOLOGY

3.1 INTRODUCTION

The majority of students entering university find it difficult to adapt to the new environment which can impact on their performance. Some of the challenges include language proficiency (for those to whom English is not the first language), preparedness (Grade 12 background might not be sufficient enough to prepare them for university), the environment (some students are from rural areas and others who have been residing in urban areas might not have been away from home making it difficult to adapt) and socio-economic status (money problems can impact on the performance of a student).

This study, however, did not investigate the challenges confronting students entering university. It was initiated as a result of poor performance, lack of motivation and the high drop-out rate of students taking the Introductory Statistics course at UWC. The researcher decided to evaluate the course for a period of five semesters to identify patterns with regard to performance in the course using Grade 12 background, demographic information and parents' background. Results from the study might be used to restructure the course offering as well as to inform the University on the findings for future planning entry requirements specifically for students wishing to pursue Statistics as a course.

In Chapter 3 the methodology used to conduct the study focuses on the data collection methods, data capturing, the cleaning process and software used to collect and perform the analysis of the data. This chapter is aimed at introducing the methods used in the study to investigate the following objectives discussed in Chapter 1:

- monitoring the quality of the first year component through the strategic management of the process;
- monitoring the characteristics of the Introductory Statistics student body intake using demographic information;
- monitoring the quality of the Introductory Statistics body intake using Grade 12 information;
- monitoring first year pass rate which was less than 50% (1999-2002 before the launch of the study). The focus and wish was to have a pass rate of 50% and above;

- monitoring the drop-out rate. The aim was to observe the trend of the drop-out rate over time, so that it could be decreased in future;
- monitoring of students' perceptions on the course offering and processes used over a period of two years; and
- developing a theoretical framework for evaluating IS programmes.

The methodology chapter investigates and explores the objectives of the study, research or project. This chapter discusses the study design and methodology of the process followed to investigate and validate assumptions and the context under which the study was conducted. The methodology utilized to explore each objective and the instruments used to capture the data, the processes undertaken during the data capturing process, the cleaning of the data as well as the limitations of the study.

3.2 TARGET GROUP

The study groups were Introductory Statistics students: STA111/131/132/125 for the period 2003 second semester (July-December) to December 2005. All the students registered for the Introductory Statistics course were part of the study excluding repeating students. The rationale for using these students were the challenges facing the course offering, lack of motivation, low pass rate, the need to understand the demography of the students and the need to introduce and expose students to technology.

3.3 DATA COLLECTION INSTRUMENTS AND METHODOLOGY USED

Both quantitative and qualitative data capturing and analysis methods were used in the study. The qualitative method was preferred to capture student perceptions due to the natural setting and the comprehensive nature of student feedback (comments were original and were exactly the student's perceptions). The originality would give the department a wide and holistic understanding of the student perceptions over time. The quantitative approach to data analysis, although narrow, would be helpful in summarizing the massive data collected into useful information needed by the department to make informed decisions about the course. Quantitative analysis was performed using summary tables, t-tests and the correlations.

Prior to the study, the department had to revisit the course offering. Several meetings were held with:

i) Students that were selected at random to gather information about what they thought was the cause of the poor performance. Students were also encouraged to provide feedback and ideas that would be useful in improving the course (see Appendix A1 for the minutes of the meetings held with the students). Out of the twenty-three students that were selected, only nine attended the meeting.

ii) Tutors also gave feedback using their tutoring experience (see Appendix A2 for the minutes of the meeting held with the tutors).

Emerging from the discussions with the IS students and tutors were the following:

- Both students and tutors felt the notation used in the course reader was difficult and there were some typographical errors that students picked up from the course reader.
- Students thought the laboratory time was not enough for students particularly part-timers who felt that the department catered for full-time students only since the laboratory was open from Monday to Friday, 08h30-16h30 due to financial limitations.
- Students thought there was a lack of student support since there was nothing set up for the students apart from the lecture contact time.
- Students felt that some of the tutors were unprofessional and lacked discipline. There were complaints about the level of noise in the laboratory as well as lack of discipline by peers.
- The two groups blamed the department for system and power failures and some of the information and technology related problems. This urged the department to arrange meetings with the laboratory manager and the Information and Communication Services department personnel (ICS, see Appendix A4 for the minutes of the meeting with the laboratory manager and ICS personnel).

The departmental staff interpreted and synthesized all the documents collected from the meetings. The information helped in reaching consensus, and in deciding to embark on the evaluation of the course. Using the gathered information, a strategic planning exercise was held to further prepare the staff for the evaluation of the Introductory Statistics programme, as well as deciding on the instruments to collect data. All the documents resulting from the meetings were qualitative in nature. The documents are the course note changes, the meetings with randomly selected students, the meeting with the ICS personnel and the meeting with the ADM laboratory support staff (see Appendix A3).

Emerging from the strategic planning exercise, the focus areas that needed investigation were the course administration and resources. Resources in the context of the study were: the laboratory (availability of computers, laboratory time especially for part-time students who felt that the department catered only for full time students), support systems provided to the students, and the course material and processes (course-notes, course content and running of the laboratory including lecturing team). The purpose of the evaluation was to look retrospectively at the course offering in general and to identify whether the course was performing as intended. If the course was not achieving the intended goals, the department had to identify the factors contributing towards the under-achievement and/or success of the course. The evaluation of the course would further assist the department in identifying areas of strength and indicators of success. At the end of the evaluation of the programme, it would be possible to make informed decisions on the future running of the course. Employing either a quantitative or a qualitative method would limit the researcher's enquiry hence the employment of a mixed method was chosen, using both qualitative and quantitative data collection tools. Focusing on the summative evaluation method, the overall course was evaluated whilst the department was also looking at diagnostic measures of success (formative evaluation).

This set the stage for the department to embark on the evaluation of the course. The aim was not to look for improvements but to understand the course offering completely, study the performance of the students given their demographic and Grade 12 backgrounds and learn

from the perceptions of the students. The sections to follow discuss the instruments used, the data collection and analysis methods used to investigate the study objectives.

The university application form contains the demographic information; Grade 12 results, whether the student obtained an exemption or school leaving remark as well as the overall symbol obtained. To monitor the characteristics of the student body intake using demographic information: the gender, age, area of residence, ethnic group, the home language and the academic language were the variables used to inform the department about the demographic characteristics of the students. All the variables were suitable for quantitative analysis. The objective was to understand the composition of the students registered for the course. It was also to identify patterns in the demographics over time. Through the interpretation of the results, the department would gain insight into the type of students who register for the course. This monitoring of the student body intake is summative in nature, since it would give the department the overall insight through the analysis of the demographic information.

It was essential for the researcher to monitor the quality of the student body intake using Grade 12 information as this would give her an idea of the type of student registered for the course. The examination board, overall Grade 12 symbol and the status of Grade 12 end of year results were used to capture this information. Both quantitative and qualitative results were captured from the three variables through the use of statistical tests and summary reports. The researcher predicts that students who obtain an exemption in Grade 12, and students who obtain a good Grade 12 (overall symbol), will perform better compared to students with a school leaving certificate, age exemption and other entrance qualifications that merit a student to study at university. The three variables would give the researcher overall feedback about the quality of students that register for the course.

The researcher further wanted to monitor the quality of the first year IS course. This is administration related and uses information supplied by the department. The aim was to evaluate the services provided to the students and is retrospective in nature. Instruments used

to achieve the objective were the entry requirements, the course-notes, the web-based tutorials and the online testing system. The sections that follow cover each of the instruments used.

3.3.1 THE ENTRY REQUIREMENTS MERITING A STUDENT TO STUDY AT THE UNIVERSITY OF THE WESTERN CAPE

Both the EMS and the Science faculties have different entry requirements. The Science faculty requires that students obtain an exemption and Mathematics on a Higher Grade (HG) with a D or a Standard Grade (SG) with a symbol C. However, students who fail to obtain an exemption and Mathematics D/HG or a C/SG on recommendation by the faculty can be admitted to the Introductory Statistics by enrolling for a four-year extended degree programme. This group of students has to pass their Grade 12 Mathematics either with an E on a Higher Grade or a D symbol on a Standard Grade. There are special circumstances where students fail to meet both conditions; no exemption, no Mathematics with either a C or D (HG), or C or D (SG). Students who fail to meet the requirements apply to the Senate and their admission depends on the results of a test that they have to write. On acceptance, they qualify for a preliminary Bachelor of Science degree with Introductory Statistics as one of the courses.

The information provided indicates that some of the students admitted in the Statistics programme may not be well prepared for the course if the entry requirements remain as stated. It has led to a proposal by the department for the upgrading of the Mathematics symbol from an E or a D Higher Grade to a C or a D and an A in Mathematics for all the students taking Mathematics at a Standard Grade. The perception of the researcher is that if the entry requirements are upgraded, there will be an improvement in the quality of the students who register for the course and thus, an improvement in the services offered by the department. These outcomes can be easily traced using the performance of the students using their Grade 12 status and symbol obtained. The enquiry of the entry requirements is exploratory, summative and quantitative in nature. It is hoped that through this enquiry, the university can be convinced to upgrade the current entry requirements.

3.3.2 GRADE 12 PROFILE

A total of seven Grade 12 profiles were created from the variety of school subjects supplied by students on the application form. Students' school subjects were taken on either Standard Grade (SG) or Higher Grade (HG).

The mean of each group was computed. All business subjects were grouped together using the profile Bus_Sci (Accounting, Book Keeping, Business Economics, Commerce, Commercial Mathematics, Commercial Law, Computer Studies, Economics, and Typing). All Natural Science subjects were grouped together using the profile Nat_Sci (Agricultural Science, Biology, Physical Science and Physiology). Social Science subjects were also grouped using the profile Soc_Sci (Biblical Studies, Criminology, Geography, History and Statute Law). Mathematics formed a single profile (Math) whilst the English grouping was English both first and second language. All the other languages were grouped under the profile Language (Afrikaans First Language, Afrikaans Second Language, French, German Third Language, Latin, North Sotho, South Sotho, Tsonga, Tswana, Venda, Xhosa first language, Xhosa Third Language, Zulu and Zulu Third Language). Lastly, the Fine_Art profile contained Arts, Home Economics, Music, Needlework and Woodwork.

Students who have a strong Mathematics background have proved to perform better in Statistics as a course compared to students who have a limited or no Mathematics background at all in Grade 12 courses (Hahn, 1988, Conners, McCown, Roskos, 1998, Nolan, 2002). The department, in consultation with the university, given the results of the study, had a possibility to either adjust the entry requirements or introduce a new course for the under-achieving students.

3.3.3 THE COURSE-NOTES AND COURSE IN GENERAL

The course-notes are developed by the Statistics department with the purpose of accommodating students at an Introductory Statistics level, to fit a course time frame of 14

weeks. It is the wish of the department to provide students with notes that are easy to understand, useful and beneficial to students for the enhancement of their knowledge as well as empowering and preparing them for higher level Statistics courses and future use of Statistics in working environments. The evaluation form administered at the end of the course, has a section capturing both quantitative and qualitative feedback from the students. Students are asked three questions relative to the course-notes. All three questions are ranked from strongly disagree to strongly agree. Students are required to select the option most suitable to them. Qualitative feedback of the students is obtained through the comments on the course-notes section of the evaluation. The comments were open-ended and students voice their concerns freely (this is an assumption as the researcher cannot measure the freedom to comment freely). The evaluation contained six questions on the fairness of grading, clarity of course objectives and content, course-content, the course setting, provision of feedback to students and an overall course rating.

3.3.4 THE WEB-BASED TUTORIALS

The computer based tutorials were introduced in 1984. The aim was to introduce computer technology to the students. The system used was programmed logic for automated teaching operations (PLATO). PLATO was originally developed at Illinois University in 1960. The developers hoped that it would meet the needs of the end users and would never be difficult to understand even to a computer beginner, (Jonas 2003). With the assistance of the lecturers, in collaboration with a qualified programmer, PLATO was used by the entire campus. As technology advanced, PLATO was replaced by a PC based Novell networking system.

There were several reasons for introducing the online tutorials. In the university's context, it was mainly to support the university e-learning initiative. The university encourages all lecturers to utilize the knowledge base system for web-based learning initiated and developed by Professor Keats, Executive Director, Information and Communication Services at UWC. In the department's context, the aims of the tutorials were to expose students to technology through the use of computers whilst simultaneously exposing them to real world cases through problem-solving. The last aim for the introduction of the web-based tutorials in the course was to assess the effectiveness of the tutorials in preparing them for tests. The

tutorials linked to the tests served as a formative assessment method. The tutorials served as a means to enhance student performance in tests. This could be measured by comparing the tutorial and test scores. The tutorials are run at the ADM laboratory but registered students with internet can access them anywhere. Three aspects were captured: the resources (computer availability), service delivery through the tutoring system and the effectiveness of the problems in enhancing student knowledge. A comments section was added to capture student's perceptions on the usability and effectiveness of the tutorials. The analysis covering the tutorials included both quantitative and qualitative approaches. The objective was to explore the following questions:

- checking whether there has been an improvement within the data collection terms;
- checking whether there has been an improvement across the terms of data collection over time;
- exploring whether working repeatedly on the tutorials is beneficial to the student over time; and
- looking at the evaluation to see what the students think of the tutorials over time.

3.3.5 THE ANGLO-GOLD DE BEER-MURRAY TRUST QUERY FORM

The Anglo-Gold De Beer-Murray Trust query form (ADM) monitored the success or failure of the tutorial system and service in the ADM laboratory. No queries or a drop in the number of queries would mean that students were satisfied with the laboratory services (see Appendix A6_5 for the ADM query form).

3.3.6 THE ONLINE TESTING SYSTEM (TESTWRITER©)

Since the end of 2004, the traditional way of writing tests, a question paper and an answer sheet has been used in all tests. The tests were scheduled for afternoons (17h00). All tests and examinations consisted of only multiple choice questions. Although the multiple choice tests reduce marking responsibilities, there is administration involved in setting the test, booking venues which are sometimes full to capacity or even overcrowded, organizing of the test papers and invigilators. Due to overcrowding, cheating is possible, especially when the test is a ten question paper. The multiple choice paper test/examination is marked through a

scanning system administered by the Information and Communication Services (ICS). Although the papers are counted before they are removed from the test or examination room, there have been incidents of missing scripts and students have had to wait for several days to obtain feedback. All staff, including those who were not part of the first year teaching team were required to invigilate. Due to the insufficient number of staff members, tutors would also assist with invigilation as there would be more than eight venues that would be full to capacity making it possible for students to resort to dishonest practices. This resulted in the department's decision to opt for an electronic testing system, which would minimize the administration, the waiting time, cheating, and accommodate test clashes while simultaneously introducing the students to technology. The tests were also intended to observe the student's theoretical understanding and application of the course (formative assessment) and to prepare students for the examination (summative feedback).

The online testing system was piloted in 2004 using the STA125 students who were also part of the study. Since then, the department has been using the online testing system. Students can write the test at any time of the day on a specific day and they can get their results immediately. Cheating is minimized because each student writes his/her own test selected at random from a pool of questions. It is the department's wish to eliminate hard copy tests and examinations completely in future.

There is a link between the tutorials and the tests in that students submit a set of tutorials before they write a test. This was aimed at preparing the students for the tests. It was also aimed at identifying sections that might be difficult or that the students found difficult in the course through observing the student's scores over time (summative). Similarly to the course-notes and the web-based tutorials, the end of course evaluation was used to capture data to monitor the effectiveness of the tests. The online test-related questions were on a five-point scale ranging from strongly-disagree to strongly-agree. There was also a comments section (see Appendix C3 for an example of the electronic test questions).

3.3.7 HOT SEAT QUERY FORM

The researcher introduced the Hot Seat as a form of support system to the students, (see Appendix A8 for the Hot Seat query form). Senior students majoring in Statistics are employed through the university's work-study programme to assist students with the course content and other aspects related to the course. The effectiveness of the Hot Seat was evaluated using the Hot Seat query form. Each student visiting the Hot Seat was given a form to complete with the students name and student number, the tutor assisting at the time, the reason for the visit and an indication of whether the problem could be solved or not. This served as a means of monitoring the success or usefulness of the Hot Seat through recording of the appointments. The Hot Seat query form served as a formative assessment instrument and information collected was qualitative.

A flow-chart to success was developed for the students, to guide them towards managing their time to meet deadlines by spacing the time for studying hoping that it would assist in the achievement of better grades in the course (see Appendix A9 for the flow-chart to success). The laboratory time was extended, to 21h00 once per week and laboratory access time was extended to Saturdays with priority to access given to part-time students after hours. A tutor training programme was introduced to take care of the tutor-discipline (see Appendix 7_3). Laboratory rules were also posted in the laboratory for students to familiarize themselves with laboratory rules (see Appendix A7_2).

3.3.8 THE PRE-QUESTIONNAIRE AND POST-QUESTIONNAIRE ON PERCEPTIONS OF THE INTRODUCTORY STATISTICS STUDENTS PRIOR AND POST TO DOING THE COURSE

Both the pre- and post-questionnaires were administered electronically, before the first tutorial and the last tutorial. The pre-questionnaire captured students' perceptions and expectations prior to doing the course whilst the post-questionnaire captured students' perceptions at the end of the course (see Appendix C6_1 and C6_3 for both questionnaires). The questionnaires served as a means of capturing student perceptions before the introduction to the courses, and checking change in perceptions after exposure to the course. This

summative evaluation process utilized both quantitative (student rankings reported in percentages) and qualitative methods (student comments).

As part of monitoring the quality of the services provided to the Introductory Statistics course students, the lecturer's teaching style, flexibility and punctuality were also evaluated using the course evaluation administered at the end of the course. Lecturer knowledge level, teaching style and time-management were evaluated by asking the students to respond to five questions on the evaluation. There was a section where students had to comment on the teaching style and helpfulness of the lecturer in understanding the course.

All the initiatives were taken to increase the pass rate whilst at the same time reduce the drop-out rates. Drop-out rate was defined as the number of students who were registered for the course but failed to write tests, tutorials and the final examinations across data collection periods.

3.3.9 INTRODUCTORY STATISTICS FINAL RESULTS

The students write a final examination at the end of the course. The end of course examination constitutes 50% towards the final results. The continuous evaluation mark is made up of both tutorial marks (20%) and the test marks (80%). The average of the latter two constitutes the other 50% of the final mark. The pass-rate which is the total number of students who write the examination (until 2005) divided by the number of students, who pass, was used to track the performance of the students over time. The end of course IS results were also used to monitor drop-out rates. The drop-out rate in the context of the study is the number of students who do not write the examination divided by the number of students registered for the course.

The end of semester IS results were also used to monitor the performance of the students using Grade 12 information. The aim was to monitor selected variables, and observe the performance. A t-test was used to see if the final Statistics grade was affected by gender, age,

area of residence, home language, language of instruction at school, examination board, overall Grade 12 symbol and Grade 12 status. The analysis methods used were both quantitative and qualitative.

3.4 DATA CAPTURING AND MANAGEMENT PROCESS

The data were collected over five periods beginning at the end of 2003 with the last set of data collected in the second semester of 2005. The primary sources of data used in the study are listed and discussed in Sections 3.4.1 to 3.4.6.

3.4.1 DEMOGRAPHIC AND SCHOOL LEVEL EDUCATION

The data were obtained from the ICS and it is the information supplied by all students who wish to pursue studies at UWC. The study focused on first time registered students when it came to the demographics and school level details. The data provided the researcher with demographic information: age, gender, residential area and home language as some of the demographic variables. Data on parent information: financial status of parents OR guardian where applicable, parent education and; school information of students: subjects studied and grades at which the school subjects were taken and average symbols as some of the school background variables for both Grades 11 and 12 was also collected.

3.4.2 INTRODUCTORY STATISTICS MARKS

The spreadsheets encompass the marks for the 16 web-based tutorial marks, the marks for the four tests and the test marks (four) and the examination marks for all the five semesters. As intensive analyses is on the tutorials in Chapter 4, there is a separate spreadsheet for the tutorials containing all the web-tutorials (from 2003 to the end of 2005) with their respective scores, the time taken to do the tutorial and the date on which a specific tutorial was done. New variable names: year and period were created for analysis purposes. The web-based tutorials are different from the ones contained in the results file in the sense that the results file contains only the highest score whilst the latter file contains all attempts to improve student marks (score). There were no problems with the final year results since they were

captured in the department and by the same person. All files were merged into a single document (AllExams). Each semester (six months) consists of two courses namely: STA111 and STA 131 (Science and EMS) with codes 381111 and 395131 respectively) and STA125 and STA132 (Science and EMS with codes 381125 and 395132 respectively). There were five data collection periods with 2003 second semester serving as the baseline data. This means there were three sets of files with the code 395132, three sets of files with code 381125, two files with the code 381111 and two files with the code 395131 that had to merged into a single file, using the variable PERIOD, starting from baseline examination results (2003sem2) and the last data collection period (2005sem2). An AllExams file was used to combine IS results from different periods.

In the end, the application form file AllDemographics, was merged with the results file (AllExams). This is a merged file that contains information from both the examination results captured in the department and the demographic data obtained from the university ICS department. The file contained 117 variables.

3.4.3 END OF COURSE EVALUATION

The end of course evaluation was captured by the researcher in the form of an EXCEL spreadsheet and had 29 questions. It was used to explore both student satisfaction and perceptions. Items evaluated were the web-based tutorials and all the processes involved in the running of the tutorials, the online testing system, the lecturers and, the course-notes and course in general. Each of the items evaluated had a comments section resulting in four separate comments files: comments on web-based tutorials, comments on the lecturer, comments on course-notes and course-in-general and comments on TestWriter©. The final WORD documents consist of the four categorised files for all the periods including the baseline comments. Variables on the final document are the identity number (IDNO) which will not be used in the analysis, the comment, the subject code (SBJCDE), year and data collection time (period). The final end-of-course evaluation file 'AllEvaluations', was a merged spreadsheet consisting of the five periods. The file consisted of all the evaluations in EXCEL. The first period data (2003) had eight questions on Web-based tutorials (with questions six and seven) excluded in the latter years. Questions six and eight were taken as

missing for the latter years. The baseline evaluation did not include TestWriter© (the online testing) information. TestWriter© was initially introduced in the second semester of 2004 to the STA125 students (381125). The group was chosen due to the fact that it is relatively small compared to the STA132 group with usually triple the total number of students in the STA125 group. TestWriter© was then employed for all groups in 2005. Students were evaluated on the Web-based tutorials (first eight questions), on TestWriter© (next six questions), on the value of the lecturer (next five questions) and finally on the course-notes (last ten questions). The 2004 STA132 group was the only group evaluated on web-based tutorials on ten questions. All the categories for which the groups were not evaluated were taken as missing. The AllEvaluations spreadsheet thus consists of 29 question responses.

3.4.4 END OF COURSE EVALUATION COMMENTS

As discussed in Section 3.4.3, each of the items evaluated had a comments section resulting in four files of student comments: comments on web-based tutorials, comments on TestWriter©, comments on lecturer and finally, a file on course-notes and the course in general. The researcher expects the comments on the web-based tutorials to include items on the administration, the tutorial content, the resources and the tutors who assist in the laboratory. It is hoped that the researcher will identify areas that need to be improved from the comments over time. Student comments on the course-notes and course in general explored student perceptions and views on the course-notes and course in general. TestWriter© comments searched for student perceptions and views on the online testing system over time.

3.4.5 PRE-QUESTIONNAIRE

Students completed the pre-questionnaire online over five periods. All five periods were merged using the variable 'period' on the final WORD document. The pre-questionnaire comments file (PreQuestionnaire comments) is also a WORD document consisting of all the comments of the students before exposure to the programme. Some of the variables explored on the pre-questionnaire are computer skills, learning styles and expected performance.

3.4.6 POST-QUESTIONNAIRE

Similarly, the post-questionnaire file, captured online is a combination of all the post-questionnaire results envisaged to measure performance and perceptions of the students after the exposure to the course. Variables included are the symbol expected before and after completing the test, the perception of the student before and after completing the test and general perceptions regarding the course before and after completing the course. The PostQuestionnaire comments file consisted of comments from the five periods merged by variable 'period'.

3.4.7 ADM QUERIES

Students had to complete the ADM query form whenever they had concerns or needed information or were experiencing problems associated with the online tutorials. The queries were named after the ADM laboratory where the tutorials were mostly accessed by the students. The ADM queries were also aimed at tracking problem areas related to the laboratory. The researcher envisaged that the fewer the laboratory–related queries, those were the less likely there would be problems at the laboratory. The purpose of analysing the monitoring of the ADM laboratory queries was to observe and follow the usefulness and effectiveness of the functioning of the laboratory. The file containing the ADM queries is a WORD document, (see Appendix A7_5)

3.4.8 HOT SEAT QUERIES

Similarly, the Hot Seat query form was administered for all semesters to all students who went to consult at the Hot Seat. The variable period was used to distinguish queries of different periods. The queries are also compiled in a WORD document, (see Appendix A8_1).

Files used in the analysis are:

- Alldata;

- PreQuestionnaire;
- PreQuestionnaire comments;
- PostQuestionnaire
- PostQuestionnare comments;
- All Web-based tutorials;
- Comments on web-based tutorials;
- Comments on the lecturer;
- Comments on course-notes and course in general;
- Comments on TestWriter©;
- AllEvaluations;
- Hot Seat queries; and
- ADM queries.

3.5 MANAGING THE APPLICATION FORM DATA

The Grade 12 and demographic data are captured by the university administration and extracted by the ICS department from the university database. Two different people extracted this information. 2003_2004 was extracted by one person whilst in 2005, a different person extracted the information. Different file names were used to save the data. Sometimes information contained in one file in 2003_2004 would be captured in two different files in 2005. There were also different variable names which had to be streamlined for analysis purposes. Some of the variables captured in 2003-2004 demographic data were not captured in the 2005 data. Variables that were not captured in the 2005 data were taken as missing in the 2005 data increasing the number of missing values.

Some of the courses and school codes were no longer available or functional in 2005. The discontinuity of some of the codes was due to the fact that the courses were no longer offered by the University to students (course related codes), and that the schools had been renamed. The renaming of schools did not impact on the study as there was no analysis done based on school codes. In all the cases for which there were no codes, they were taken as unknown to distinguish them from missing information.

All the 2003_2004 files were in a one-student one-row format whilst some of the 2005 files had the same data captured more than once in the same row, for example all the students did at least six Grade 12 subjects. Files with Grade 12 subjects had more than one student number and application number for the same student. Proc Transpose of SAS was used to create a one-student one row file where applicable.

The changes and management of the data were done in consultation with both the ICS and the administration personnel to keep the data as reliable and efficient as possible whilst at the same time maintaining data integrity.

3.5.1 GRADE 12 SYMBOL CONVERSION

Before the analyses could be performed, particularly quantitative analysis involving school level subjects and grades, a standard scale was created for the subjects after studying symbol conversion from several South African Higher Education Institutions whose symbol conversions are listed in Table 2 using the following conversion:

Table 2: Summary of the Grade 12 symbol conversion: UWC Introductory Statistics Evaluation

Symbol	Higher Grade	Standard Grade
A	8	6
B	7	5
C	6	4
D	5	3
E	4	2
EE, F	3	1

Table 2 is a summary of the symbol conversion of the Grade 12 subjects for students in the IS programme. The Grade 12 subjects were taken either on Higher Grade or Standard Grade hence the need for the conversion.

3.6 SHORT COMINGS AND SOURCES OF ERROR

The department tried its best to minimize errors and inconsistencies, however there are processes and technicalities that it does not have control over, for example, the server being down at times and electricity failures. All of these impact on the running of the course, particularly the tutorials and the online testing system which depend on the power supply (electricity). The students were supposed to submit sixteen tutorials each year, however, due to the circumstances mentioned above, in some of the years, less than sixteen tutorials were submitted.

The majority of the pre- and post-questionnaires assessed the extent to which the students could handle computers. There was little on the understanding of the course. However the two questionnaires did not fail the study in terms of capturing perceptions before and after doing the course.

The researcher thought that she would, as part of the study, use the chat-room and discussion room which would serve as platforms to have open debates with students and lecturers which included problems that the students might have found worth discussing and Statistics related topics. Students would have logged on using their email accounts which were allocated to the students immediately after registering. This was not possible as the ICS department could not trace or capture discussion forum and chat-room student log-ons. Not being able to use these log-ons limited the study as the aim was to introduce Statistics related topics using the two tools and trace the performance of the students participating. There were questions on the chat-room and discussion forum although they were not utilized.

The lecturer section on the evaluation could have been addressed in a more efficient manner. The evaluation assumed that one person was teaching the course whereas the course lecturing is team-based. It would have been effective if for each evaluation, a question prompting the student for the lecturer's name was included to effectively monitor each lecturer's service delivery ability. This would not have been aimed at embarrassing the lecturer, but would serve as a means of improving lecturing skills whilst at the same time motivating the other lecturers.

The question of the validity of student responses when responding to the evaluation of the course in general was also studied. Finally although the study traces drop-out rates, there were no questions asked with respect to this matter on the evaluation to probe students on whether they would drop-out of the course or not and their reason for dropping out. The information, should it have been gathered, would have assisted the department in limiting drop-out rates, whilst at the same time predicting chances of dropping out. It is, however, assumed that the reasons for the drop-out were not as a result of poor service delivery or were not related to the course.

3.7 DATA ANALYSIS

The Statistical packages SAS and SPSS were used to analyze the data. All of the data capturing was performed in EXCEL and exported either to SAS or SPSS for further analysis. Analysis methods used include:

- the descriptive statistics of the Grade 12 information, demographic information
- tertiary information in the form of graphs and tables;
- regression analysis (logistic model/mixed);
- statistical tests (t-test); and
- graphical representation.

The sections to follow describe each of the analysis approaches used as well as the advantages for using them in the analysis.

3.7.1 DESCRIPTIVE STATISTICS

The descriptive statistics used in the analysis are simple frequency tables and cross-tabulations reported in percentages. The researcher, using percentages, would be able to see the distribution of the variables used in the study. The frequency distribution minimizes massive data and makes it easy for any researcher or individual, to report in a single number.

Cross-tabulations are an extension of the simple frequency table. They can be two-dimensional or three-dimensional. Two-by-two cross-tabulations explore relationships between two variables whilst the three-dimensional tables are more informative. Cross-tabulations are aimed at exploring relationships between two or more variables. The strength of the existing relationship is measured using other statistical methods (Martins, Loubser, Van Wyk, 1996).

3.7.2 REGRESSION ANALYSIS

Statistical modelling can be performed either using the t-test, analysis of variance (ANOVA) or regression. Both the t-test and ANOVA are employed in statistical modelling when the outcome is continuous and the predictor variables are discrete whereas regression modeling is used when variables are continuous. Regression analysis is mainly used to predict the performance of a variable (dependent) explained by another or more independent variables. Ten Grade 12 subjects English, Mathematics, Physics, Commerce, Accounting, Economics, History, Biology, Agriculture and Geography were selected from the Grade 12 subjects. The aim was to see how the students who had taken these subjects in Grade 12 performed in Statistics. This would inform the researcher on the variety of students considered for acceptance to the course, whilst at the same time enabling the researcher to know the strengths and weaknesses of students given their Grade 12 subjects.

3.7.2.1 LOGISTIC REGRESSION-MIXED MODEL

Several Grade 12 subjects were used to predict the performance of students in IS given that they had taken the subjects. The mixed model method using both the logistic regression and multiple logistic regression methods were used in the study. The motivation was that students were categorized into two groups, pass and fail and whether they had taken the Grade 12 subject or not. Each of the Grade 12 subjects, was flagged either as 0 indicating a student 'not taking' or 1 indicating 'taking' a given subject. The IS final mark was also flagged as either 0 or 1 indicating a fail and pass. The selected demographic variables were age, gender, home language and academic language. Amongst other statistics, the logistic regression resulted in the Chi-square statistics for differences between groups, (see Chapter 4 for the full analysis and discussion of the results). The models used are the simple logistic regression model:

Logit (pi) = $\beta_0 + \beta_1 X_1$ where:

Logit (p_i) = log transformation of the probability of the event (performance in IS)

β_0 = the intercept of the regression line

β_1 = slope of the regression line

X_1 = the predictor grade 12 subject

The multiple logistic model is an extended version of the above model.

3.7.3 STATISTICAL TESTS AND MEASURES OF ASSOCIATION

Cross-tabulations were used to summarize the relationships between selected variables (see Appendix B for the cross-tabulations performed), and possible relationships and differences existing between groups were explored using the Spearman correlation and the student t-tests.

3.7.3.1 SPEARMAN CORRELATION

The Spearman correlation measures the strength of the rank association between the variables. It ranges between -1 and +1. Spearman values close to +1 indicate a high degree

of a positive correlation whilst values close to -1 indicate a relatively high degree of negative correlation. Spearman correlations close to 0 indicate weak correlations between the ranked variables under scrutiny. The Spearman correlation (rs), was used in the analysis of the end-of-course evaluation (Chapter 5) and the tutorial and test scores (Chapter 4).

3.7.3.2 CHI-SQUARE TEST

The Chi-Square test examines possible associations existing between variables and is based on two hypotheses; that there are no associations existing between two variables (null hypothesis) against the alternative hypothesis that relationships do exist between the variables under observation. The p-value of the Chi-Square test gives one the chance that an association exists between groups. The weakness of the Chi-square lies in the fact that it is affected by sample size. A large sample size tends to result in a significant p-value. The Chi-square test was used in both Chapters 4 and 5. The hypotheses of the Chi-square test employed in the study are as follows at a 5% significance level:

Null hypothesis =No association: observed frequencies=expected frequencies

Alternative hypothesis=Association: observed frequencies ≠ expected frequencies.

3.7.3.3 STUDENT T-TEST

The student t-test, discovered by Williams S. Gosset, was used to test for differences between the performance of students in IS given that they fell or did not fall into a given profile. Seven Grade 12 profiles were created and performance in IS given a specific profile was explored using the t-test where all the students falling to a specific profile were grouped together and all that did not, fell into another group. The analysis of the Grade 12 profiles is done in Chapter 4.

3.7.4 QUALITATIVE ANALYSIS

Chapter 5 covers qualitative data analysis. The student comments on the usefulness of the ADM laboratory resources and personnel, the Hot Seat query forms, comments on the perceptions of the students on the teaching style and helpfulness of the lecturer, comments on the course-notes and course in general and pre-questionnaire and post-questionnaire comments were qualitative responses. Qualitative methods were used to analyze the responses to look for patterns and to observe change in perception over time using a quasi statistical analysis model (evaluation comments, pre-questionnaire comments and post-questionnaire comments).

The software ATLAS TI was used to capture the comments from the evaluation, pre-questionnaire, post-questionnaire, Hot-Seat queries and the ADM laboratory queries. In the end of course evaluation, the pre- and post-questionnaires, students voiced their perceptions and satisfaction or dissatisfaction towards the services, the resources and the personnel involved in the Introductory Statistics offering. Some of the comments, although conveying the same message, were phrased differently by different students. Themes or codes were created which grouped comments which were similar or conveyed the same message. This was the initial stage of the analysis. In the second stage, networks and relationships between the networks were created based on the original themes. For instance on the comments on the course-notes and course in general, the original themes included, nothing wrong, boring, workload, Mathematics background, difficult course and notes need to improve. The theme "nothing wrong" is not related to any of the other themes, whereas the theme "Mathematics background", is related to theme "difficult course", in the sense that students with no Mathematics background may perceive the course difficult and perhaps "boring". The complete structure or framework for the qualitative analysis is presented in Figure 32.

3.7.5 GRAPHICAL PRESENTATION

Some of the results are presented in the form of graphs (pie charts, bar graphs and trend lines). This is to give a pictorial representation of the results (pie and bar charts) whilst the trend line is used to see if there is a pattern over time.

3.8 ETHICS AND VALIDITY

The students completed the pre- and post-questionnaire online. Both of these questionnaires record the student details (student number and contact details). The end of course evaluation, the ADM and Hot Seat query forms were paper copies where the student number was recorded. The student details were not utilized except for the student number which was used to extract and merge all information pertaining to a given student for analysis and comparison purposes.

Students responded voluntarily to the questionnaires, evaluations and query forms. As the students responded voluntarily, it was one of the ways in which the researcher felt reliable information could be obtained to try to improve the quality of the course.

3.9 CHAPTER THREE SUMMARY

Rutan (1999:3) mentions planning, execution and monitoring as some of the important features towards a successful business or organization. He further emphasizes that "organized, formal strategic planning allows for a methodical consideration of the information required to understand the business environment, a structured analysis of that information, thoughtful decision-making and realistic implementation planning". It was in the light of this perspective that the department launched a strategic planning exercise at the end of year 2003. Information gathered from the meetings was used as part of the strategic planning session. The vision of the department, the objectives and outcomes of the first year Statistics programme were critically discussed. It was after the strategic planning meeting, that the researcher decided to embark on the Grade 12 evaluation process, for a period of two and a half years.

Monitoring the quality of the student body intake using demographic information was one of the objectives of the study. The characteristics of the student body intake were monitored

using demographics: residential area, the examination board, ethnicity, home language, academic language, gender and age variables.

The evaluation of the demographic information would inform the researcher of the type of student the university attracts by location: for example does it attract students from the Eastern Cape, Western Cape or any other area? Although the location by residential area, does not have much of an impact on the performance of the student, it gives one an overview of the students attracted to UWC, thus providing UWC with insight for decision making in terms of marketing the University to other geographical areas. If only students from the Western Cape are attracted, what is it that is causing the other students to study elsewhere? Is the institution doing enough marketing to attract students from other areas?

The Grade 12 examination board was also selected for analysis. The researcher wanted to follow students who had studied Statistics and explore the different examination boards under which they wrote. The analysis was diagnostic as it tracked performance in Statistics as a subject given by the examination board.

Two other demographics of the students that were evaluated were the home language and academic language at high school. Although it is tricky to differentiate between home language and mother tongue, on consultation with the administration department, the home language is treated as a mother tongue in the study and the academic language is the language of instruction at school level. Home language has been sited in the literature sources to have an impact on the performance of a learner, specifically if the language of instruction is different from the home language. Students struggle to interpret or to make sense of what is written in a foreign language. They also struggle to express themselves in a language different from their mother tongue. The study seeks to find out the composition of the Statistics student body intake by home language and academic language. It further uses diagnostic evaluation to establish the impact of home language on the performance of the students by investigating the extent to which the home language impacts on the performance of the students in Statistics. Information gathered will be valuable since it might result in the

introduction of support systems for students who are encountering difficulties due to home language.

Grade 12 profiles were monitored to see whether there were patterns with respect to the composition of the students registered for the course over time and to see which profile dominated in the Statistics course. The Grade 12 profiles were used as diagnoses to check the performance of the students in Introductory Statistics, given a specific profile.

One would argue that it was not necessary for the researcher to investigate and monitor the student profiles. There was a need to explore the profiles for future research and future planning of the IS course but the information would be valuable in making and taking decisions as to whether or not it is necessary to keep or accept students belonging to a specific profile.

The fourth objective of the study was to monitor the first year pass rate which was less than 50 % between 1999 – 2002 but improved to 50 % and above. Not only did the study monitor the pass rate (summative evaluation) but indicators of failure and success in the course were investigated (formative evaluation). The end of semester results (final) of the IS course were also used to capture the overall performance of the results.

There was a strong need to monitor the drop-out rates as high drop-out rates could influence the number of students registering for the course, leading to fewer students registering for the course in future and leading to the course being discontinued over time.

In Chapter three the study design and methodology was covered. Chapter four will deal with the analysis and interpretation of the results.

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CHAPTER FOUR

PRESENTATION, ANALYSIS AND INTERPRETATION OF RESULTS

4.1 INTRODUCTION

The chapter presents the analysis methods, data capturing and the management process, the analysis and the interpretation of the results. The main purpose of Chapter 4 is to organize and transform the data collected into meaningful information enabling a researcher to explore and investigate research objectives whilst at the same time answering study questions using readable summaries obtained through the analysis methods suitable for the particular study. Graphs, statistical tables and statistics in the case of quantitative data are usually used to achieve the desired outcomes whilst themes or categories are used in the analysis methods, for example content analysis and discourse analyses in the case of qualitative data.

From the researcher's point of view, it is not always the case that the results of the study will support those of existing scholarly literature; in some cases, the results are the opposite of existing literature. This may occur as a consequence of changing times. For example, the semester at which the previous studies were conducted may have been conducive for that particular study. The difference in perceptions and mindsets in the case of human related studies may impact on the difference in opinions. As a consequence, there is a need for ongoing study for growth and development and for new ideas to inform people about the future, whilst at the same time getting knowledge about the past. Chapter 4 further provides researchers with clarity on issues not studied previously. The aim of this chapter is to explore and investigate the following research objectives:

- monitoring the quality of the first year Introductory Statistics offering through process management;
- monitoring the characteristics of the student body intake using demographic information and Grade 12 profiles;
- monitoring the quality of the IS student body intake using demographic and Grade 12 information;

- monitoring the first year pass rate which was less than 50% (1999-2002). The objective is to have a pass rate of 50% and above;
- monitoring performance by Grade 12 information;
- monitoring the drop-out rate. The aim is to observe the trend of the drop-out rate over time; and
- monitoring of students' perceptions over the two-year time period.

Innovative tools used in the process of exploring objectives were mentioned and investigated using the analysis methods discussed Section 4.2.

4.2 ANALYSIS METHODS

The analysis is performed and discussed per research objective and instrument used. The process followed to analyze the data collected includes:

- a discussion and analysis of the meetings with students, ADM laboratory managers and ICS personnel held at the end of 2003;
- descriptive statistics of the Grade 12, demographic and tertiary data in the form of graphs and tables;
- regression analysis (logistic and mixed models);
- statistical tests (Chi-square test and t-test); and
- a quasi-analysis of the comments and queries and; relevant feedback.

In the sections to follow, each of the study objectives is investigated using the statistical methods listed above.

4.2.1 MONITORING THE QUALITY OF THE FIRST YEAR INTRODUCTORY STATISTICS

OFFERING THROUGH A STRATEGIC MANAGEMENT OF THE PROCESS

Changes were implemented after the initial strategic exercise carried out at the end of 2003 in the course-notes, the tutorials and the tests. This section discusses the entry requirements meriting incoming students to study IS. The 'envisaged statistics department' entry requirements are also discussed. The course-notes, the web-based tutorial marks, the tests and the final results are covered in this section.

Lussier (2003) describes quality as an internal factor as it is controlled inside the organization. The level or standard of quality can be measured through customer feedback (negative and positive comments), the extent to which a product sells and the demand of the product in the case of profit oriented organizations. It is every organization's wish to produce good quality products.

UWC's mission statement is to produce both quality programmes and graduates whilst at the same time ensuring that there is growth in all the respective stakeholder categories. This makes it essential for the Statistics Department to develop and run programmes that are of a good quality and standard. In achieving this, Lussier's systems process was adopted in

monitoring the quality of the first year statistics offering (see Figure 4):

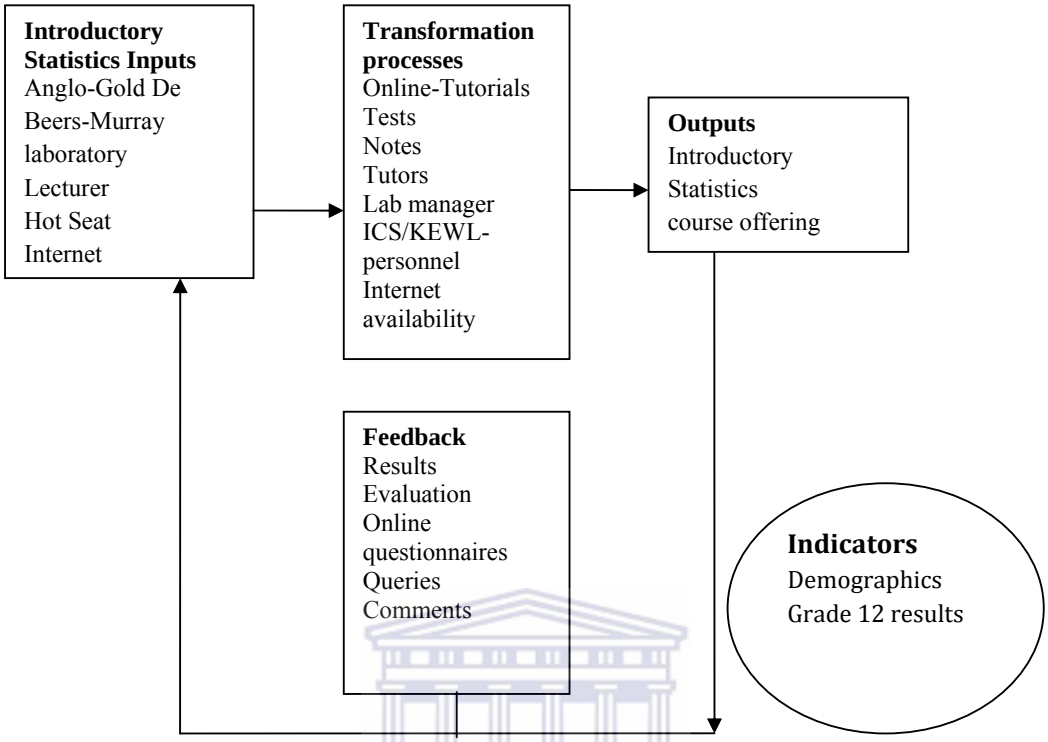


Figure 4: Systems process for monitoring the Introductory Statistics offering (adopted from Lussier: 2003)

In Figure 4, there are four major components of the systems process that the researcher adopted in monitoring the quality of the Introductory Statistics offering. The inputs of the Introductory Statistics as described by the researcher are the resources (ADM laboratory, the Hot Seat, lecturers, knowledge enhancement material), student support and the course administration. The ADM laboratory is where the students do their tutorials as explained in the previous chapters. They write their tests in this venue. The tutorials, tests, course-notes and web links in KEWL are for knowledge enhancement. The tests serve a bigger purpose as, through the tests, one can see whether students follow or understand the concepts or not (through good grades). The researcher has to ensure that the online tutorials as well as the tests serve the purpose for which they are intended.

Two innovative tools are applied here; the tutorials and the online testing system (TestWriter©). The tutorials consist of randomly generated questions where the student is presented with new data every time he/she logs in. This was done so that students are less prone to copying. The system marks the tutorial and registers the tutorial number, time taken to complete the tutorial, the number of times the student attempted the particular tutorial and the mark obtained for the tutorial. The online testing system, initially introduced to a pilot group in the second semester of 2004, ensures that tests are also marked by the system and supplies the student with immediate feedback. The online testing system is discussed in Section 3.5.6.

The laboratory functioning, availability of the computers, laboratory and computer maintenance, the style and attitudes of the people involved in the running of the course impact on the quality of the course as perceived by the students. As part of the quality monitoring process, the researcher has to ensure that there are good relationships between all the people involved in the course. The ICS personnel were called in to discuss possible disasters and challenges that might lower the level of the quality the department intended to maintain. Matters discussed at the meeting included stress testing, reliable internet availability, security assurance such as back up, virus updates and bug checkers. The meetings set a platform for ongoing collaboration between the ICS personnel and the department. The laboratory has routine maintenance every Monday morning (computer updates, virus cleaning and all the technicalities involved for quality service delivery and running of the laboratory processes).

There is ongoing encouragement for positive attitudes of the lecturers involved in the course offering. The researcher holds weekly departmental meetings for report backs, feedback and discussion of issues for quality assurance. Tutors assist in the laboratory and at the Hot Seat with student problems. Tutors undergo training to familiarize them with the processes used in the IS offering (see Appendix A6 for the documents used in the training of the tutors).

A strategy for the handling of administration related issues, for example, notices and feedback to students for quality and maintenance of a good standard are discussed at the departmental meetings on a continuous basis.

All the transformation processes are aimed at up-lifting the quality of the Introductory Statistics offering which is the output. Measurement of the success or quality of the course is achieved through the feedback obtained from the results, the queries, the pre-questionnaire, the post-questionnaire and the evaluation. The last component of Figure 5 constitutes the indicators, which are the Grade 12 results and the demographic information obtained from the application form. The indicators serve as a measure that can either inhibit or enhance the performance of the students.

4.2.2 DESCRIPTION AND ANALYSIS OF THE RESULTS

Sections 4.2.2.1 to 4.2.2.6 deal with the discussion, exploration and analysis of the results. The information is narrative, in the form of tables and graphical representation. This section explores and discusses the type of student that the institution accepts and that registers for the Introductory Statistics course using demographic information obtained from the application form that prospective students complete prior to admission. Variables that were explored are the demographic information: age-group, gender, the area of residence, the ethnic groups, home language and the academic language. The quantitative responses of the pre-questionnaire the post-questionnaire and the evaluation are analyzed using descriptive statistics such as percentages and means.

4.2.2.1 MONITORING THE CHARACTERISTICS OF THE STUDENT BODY INTAKE USING DEMOGRAPHIC INFORMATION

In the subsections that follow, the above objective has been subdivided to organize the information making it easy to read and understand as the information is reported in small chunks. The analysis of the results is reported using graphs and summary percentages

obtained through frequency tables. All the demographic data, Grade 11 and Grade 12 analyses are contained in Appendix B.

(i) Composition by Age Group

One-thousand seven-hundred and thirty-three students had the age information on their application form. The ages were categorized into three groups: those assumed to have come to university immediately after Grade 12 (17-19), those assumed to have had a delayed entrance (20-25) and students with ages greater than twenty-five were assumed to have a late entrance. Of the 1733 students, 820 (47%) came directly to university, 44% had a delayed entrance before coming to university and 9% had a late entrance (see Table 16, Appendix B6).

(ii) Composition by Gender

The Introductory Statistics course was female dominated with 54% females and 46% males. When comparing the gender distribution using the data collection period, there were more females compared to male students in 2003 (56% females), slightly more males in the first semester of 2004 (51%), more females compared to males in 2004's second semester (54%), more males during the first semester of 2005 (51%) and, there were more females in the second semester of 2005 (55%), (see Table 14, Appendix B5).

(iii) Composition by Area of Residence

The IS programme is dominated by students residing in the Western Cape (75%, Table 1, Appendix B1). This is not surprising as the institution is in the Western Cape. Following the Western Cape is the Eastern Cape with 8%. Five percent of the students, provided codes outside the range of those listed for the coding. All such students were grouped into an unknown category (5%). Students from other areas were less that 3% of the total (see Table 1, Appendix B1).

(iv) Composition by Ethnic Group

More than half of the students were Coloured (56%), 24 % were African and Indian students constituted 9% of the Introductory Statistics students. Six-percent of the students came from other racial groups. Asian and White students were the least dominant (both groups had less than 5% representation), (see Table 6, Appendix B2 as well as Figure 5).

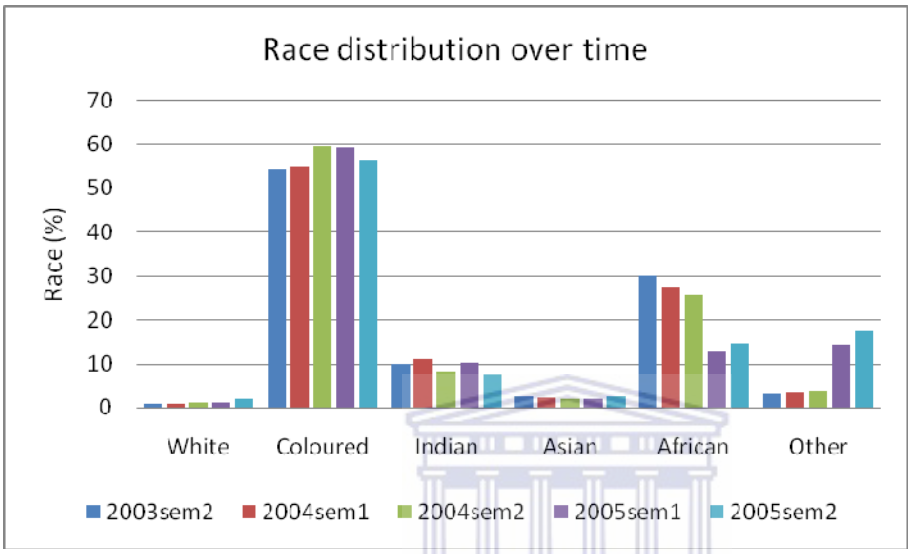


Figure 5: Racial groups in percentage over time

Figure 5 represents the racial groups in percentage form over time. The Introductory Statistics course was dominated by Coloured, African and Indian students. (Coloureds started off above 50%, increased in the second semester of 2004 to approximately 60% and dropped again in 2005. Africans constituted 30% in the second semester of 2003 to gradually decrease to less than 20% over time. Asian and White students were the least represented groups although Figure 5 indicates a slight increase in the percentage of White students over time. Information collected on racial groups was also from 'other' and 'unknown students'. The two were collapsed to form a single group 'other'. Figure 5 indicates a slight increase in the percentage of students over time for this group, (see Table 7, Appendix B2).

(v) Composition by Home Language

UWC is situated in the Western Cape and the pool is drawn mostly from students from previously disadvantaged backgrounds. There is diversity in languages from Afrikaans-speaking to Ndebele-speaking students. It is of utmost importance that home language is discussed in the study as it is expected that this variable will impact on student performance. This sub-section focuses on home language. The performance of the students given their home language was analyzed in detail using regression methods.

Of the 3371 students who submitted demographic information, 2447(73%), supplied home language information. The majority were English-speaking across semesters (45%). Xhosa-speaking students constituted 18%, 13% were Afrikaans-speaking, and 12% spoke both English and Afrikaans. For all the other home languages combined, the percentage was 12%, (see Table 8, Appendix B3).

(vi) Composition by Academic Language

Figure 6 represents the school academic language of the students over time. The majority of the students indicated English as their academic language throughout the time period of the study and very few students indicated Afrikaans as their academic language.

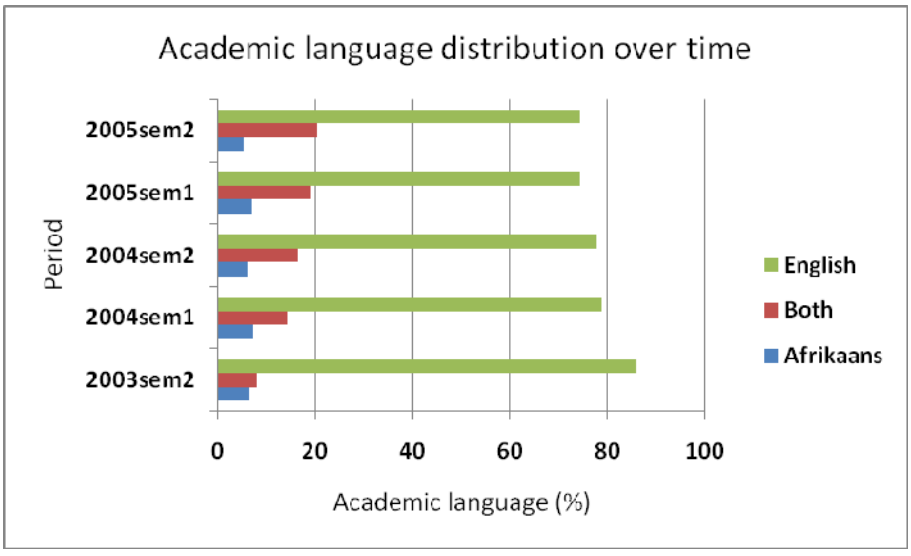


Figure 6: Grade 12 academic language over time

Figure 6 is a presentation of the academic language of students in Grade 12 over time. The majority of the students were taught in English though this decreased over time from more than 80% in 2003 to 74% in the second semester of 2005. There was a slight increase in the number of students indicating Afrikaans and English as their language of instruction at school level from below 8% in 2003 to 14% in the second semester of 2005, (see Table 12, Appendix B4).

4.2.2.2 MONITORING THE QUALITY OF THE INTRODUCTORY STATISTICS STUDENT BODY

INTAKE USING GRADE 12 BACKGROUND

In this section, the quality of the Introductory Statistics student body intake was monitored using the Grade 12 profiles, the Grade 12 status, the Grade 12 average symbol and Mathematics background. The report was in the form of graphs and percentages obtained from frequency tables.

(i) Examination Board

Most of the students registered for the course were trained in the Western Cape Education Department (77%), followed by the Eastern Cape Education Department (8%) and the Foreign examination board (5% non-South African students). Students from other examination boards constituted 10% (see Table 25, Appendix B10).

(ii) Grade 12 Profiles

Figure 7 presents the distribution of the Grade 12 profile over time in percentages. Seven profiles were created and the Fine Arts profile was the least represented over time. For all the years, the percentage of students with the Fine Arts profile in Grade 12 was less than 5%.

Although there was no imminent trend, that is, neither increasing (decreasing) for students taking courses in a particular area. Mathematics, Languages and English were the most dominant profiles over time (percentage of students with the profiles ranged from 17 to 25%).

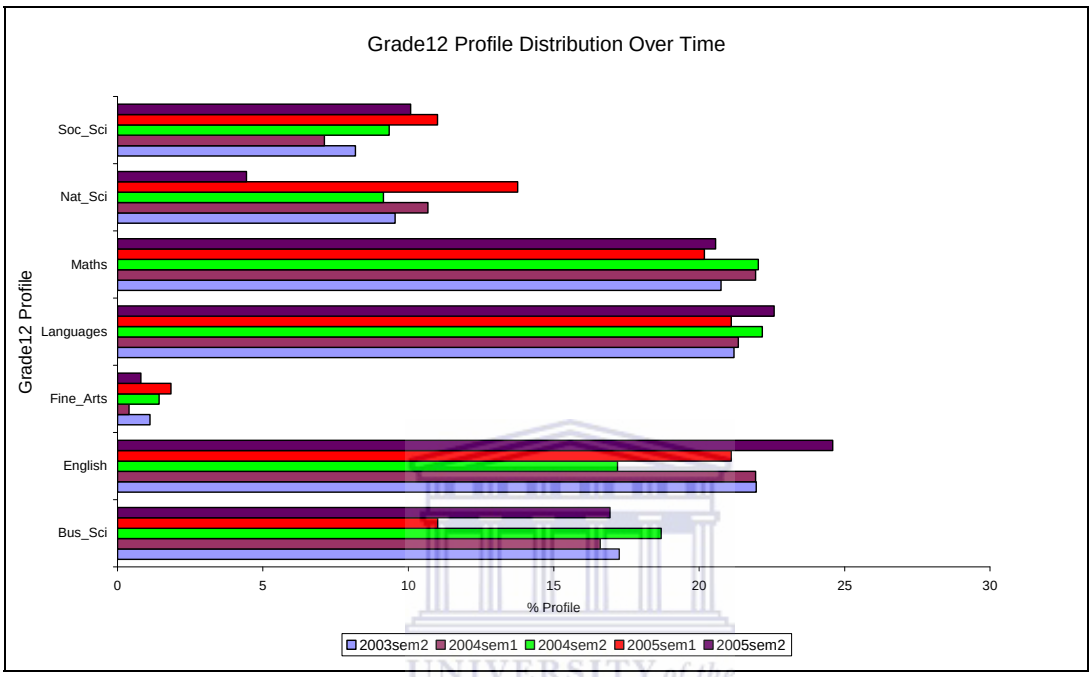


Figure 7: Grade 12 Profile Distribution Over Time (five semesters)

(iii) Mathematics Status

"Mathematics and Science are key areas of knowledge and competence for the development of an individual and the social and economic development of South Africa in a globalizing world" (Reddy, 2005-2006).

Various studies have touched on the challenge of teaching Mathematics-related subjects both at school and university level and the impact that it has at university, (Reddy, 2005-2006; Rumsey, 1998; Van der Berg and Louw, 2006; Garfield et al., 2002). This section explores the Mathematics background of the students prior to entering university. Their performance

at University, given that they had taken Mathematics as a school subject, is further investigated in later sections.

Of the 992 students who submitted demographic information in the 2003sem2, 59% had taken Mathematics as a subject. Within the second semester of 2003, the majority (22%) obtained a symbol D in Mathematics, 20% had passed Mathematics with an E-symbol, 17 % with a C-symbol, 10% with a B-symbol and only 8% of the students obtained an A symbol in Mathematics. Students with a Grade 12 Mathematics symbol below an E, comprised 28% (see Table 52, Appendix B11).

In the second semester of 2005 (2005sem2), of the 686 students who submitted demographic information, 47% had done Mathematics at Grade 12 level. Within 2005sem2, 29% passed Mathematics with a D, 22% with an E, 21% with a C, 12% with a B and only 6% of the students had an A symbol in Mathematics. In comparing the 2003sem2 and second semester of 2005 (2005sem1), as the symbol decreased from an A symbol to an E symbol, the percentage of students increased indicating that students became weaker in Grade 12 Mathematics. This was an indication that over time, the quality of students with respect to Grade 12 Mathematics performance weakened (see Table 52, Appendix B11).

(iv) Grade 12 Status and Average Grade 12 Symbols

This sub-section explores the Grade 12 status of the student, that is whether the student had obtained an exemption or not. The Grade 12 average symbol is also investigated in this section.

The majority of the students had a full exemption (77%), 10% had a conditional exemption and percentages for senate discretion, school leaving and exemption on foreign qualification were each less than 5% across semesters (see Table 34, Appendix B10). There was no

significant difference in Grade 12 status over time across semesters, (see Table 26, Appendix B10).

Two thousand four-hundred and fifty-four and sixty seven (73%) of the total sample submitted Grade 12 average symbol information, (see Table 30, Appendix B10). (The total number of students in tables might differ from table to table as different classification variables are used for particular tables, for example Table 30 has a total of 2454 students whereas Table 31 has a total of 2360 students but an additional variable '*period*' was introduced).

Of the 3371 Introductory Statistics students who were part of the study, 73% had Grade 12 symbol information. Figure 8 below represents the overall Grade 12 symbol distribution over time.

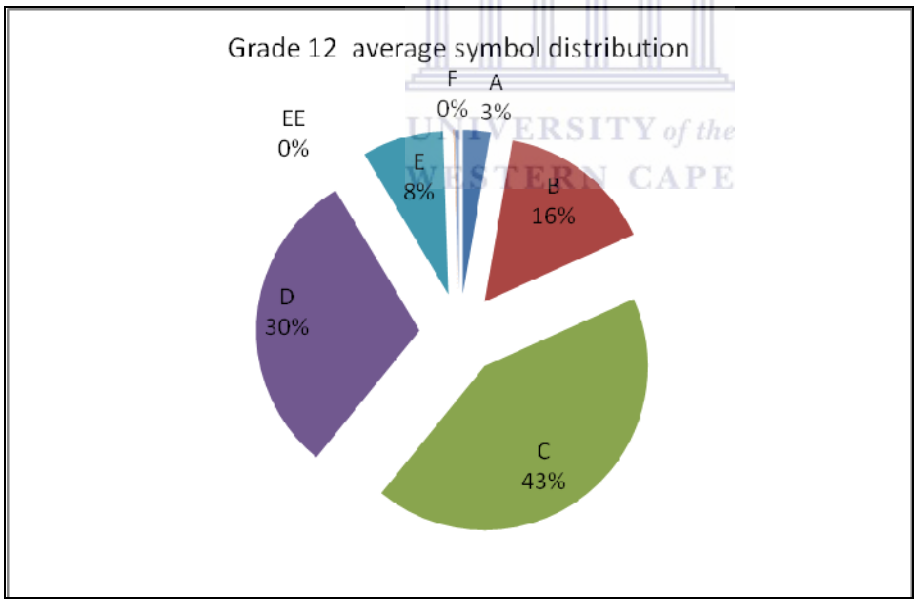


Figure 8: Average Grade 12 symbol

The study was dominated by students with an average symbol C (43%), followed by a D-symbol students (30%). A few students with an A-symbol registered for the course over time

(A-symbol percentage was below 5%). Some outlying students had EE and F as their Grade 12 aggregate symbol (percentages were below 1%, (see Table 31, appendix B10)).

4.2.2.3 MONITORING THE EFFECTIVENESS OF ASSESSMENT METHODS

Assessment methods used to measure student performance were the tutorials, tests and the end of year examination. Graphs, cross-tabulations, reports in percentages, regression methods and statistical tests were used to capture and present the information needed to assess the effectiveness of the assessment methods. Tutorials were submitted monthly and four tests were written. Each test was written after the submission of a tutorial set (tutorials 1 to 3 coded as tut1_3 were the first set, tutorials 4 to 7 coded as tut4_7 was the second set, tutorials 8 to 11 (coded tut8_11) was the third set and tutorials 12 to 16 (coded tut12_16) was the last set. Both the tests and tutorials were written with an innovative computer-based tool with the aim of exposing students to technology, to reduce administration and to minimize cheating by the student (tests). Each student was presented with a different test from a bank of similar types of questions. The testing system utilized was TestWriter© programme. TestWriter© was initiated in the second semester of 2004, and hence, responses for the second semester of 2003 and the first semester of 2004 were taken as missing. The analysis covering the assessment methods included descriptive statistics, statistical tests and regression analysis. Graphs were also produced to give the researcher a summarized overall view of the results.

(i) Tutorial and Test Analysis

The web-based tutorials are considered a very important and innovative tool. Tests are an item in the "transformation process" in the Lussier model (see Figure 4), the analysis of these, especially the online tutorial data, was approached from several angles to try to understand the contribution of this tool where students could improve their skills in problem-solving. Firstly, the overall picture (including all data without breakdown by semester) presents data at a first glance and secondly it is possible to zoom in to consider what happens over time (over semesters). The tutorial data set was a very complex data set. This originated from the fact that online tutorials were redone as many times as students wanted to access

them. This resulted in multiple records for some students for specific tutorials. In order to describe the wider picture of the tutorial data, the distribution of the number of tutorials completed is displayed in Figure 9.

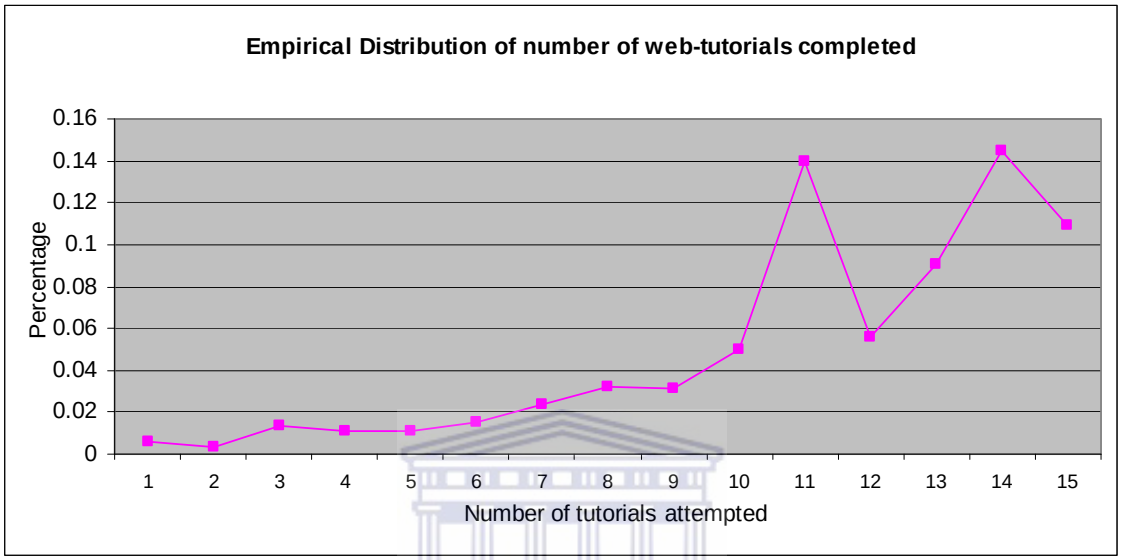


Figure 9: Distribution of the number of tutorials completed over all periods

Figure 9 is the empirical distribution of the number of tutorials completed over all semesters (students who obtained zero for tutorials are excluded from the data). Students could have completed only one tutorial (0.6% of the students accessed the system for only one tutorial), two tutorials (0.4% of the students accessed the system for only two tutorials) or fifteen tutorials (10.9% of the students accessed the system for fifteen tutorials). No student completed sixteen tutorials in any of the semesters if tutorials where a zero was recorded are excluded. "Completed fifteen tutorials" also does not necessarily mean that consecutive tutorials were completed but any fifteen (any combination of any number of tutorials from tutorial one to tutorial sixteen with a score greater than zero). A significant jump occurred for students who completed eleven tutorials. The number of tutorials completed drops to 6% at "twelve tutorials completed" to increase again above 14% for "fourteen tutorials completed".

A graph of the standard deviation of the total number of tutorials completed is displayed in Figure 10.

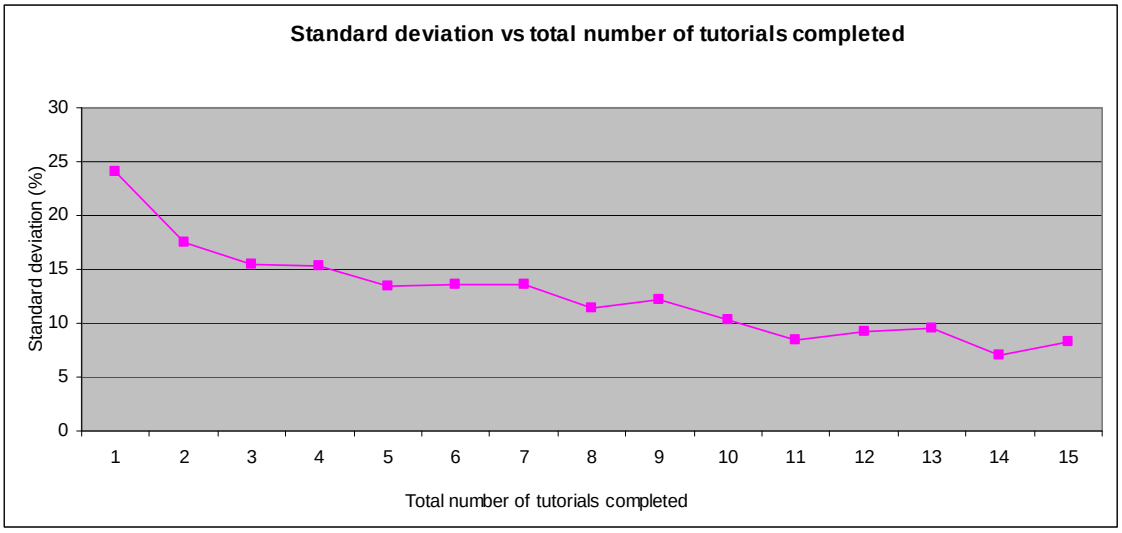


Figure 10: Standard deviation of the number of tutorials completed vs total number of tutorials completed

The scale of the standard deviation is measured in percentages each time. It is observed that the standard deviations become lower as the total number of tutorials completed, increases. The reason for this phenomenon may be that the ability of the students to do tutorials improves as he or she proceeds.

Figure 11 depicts the average marks obtained for the number of tutorials completed over all semesters.

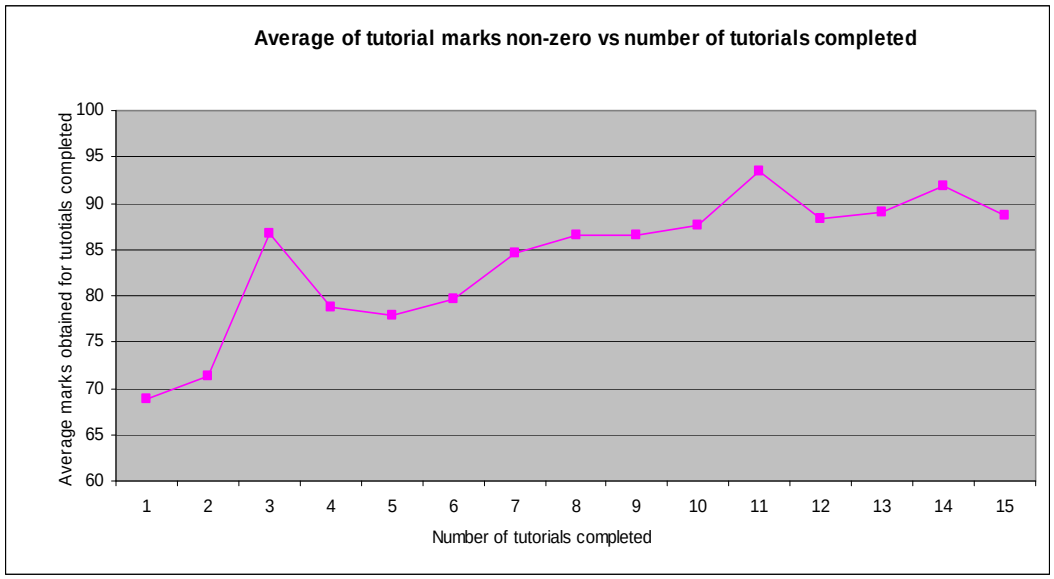
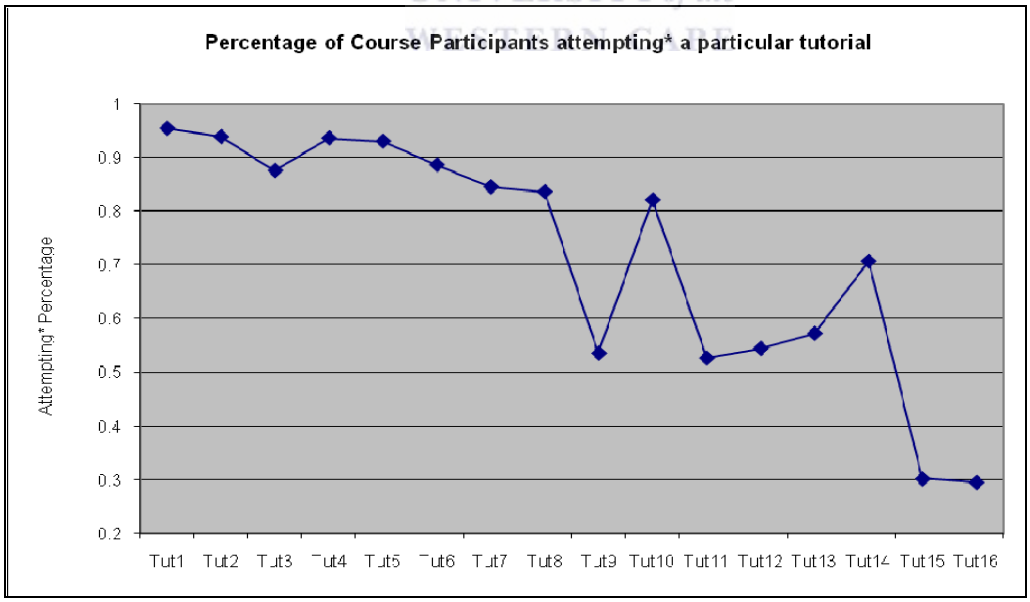


Figure 11: Average marks obtained for number of tutorials completed over all periods

An increase in the average mark could be observed as the number of tutorials completed increases. This may suggest that the completion of more tutorials resulted in a higher average score and that students did benefit from doing these practical examples.



(*Attempting means obtaining a non-blank score that is better than zero)

Figure 12: Graph of tutorials and the percentage of students who attempt a particular tutorial

The tutorials consisted of randomly generated questions (the questions and quality thereof included in the online tutorials were summarized and analyzed in detail by Jonas (2003)). The student is presented with a new data set every time he/she accesses the online system. The system marks the tutorial and registers the tutorial number, time taken to complete the tutorial, the number of times the student attempted a particular tutorial and the mark obtained for the tutorial together with the date on each occasion.

As explained above, students could redo the tutorials as many times as they wanted to. This facility was built into the online tutorials as it was expected that after repeating the tutorials, student tutorial marks would improve, students would also use the tutorials to revise and prepare for tests and this would reflect in their performance (tests). Overall it was anticipated that this may lead to a better understanding of the course material as students have ample opportunity to practice what they had been exposed to in the classes whenever they had time outside lectures; it was expected that this facility would contribute to an improvement in the quality of the course. The first stage of the tutorial and test result analysis involved checking the number of times (tries) a specific student attempted the tutorials and checking whether this had had an impact on the student's performance and whether improvement could be determined. The results are discussed below.

With the special feature developed within the online tutorials to redo them, it was of interest to investigate how students made use of this tool over time (over all semesters). This innovative feature made it possible to provide students with new data in the same problem environment for each new attempt so that new calculations and derivations had to be made. Several variables were developed in the course of the analysis to try to explain how the online tutorials added to the quality of the IS course. It was of particular interest to try to determine: if scores changed with multiple attempts, if any improvement could be determined (where improvement was seen as a percentage increase between the lowest and the highest score of all attempts by a particular student), the time used to complete the tutorials, best scores and the total time used to complete a tutorial. The graph below presents the data on students who made use of the tool *more than once* for all sixteen tutorials over *all semesters*.

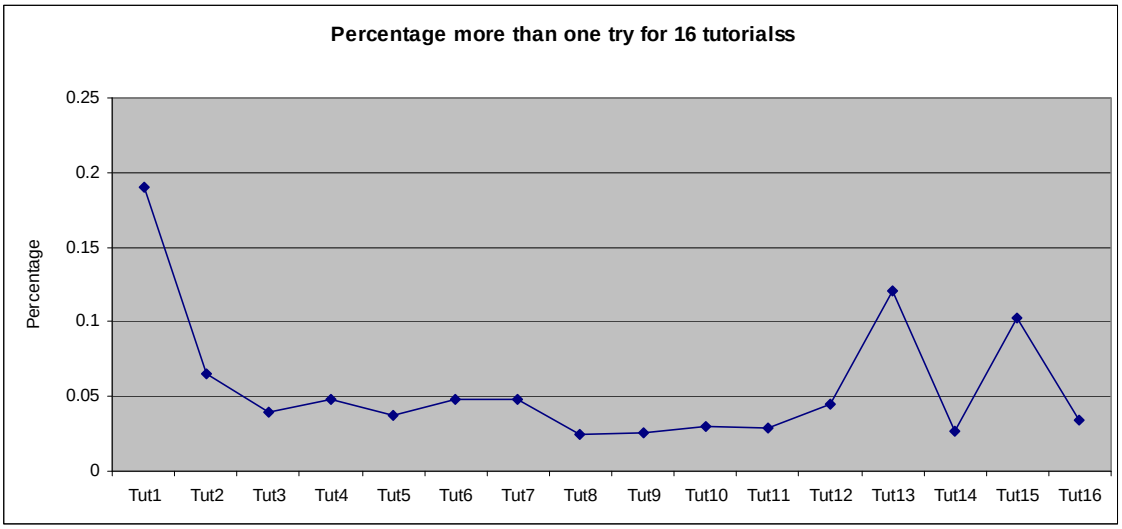


Figure 13: Tutorial repetitions (tries > 1 over all semesters)

From Figure 13 it can be seen how students made use of the built in facility to redo tutorials. Tutorial one recorded the highest percentage of students who tried the tutorial again (19.1%). Thereafter students became less enthusiastic to attempt tutorials more than once or the work became more difficult. This can be expected as the amount of work for the course accumulatively increases with each lecture. Towards the end, however, the increase in the number of tries may be due to an attempt to improve the overall tutorial marks. Only one mark (the best attempt for a specific tutorial) is used to compute the average combined with the test marks in the final first year data set to calculate the semester mark and pass rates.

As a second approach to investigate this data a further study of the repetitions (tries > 1) for students attempting any number of up to sixteen tutorials, will now be examined by *individual semesters* to study scores, improvement and time taken to complete tutorials over time (over semesters).

Table 3 shows improvement recorded for tries greater than one which is given below as these results are of key importance. The results give insight into student performance when multiple opportunities (tries>1) to practice the practical side of the course are provided with

the online tutorials. Several important quantiles are listed. (In period 20032 the minimum improvement was 2%, the median improvement was 33% and the improvement at the 90th percentile was 57%, see Table 3).

Table 3: Improvement over time in percentages (tries > 1)

Period	Tutorial	Observations	Minimum	10th Perc	Mean	Median	75th Perc	90 Perc	Maximum
20032	1	152	2	3	33.9	33	50	57	100
20041	1	42	2	2	33.6	33	53	58	88
20042	1	108	2	6	36.6	31	55	86	98
20051	1	39	2	2	34.6	39	52	55	67
20052	1	77	2	3	30.3	28	50	56	91
20032	2	287	25	25	45.6	50	50	75	100
20041	2	49	25	25	49	50	50	75	100
20042	2	110	25	25	53.4	50	50	75	100
20051	2	29	25	25	50.9	50	50	100	100
20052	2	69	25	25	50	50	50	75	100
20032	3	128	14	14	60.4	71	86	100	100
20041	3	32	14	29	67.4	71	86	86	100
20042	3	81	14	14	62.7	72	86	100	100
20051	3	23	14	14	51.5	43	72	86	100
20052	3	62	14	14	54.2	57	86	86	100
20032	4	151	3	4	32.2	14	59	80	100
20041	4	42	3	3	25.4	7	49	69	97
20042	4	97	3	3	28.9	10	52	87	100
20051	4	28	3	3	21.6	5.5	39.5	80	87
20052	4	56	3	3	25.3	11	42	72	90

Table 3: Improvement over time in percentages (tries > 1) (continued)

Period	Tutorial	Observations	Minimum	10th Perc	Mean	Median	75th Perc	90 Perc	Maximum
20032	5	187	1	10	29.8	20	40	70	100
20041	5	18	10	10	36.7	25	60	70	90
20042	5	51	10	10	36.3	20	50	80	100
20051	5	17	10	20	31.2	20	30	60	100
20052	5	29	10	10	31.7	30	50	50	70
20032	6	135	7	7	42.4	36	71	93	100
20041	6	36	7	7	34.6	25	57	79	100
20042	6	95	7	7	40.1	36	64	86	100
20051	6	40	7	7	33.7	22	46.5	79	100
20052	6	54	7	7	42.4	36	57	86	93
20032	7	148	11	11	43.1	33	78	89	100
20041	7	41	11	11	29.2	22	33	78	100
20042	7	103	11	11	34.3	22	56	78	100
20051	7	37	11	11	37	33	56	78	100
20052	7	63	11	11	32.4	22	45	78	100
20032	8	85	8	9	44.8	33	67	92	100
20041	8	19	8	8	38.1	33	67	83	92
20042	8	56	8	9	44.3	33	67	92	100
20051	8	23	8	25	42.3	42	58	67	75
20052	8	36	8	8	38.4	33	54	92	100

Table 3: Improvement over time in percentages (tries > 1)

Period	Tutorial	Observations	Minimum	10th Perc	Mean	Median	75th Perc	90 Perc	Maximum
20032	9	9	14	14	38.1	43	43	100	100
20041	9	8	14	14	39.1	14	71.5	100	100
20042	9	30	14	14	45.8	43	57	79	100
20051	9	20	14	14	35	29	43	71.5	100
20052	9	40	14	14	37.3	43	43	64.5	100
20032	10	138	20	20	53.5	40	60	90	100
20041	10	23	20	20	50.4	40	60	80	100
20042	10	63	10	20	55.7	60	80	100	100
20051	10	27	20	20	48.1	40	60	80	100
20052	10	43	10	20	45.1	40	60	80	100
20032	11	125	10	20	37.8	40	40	60	100
20041	11	18	10	10	35	20	50	80	80
20042	11	45	10	20	31.8	20	40	80	80
20051	11	23	10	10	33.9	30	60	60	60
20052	11	19	20	20	34.2	40	40	60	60
20032	12	174	8	8	33.2	25	42	67	100
20041	12	39	8	8	35.7	33	42	75	100
20042	12	90	8	8	30.9	25	42	67	92
20051	12	26	8	8	28.9	25	42	50	75
20052	12	42	8	8	30.8	21	42	67	100
20032	13	448	16	17	57.9	66	83	100	100
20041	13	117	16	17	56.2	66	83	100	100
20042	13	265	16	17	61	67	83	100	100

Table 3: Improvement over time percentages (tries > 1) (continued)

Period	Tutorial	Observations	Minimum	10th Perc	Mean	Median	75th Perc	90 Perc	Maximum
20051	13	97	16	33	60.9	66	83	83	100
20052	13	198	16	17	57.8	66	83	100	100
20032	14	78	4	5	33.6	14	67	95	100
20041	14	12	5	5	39.3	16.5	71	100	100
20042	14	55	4	5	34.4	14	76	90	100
20051	14	18	5	5	37.4	21.5	48	100	100
20052	14	29	5	5	27.1	14	47	86	100
20032	15	415	3	29	71.7	83	100	100	100
20041	15	84	1	30	70.7	83	100	100	100
20042	15	255	2	24	68.8	76	100	100	100
20051	15	85	6	30	63	53	97	100	100
20052	15	171	3	25	68	75	97	100	100
20032	16	53	1	1	14.5	4	26	45	55
20041	16	10	1	1	20.6	18.5	35	46	46
20042	16	35	1	1	17.5	11	25	48	50
20051	16	25	1	2	12.9	10	18	25	52
20052	16	20	1	1	15.1	8.5	26		

*perc = percentile

Visually, the results presented in Table 3 are portrayed in Figures 14 to 17. Improvement is measured from the first attempt to the highest score for that particular tutorial under multiple attempts.

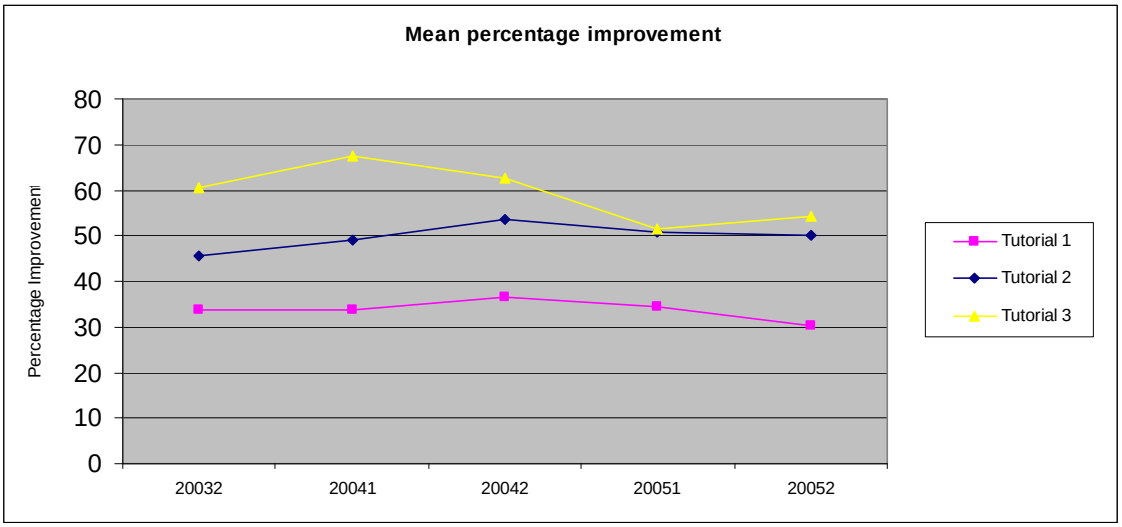


Figure 14: Mean percentage improvement over semesters for tutorials 1, 2 and 3

Figure 14 shows the improvement of tutorials 1 to 3 over time: 2003 semester 2, 2004 semester 1, 2004 semester 2, 2005 semester 1 and 2005 semester 2). For tutorial one the mean improvement score was 33.9% in the second semester of 2003, 33.6% in the first semester of 2004, 36.6% in the second semester of 2004, 34.6% in 2005 first semester and 30.3% improvement in the second semester of 2005. For tutorial two the mean improvement score was 45.6% in second semester of 2003, 49% in the first semester of 2004, 53.4% in the second semester of 2004, 50.9% in 2005 first semester and 50% improvement in the second semester of 2005.

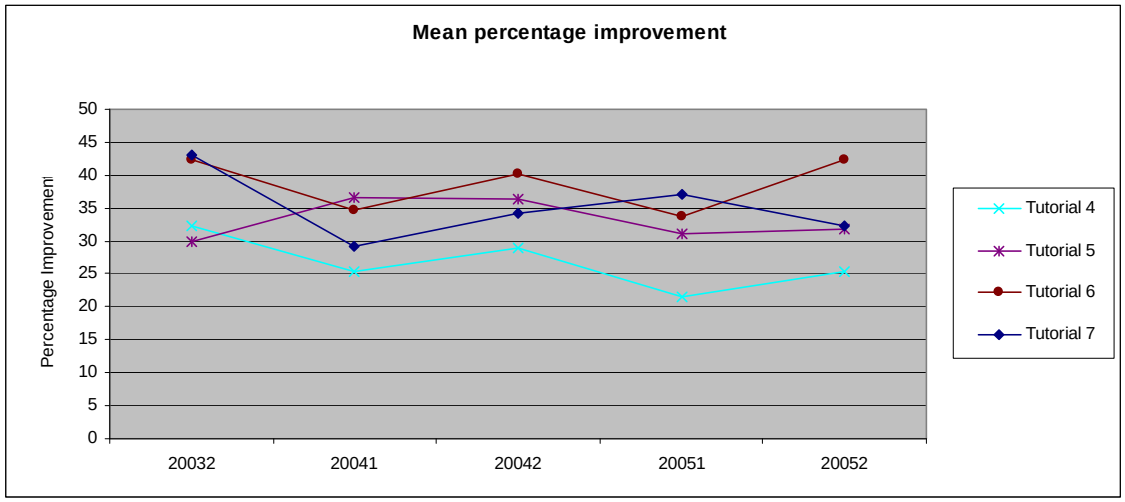


Figure 15: Mean percentage improvement over semesters for tutorials 4, 5, 6 and 7

From Figure 15, tutorials 4 and 6 follow an almost similar fluctuating trend. On the other hand, tutorial 7's mean improvement percentage was above 40% in 2003 and decreased to below 30% in the first semester of 2004, increased between 2004 second semester to the begining of 2005 (20051), to drop again between 20051 and 20052.

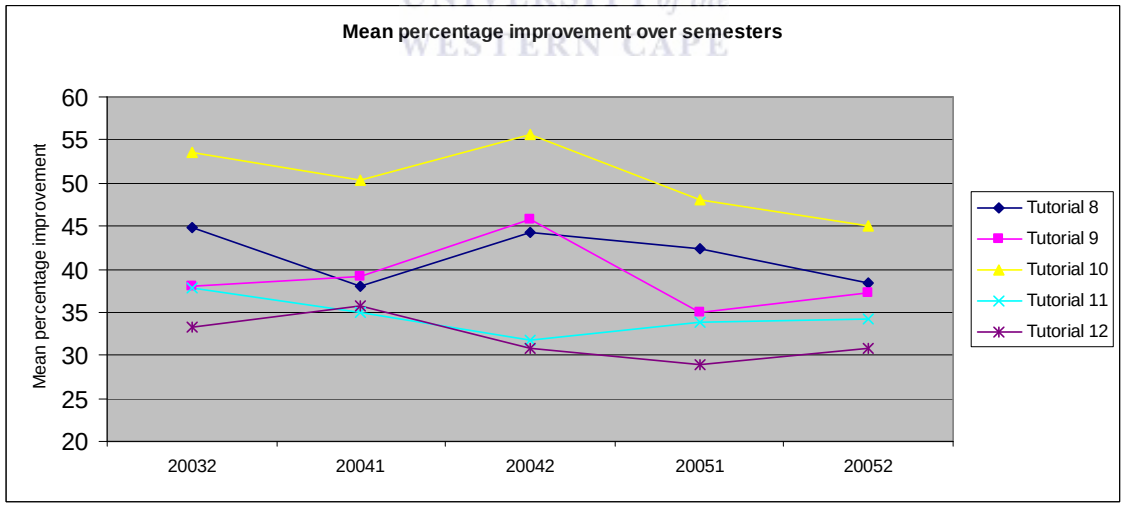


Figure 16: Mean percentage improvement over semesters for tutorials 8, 9, 10, 11 and 12

Tutorials nine and ten seem to have followed a similar trend over time.

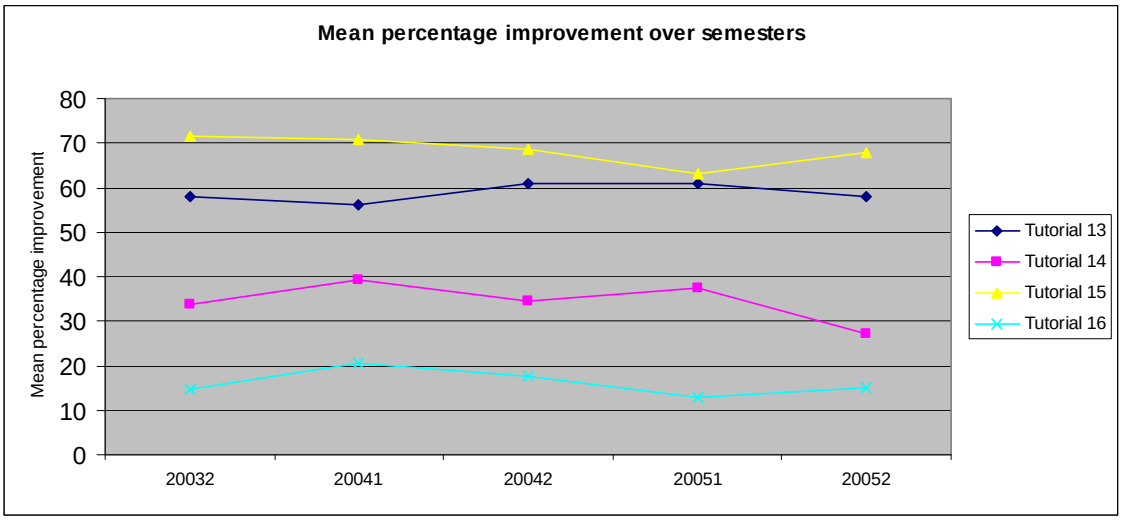


Figure 17: Mean percentage improvement over semesters for tutorials 13, 14, 15 and 16

Figure 17 presents the mean percentage improvement over semesters for tutorials 13, 14, 15 and 16. For the last tutorial, tutorial sixteen, the mean improvement score was 14.5% in second semester of 2003, 20.6% in the first semester of 2004, 17.5% in the second semester of 2004, 12.9% in 2005 first semester and 15.1% improvement in the second semester of 2005. Tutorials three, thirteen and fifteen showed the largest consistent improvement and tutorial sixteen the smallest improvement over semesters.

A table of numbers is also presented for the average time taken to complete a tutorial, the best score (labelled best_score and is contained in the improvement calculations), the first score (labelled first_score), the first time recorded for doing a tutorial and the maximum time spent on a particular tutorial (labelled max_time) to compare successive semesters (see Table 36; Appendix D1_9).

From the repetitive data (where tries were larger than one), a single best score was recorded for a tutorial completed by each student.

(ii) Exploring the Relationship between the Tutorials and Tests

In examining the bulk of the data for tutorials and tests, the average of each students' test mark is calculated as well as the number of tutorials completed. It is important to realize that the repetitive measurements for tutorials (by redoing the tutorials) are replaced and captured as the best score for a particular tutorial for each student. When test and tutorial marks are analyzed further for quality purposes, the best tutorial mark is used from that point on.

Overall averages of the average of tests (it was expected that students would write four tests but not all students completed four) were then compared with the number of tutorials completed is presented in Figure 18.

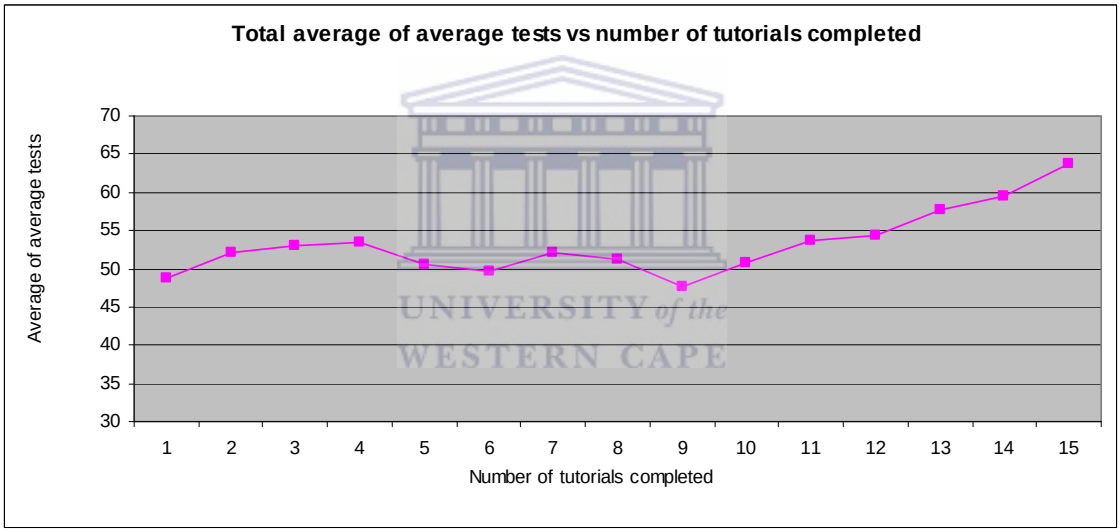


Figure 18: Graph of the student averages for tests and number of completed tutorials (excluding zero marks for tutorials)

Figure 18 indicates from tutorial 1 a clear increase in average test results for the number of tutorials completed.

For the overall approach to study relationships, a plot of average test marks for test one against tutorial one to three (the set of tutorials grouped with test one) is given in Figure 19.

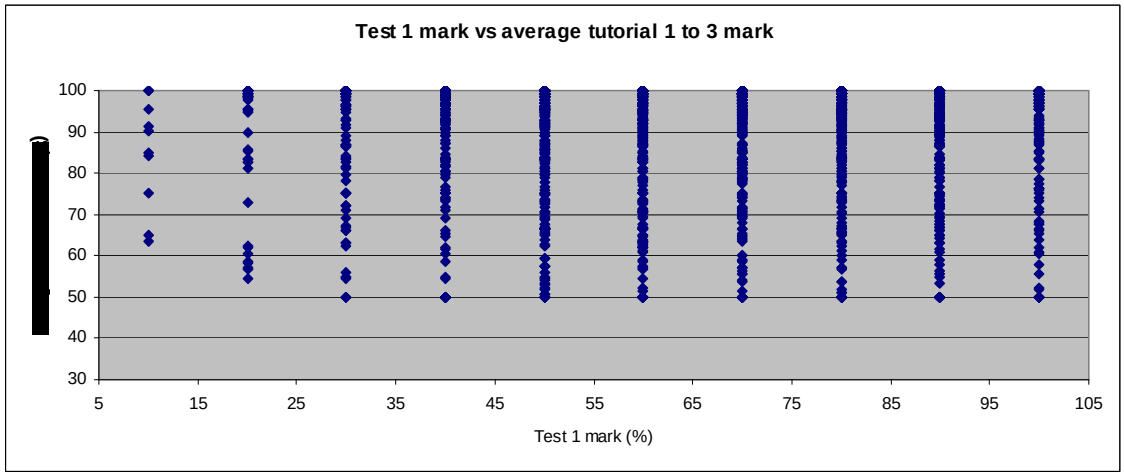


Figure 19: Average tests vs tutorial 1 to 3

Each tutorial set was aimed at enhancing student understanding whilst preparing the student for tests. Tutorial set one to three was aimed at preparing students for test one. Figure *19* explores the performance as percentages of the students in test one given that they had submitted the first set of tutorials. The majority of the students managed to obtain more than fifty percent in the tutorials. The test marks reported in percentage form, were centred between 40 and 50. A few students got below 20 % and many students obtained more than 50% for the test. Similar graphs for the other tutorial pairs can be obtained (see Figures 43 to 47, Appendices D1_2 to D1_4).

A second approach, a time study (over semesters) was also completed and for this exploration correlations were calculated. The tutorials were due prior to writing the tests and contributed twenty percent towards the semester mark. Analyses covering the tutorials included regression and statistical tests. Graphs were also used to capture and give the researcher an overall picture. The Spearman correlation coefficients were used to test for relationships existing between the tutorial and test marks over time. The data were skewed hence the use of the Spearman Correlation.

The presentation of the Spearman correlation between the tutorial and test pairs is displayed graphically in Figure 20.

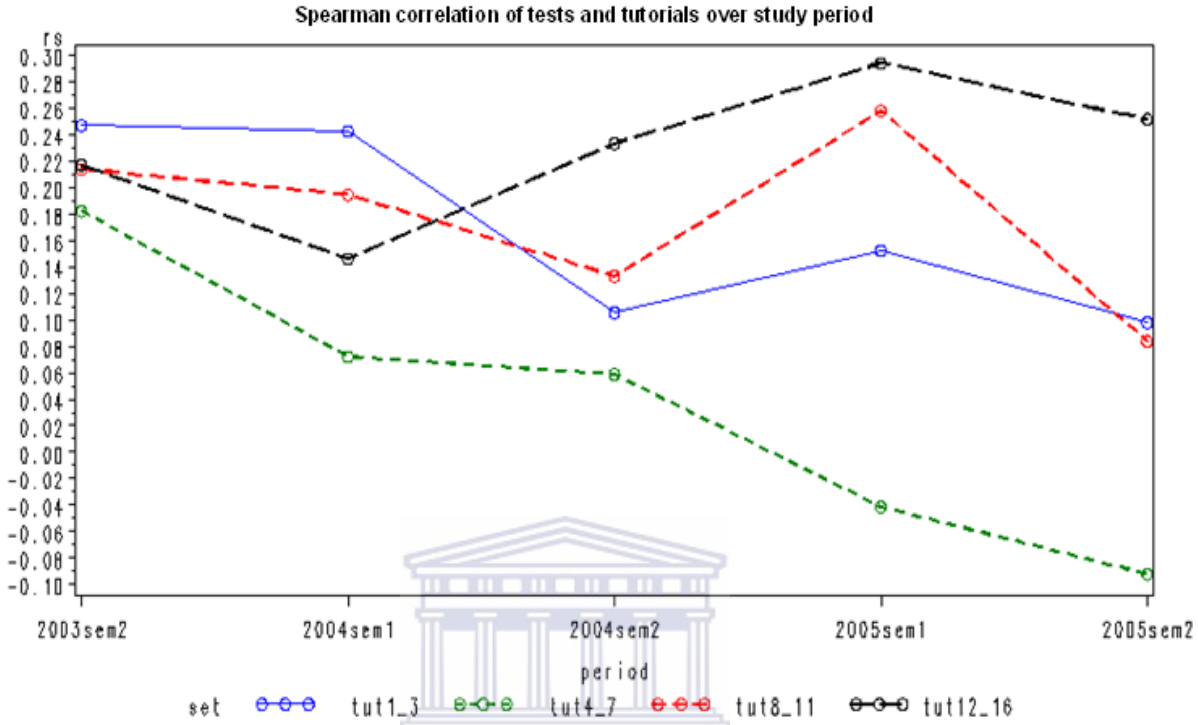


Figure 20: Relationship between the tutorial sets and tests over time (Spearman correlations)

Figure 20 is the plot of Spearman correlations between tutorials and tests over time. The x-axis represents semesters and shows a legend where tutorials one to three (coded tut1_3) were intended to prepare students for test one, tutorials four to seven (coded tut4_7) were intended to prepare students for test two, tutorials eight to twelve (coded tut8_12) for test three and tutorials thirteen to sixteen (coded tut13_16) for test four. The y-axis is the Spearman correlation coefficients of the tutorial-test pairs. Since the tutorial sets were used to prepare the students for the tests, it was essential to explore the extent to which the two; tutorials and tests varied over time. Both the blue and red lines for tutorial-test pairs labeled tut1_3:test1, tut4_7:test2 seem to follow a similar pattern over time. Likewise tutorial and test pairs labeled tut8_12: test3 and tut13_16:test4 seem to follow the same pattern. Over time, the relationship between tutorials four to seven and test two seems to have weakened from above 0.18 to about -0.09. This is a concern which needs to be investigated further as it indicates a

problem area. Tutorial pairs 4-7 were linked with test two which assesses the understanding of the 'probability' section. For tutorials one to three and test one, the relationship, although it weakened over time, remained positive. Tutorials thirteen to sixteen and test four on the other hand have a different picture; the relationship, although positive and weak, weakened between 2003 and 2004 second semester, strengthened from about 0.15 to about 0.30 from 2004 second semester to 2005 semester one, to drop again between the 2005 first semester to the 2005 second semester. Overall, the tutorial–test correlation coefficients were relatively small, none were close to 0.5, indicating that though there is learning enhancement, more needs to be done to ensure that students grasp the concepts of IS, and should be clearly reflected from the tutorial-test statistical tests.

Of all the data measures for student progress and student performance, three stand out and will be investigated further. These are the semester mark of the students, (for the latter the best tutorial mark which constitutes 20% of the semester mark whilst tests contribute 80% towards the semester mark), the examination mark (no tutorial and test marks are contained in this score) and the final mark (50% of the semester mark that contains the tutorial and the test mark and 50% of the examination mark).

A visual presentation of "all average marks" against the semester mark, examination mark and the final mark is displayed in Figures 21 to 25, enabling one to study the three measures at a first glance.

It is important to understand the data contained in the "average of all tutorials" used to plot the three measures (semester mark, examination mark and final mark). The "tutorial mark" used in the calculation of the semester mark is the best value recorded for a particular tutorial (of all repetitions of that specific tutorial) for the student record the best "x" tutorials are used (x is determined during each semester). Twenty percent of this value for the best x tutorials is incorporated in the semester mark. This explains the relatively high scores. The a*verage of all tutorials* on the other hand, is calculated for all repetitions of a particular tutorial and all averages for tutorials completed by a student are then averaged again to obtain the "average

of all tutorials" number. It is the latter that was used to plot the three scores (semester mark, examination mark and final mark) against as it is believed this gave the overall input (repetitions included) information for a student's efforts.

The tutorials are included in the semester mark (20%) and final mark (20% of the semester mark which in the end is weighted 50% of the final mark). The graphs are given as an illustration only and the tutorial mark contained in the actual semester mark excludes much of the information, captured in the "average of all tutorials" variable. It was not the intention to study outliers, symmetry or distributional properties of the lines shown in the graphs. They are displayed only to show a positive relationship, if any, at a first glance. The assumptions of ordinary linear least squares regression were not investigated as part of the exercise.

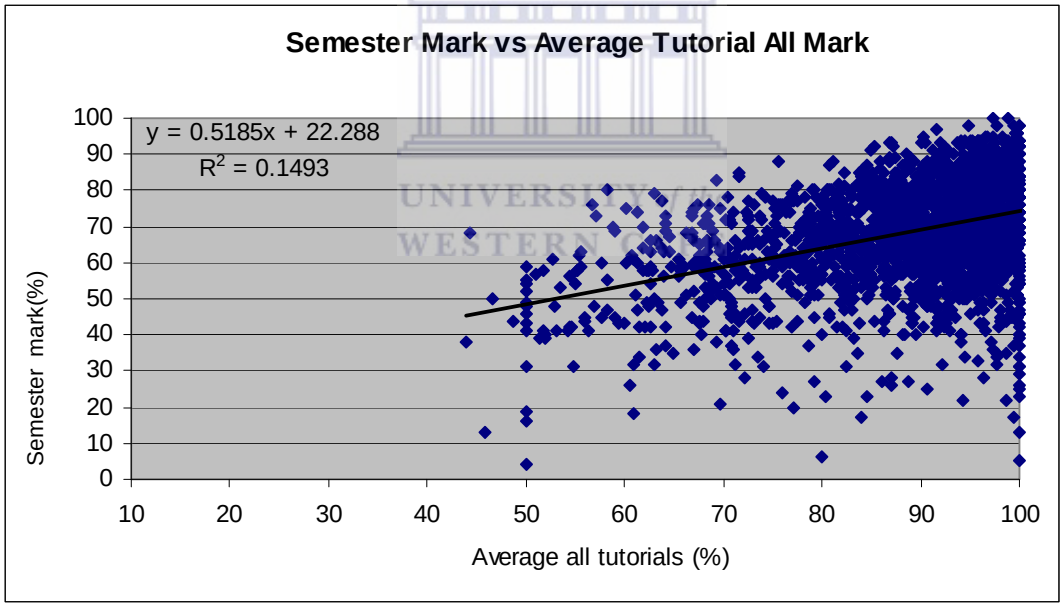


Figure 21: Semester marks against the average tutorial mark

Figure 21 explores the relationship between the tutorial marks and the semester marks. Average tutorial marks less than 50 percent led to lower semester marks even though only 20 percent of tutorials were part of this mark. At approximately an average of a 100 percent tutorial mark, the majority of the students had a semester mark of 50% and above. Figure 21

indicates that the tutorials impacted positively on the student's semester marks (slope is 0.5185).

A presentation explaining the overall relationship between tutorials and examination marks is given in Figure 22.

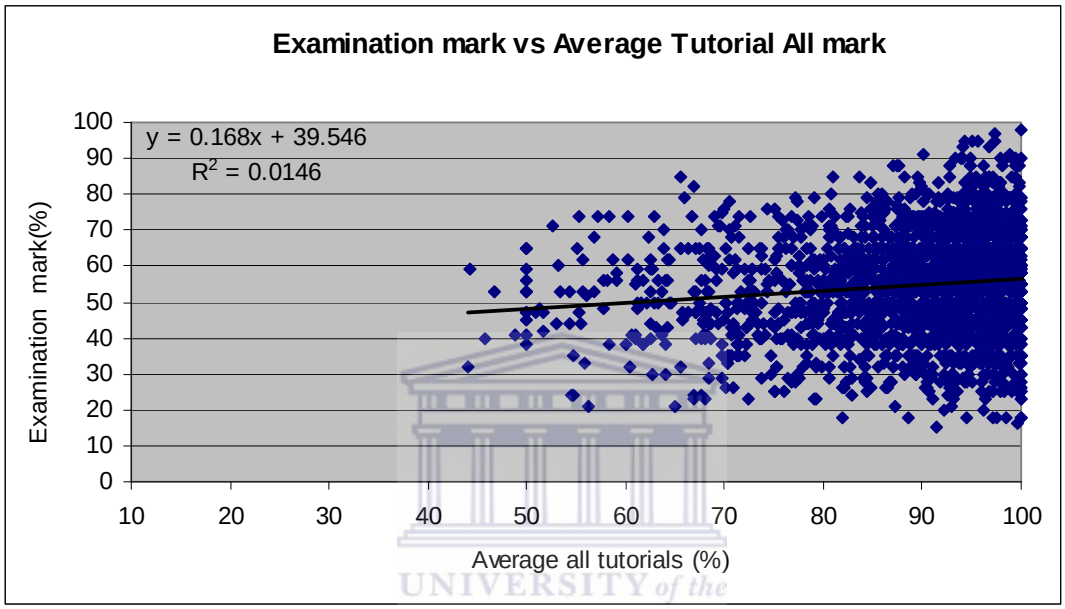


Figure 22: Examination marks against the average tutorial mark

The slope of the regression line is positive (0.168) though small and we can deduce that a higher tutorial average is related to higher examination marks. Although many students who do not pass are able to score high average tutorial marks, this can be due to the fact that students are able to redo tutorials and can improve their mark.

A final mark was also plotted against tutorials over all data and is given in Figure 23.

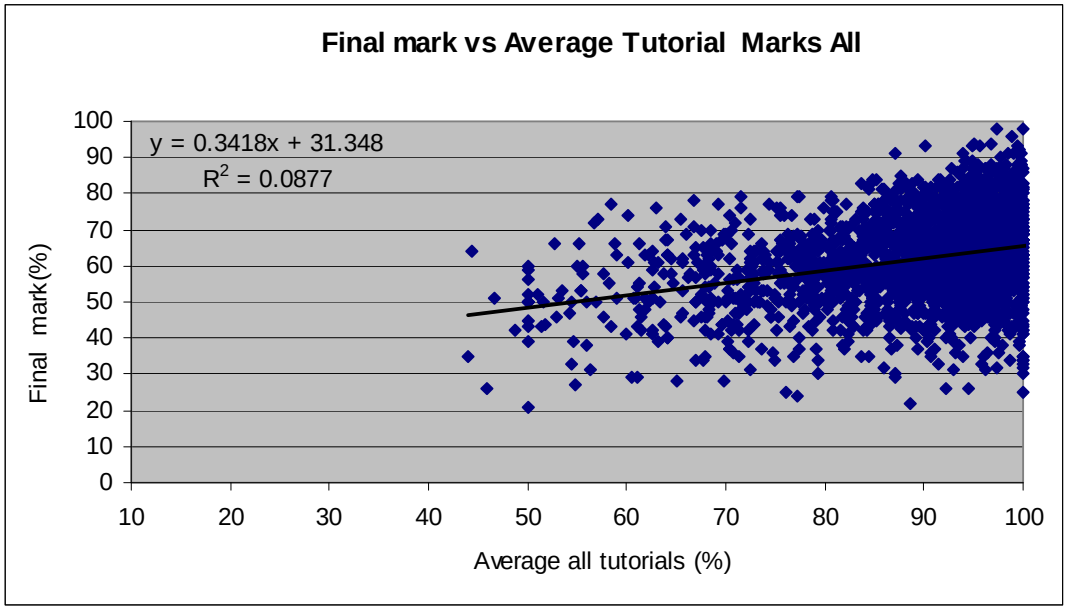


Figure 23: Final marks against the average tutorial mark

The three scores (semester marks, examination marks and final marks) show a shift in the concentration of observations between the Figures 21 to 23. When semester marks are plotted against average tutorial marks the observations are clustered between 60 and 90 percent, when examination marks are considered the cluster seems to lie between 30 and 70 percent and in the case of final marks the cluster lies between 40 and 80 percent. The relationship between tutorial scores and final marks is stronger (slope is 0.3418) and higher tutorial marks impact on a positive final mark outcome.

(iii) Is It Possible to Identify Difficult Sections in the Course Using the Test Marks?

The mixed model procedure was used to identify difficult sections using the test marks. The hypothesis used was that the tests had the same level of difficulty. Over time, test two emerged to be the most difficult (mean score of test 2 was 46 and below 50%, all the other tests had mean score >50). For all tests the percentages ranged from 0% to 100%. There seemed to be little difference in the variability in marks of test one, test two and test three (standard deviation of the three tests ranged between 20 and 21 whereas test 4 had a standard deviation of 22.8) (see Table 6, Appendix D6).

When testing for the differences between test pairs, using the least squares means from the mixed model, almost all test pairs were significantly different except for test pairs test 2 and 3 with p-value = 0.2375 at the 0.05 significance level. This means that test two and test three did not have different levels of difficulty (the p-value of the pair was 0.24 >0.05), (see Table 5, Appendix D6).

Two more graphs are presented, that of the number of tutorials completed and the examination mark, and the average test marks against the examination mark.

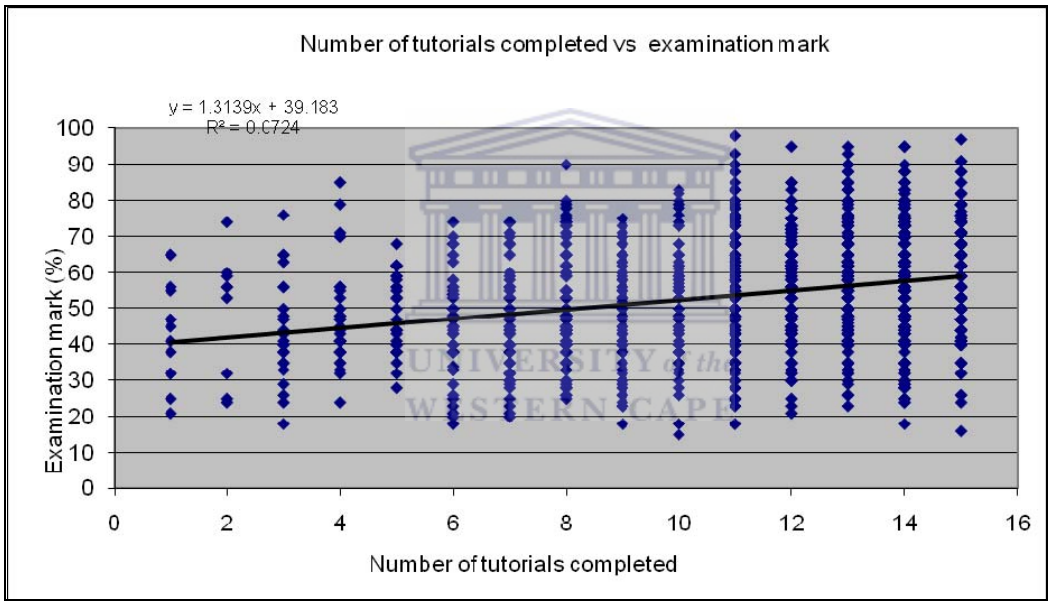


Figure 24: Number of tutorials completed vs examination mark

Figure 24 indicates that there is a positive relationship between the number of tutorials completed and the examination mark. This may be an indication that students do score a higher examination mark if they complete more tutorials adding to the quality of their learning experience.

Figure 25 shows that students perform better in the examination when their test scores are higher, where the tests are part of the continuous assessment and the examination is written once, at the end of the course.

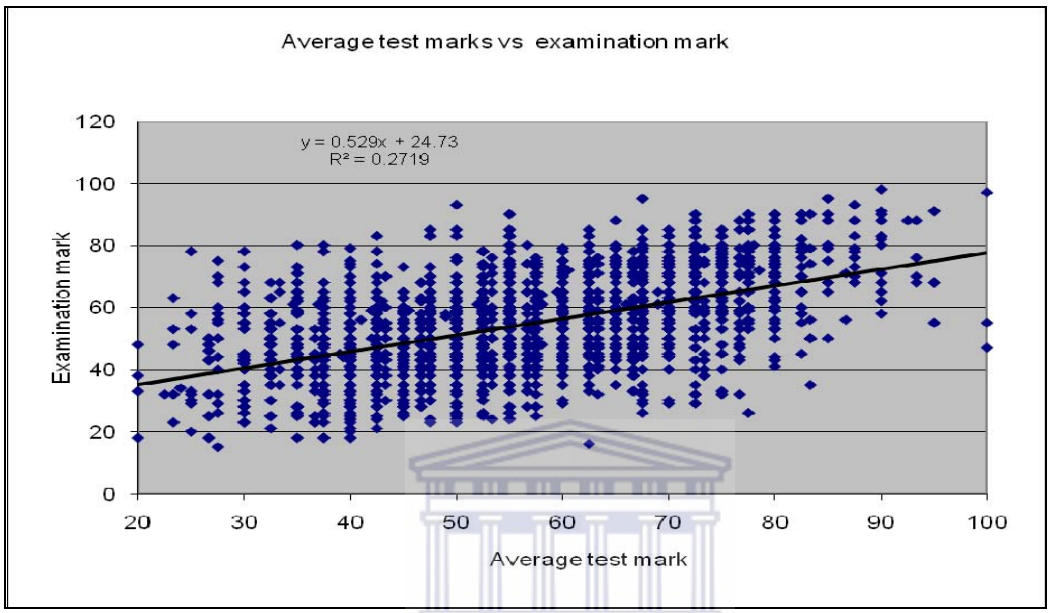


Figure 25: Average test marks vs examination mark

4.2.2.4 MONITORING THE INTRODUCTORY STATISTICS PASS RATE OVER TIME

Pass rate is defined as the number of students who write the final examination divided by the number of students who pass across semesters. During 1999 to 2002, the pass rate was less than fifty percent. One of the objectives of the study process was to improve the pass rate to fifty percent and above over time.

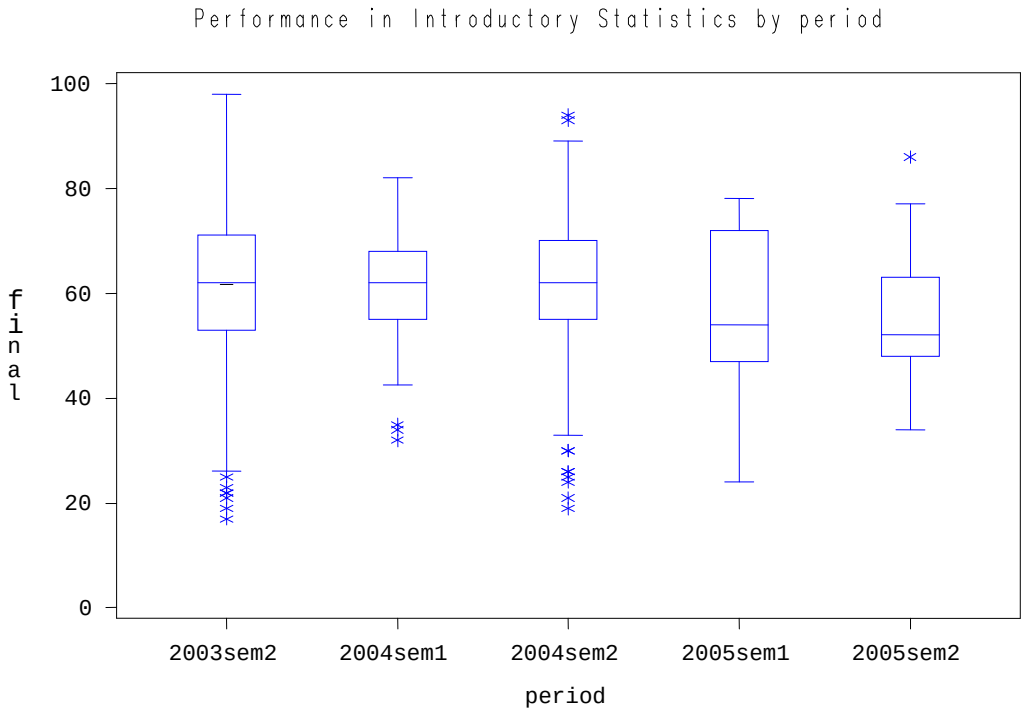


Figure 26: Final Introductory Statistics Final (%) over time

Figure 26 represents the final IS mark as a percentage over time for the study period. It must be pointed out that the pass rate was between 30% and 40% before the study commenced. Although there seemed to be an increase in passes at first from 2003 to 2004, the percentage of students who passed dropped over time. From the 2003sem2 to the first semester of 2005, the mean pass rate was 50% and above 60%. In second semester of 2005, the mean pass rate was 59%. The box-plots show that from 2003sem2, the median increased and stayed the same from the first semester of 2004 to the first semester of 2005, to decrease to about 50% in the last two semesters. There were several outliers in the 2003sem2 and the second semester of 2004.

4.2.2.5 MONITORING PERFORMANCE USING DEMOGRAPHICS AND GRADE 12 BACKGROUND

This section explores the performance of the students in the Introductory Statistics course using demographics and Grade 12 background. Variables included in the analysis are the age group, gender, ethnic group, home language and academic language. Grade 12 subjects are further used to predict the performance of the students in the course.

(i) Performance by Age Group

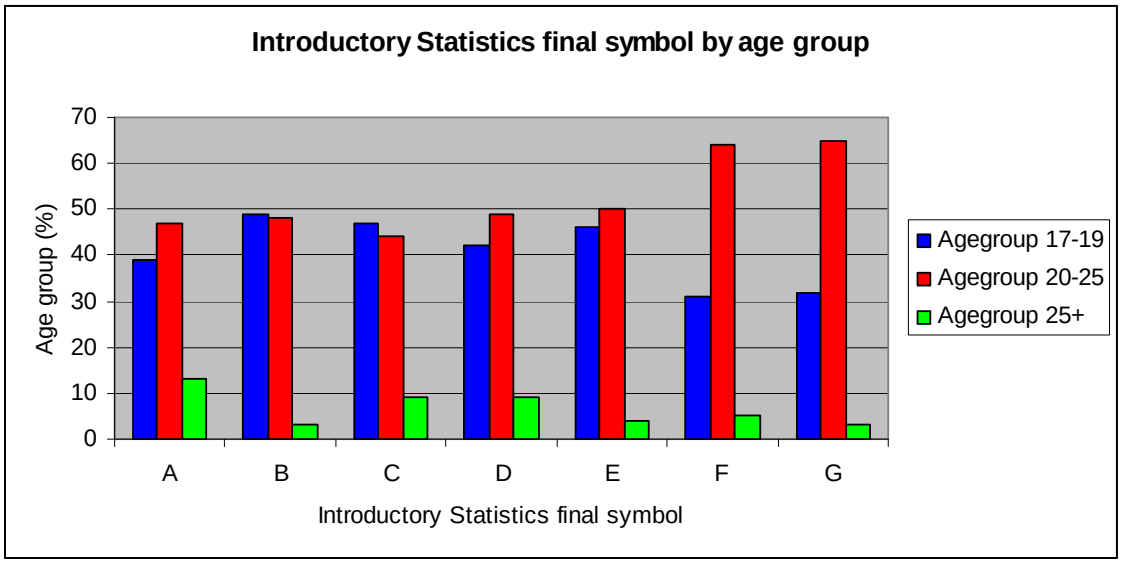


Figure 27: IS final symbol distribution by Age Group

Students were categorized into three groups by age. All the students ranging from 17-19 were assumed to have attended university immediately after obtaining their Grade 12 (no delay after Grade 12). The second category was for the age group 20-25 (delayed entrance) and, the last age group; older than 25 was assumed to have a late entrance. Figure 27 compares the three groups by performance (final IS symbol). Students with a delay of one to two years weakened, distinctions for the group were close to 50% whilst students with an 'F' and 'G' symbol were above 60%. Students with a late entrance gave a different picture, more students obtained distinctions compared to those who obtained G's in the course. The same applied for students who had no delay before coming to university with the percentage decreasing as the symbol weakened. The p-value (p=0.0067), obtained from the chi-square to test for differences between the groups indicated that significant differences did exist between the three age groups,(see Tables 13 and 14, Appendix E).

(ii) Performance by Gender

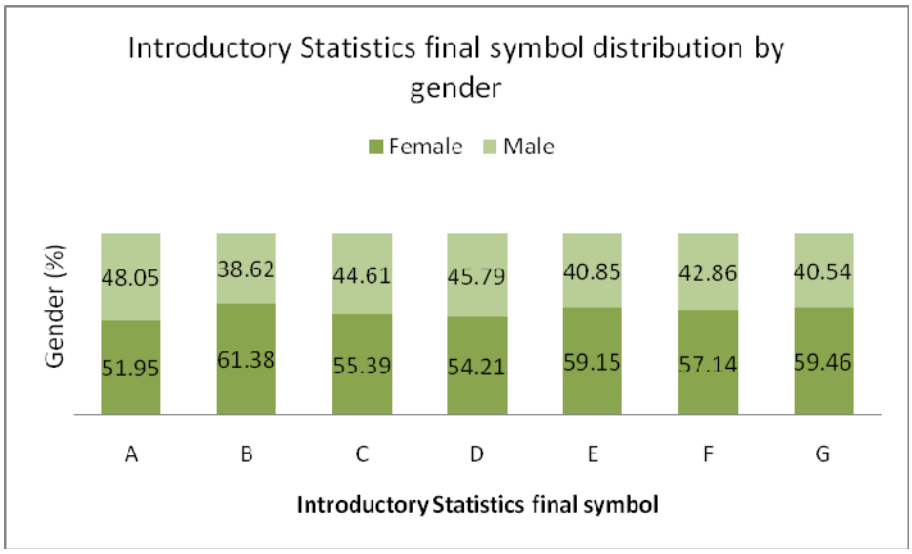


Figure 28: Introductory Statistics symbol distribution by gender

Female students tended to do better compared to males when comparing the two groups by symbol. However, the shift from the highest symbol to the lowest symbol was different, males tended to do better compared to females; there is a decrease in the percentage of males from the highest to the lowest symbol whereas the percentage of females tended to increase as the symbol weakened. The p-value obtained from the chi-square test was 0.6640 indicating insignificant differences between males and females over the various periods (see Tables 3 and 4, Appendix E).

(iii) Performance by Race

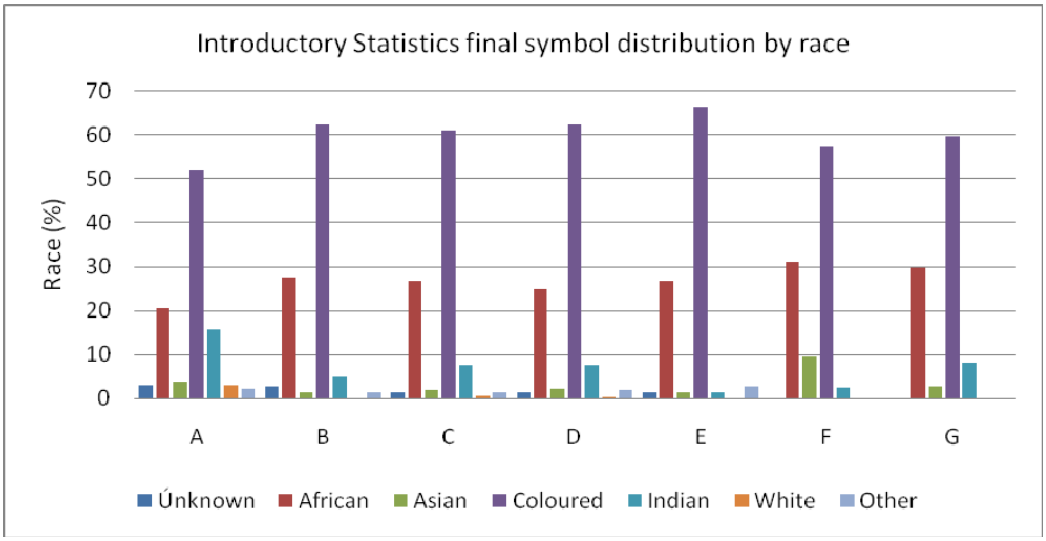


Figure 29: IS symbol distribution by race

Figure 29 indicates that 66% of the Coloured students obtain an E in the IS as their final symbol. African students obtain mostly either the F symbol (above 30%) or the G symbol (exactly 30%). The majority of students, whose ethnic groups are unknown, obtained mostly distinctions (about 15%). There seems to be differences in the number of students reported in percentage form, the differences were also statistically different (chi-square; p=0.0008), (see Tables 5 and 6, Appendix E).

(iv) Performance by Home Language

The IS symbol was further used to see the impact home language had on the performance of the students. The results revealed significant differences between the groups by home language (p=0.0066), (see Table 18, Appendix E).

(v) Performance by Academic Language

The grouping using the final IS symbol to investigate possible differences with respect to the academic language showed the differences were insignificant, (chi-square, p=0.1691), (see Tables 19 and 20, Appendix E).

(vi) Performance by Grade 12 Profile

The t-test was performed to see whether there was a difference in the performance in the Introductory Statistics Course of the students who belonged to a specific school profile against those who did not belong to the profile allocating a 0 (had not taken a course) and a 1 (had taken a course). Table 4 summarizes the t-test results. The results indicated that for all the profiles excluding the Fine Arts, there were significant differences in the performance of the students in the course. When observing the mean differences at the 95% confidence level, the Fine Arts profile was the only profile, whose mean difference included a 0 (-4.971; 1.8101), (see Tables 14 to 32, Appendix E for the detailed t-test results).

Table 4: Summary statistics of the performance of students given a specific Grade12 profile

Profile name	Mean difference	T-test	p-value
Mathematics	-3.63	-6.14	0.0001
Natural Science	-3.709	-5.33	0.0001
Business Science	-1.68	-2.85	0.0045
English	-2.165	-3.58	0.0004
Fine Arts	-1.581	-0.91	0.3607
Languages	-1.425	-2.38	0.0176

(viii) Performance by Grade 12 Status

The chi-square test was used to test whether the Grade 12 status (MSTS) impacted on the performance of the students in IS. The results revealed that the majority of students with an age exemption, conditional exemption and full exemption were more likely to pass (flagged 1) than fail (flagged 0) (see Table 14, Appendix F). Further, the chi-square test was significant at the 5% significance level (p=0.0119), (see Table 35, Appendix E). The IS final symbol was further explored using the Grade 12 status. The results are presented in Figure 30.

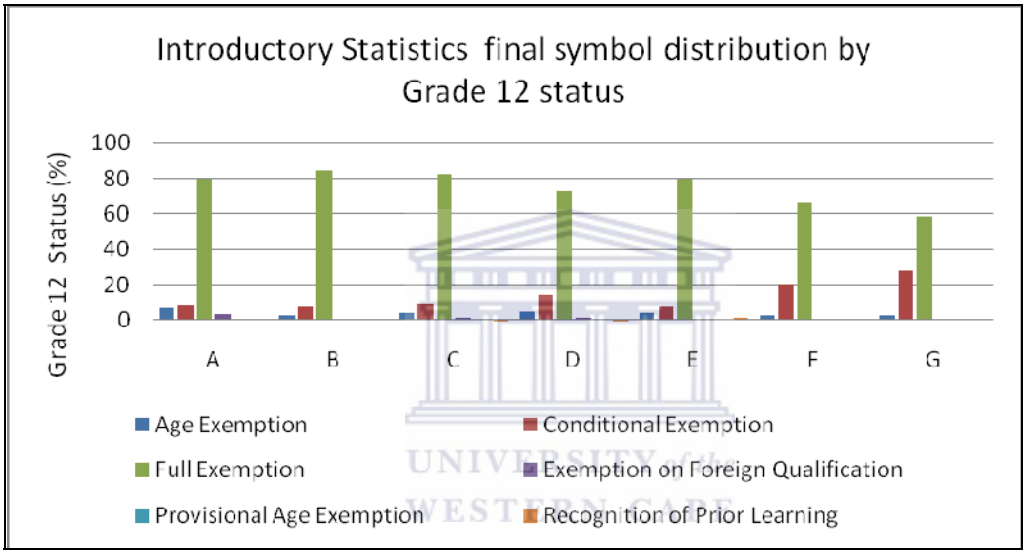


Figure 30: IS symbol distribution by Grade 12 status

Figure 30 shows the symbol distribution of the IS students by Grade 12 status. Figure 30 indicates that the Grade 12 status impacted on the performance of the students in the IS course. There was a decreasing pattern from symbol 'A' to symbol 'G' for students who had obtained a full exemption in Grade 12, indicating that students with a full exemption are more likely to pass the course well, than failing it. The same pattern was observed for students with an age exemption. The pattern followed by students with a conditional exemption was different, the distribution increased as the symbol obtained weakened.

(ix) Performance by Grade 12 Average Symbol

The chi-square was run to see if there was a relationship between Grade 12 symbol and performance of the students in the course. Of the 26 students who had an 'A', 96% passed and only one student dropped out. Of the 162 students who obtained a 'B' at Grade 12, 96% passed. Of the 554 students with a C-symbol, 88% passed, similarly of the 408 students who had a D aggregate in Grade 12, 77% passed (Table 12, Appendix F2). The chi-square test was significant at the 5% significance level (p=0.001, see Table 36, Appendix E). The overall Grade 12 symbol also had an impact on the performance of the students. All the symbols below C had p-values that were insignificant. Both 2004 and 2005 second semesters in particular stood out as the most challenging semesters.

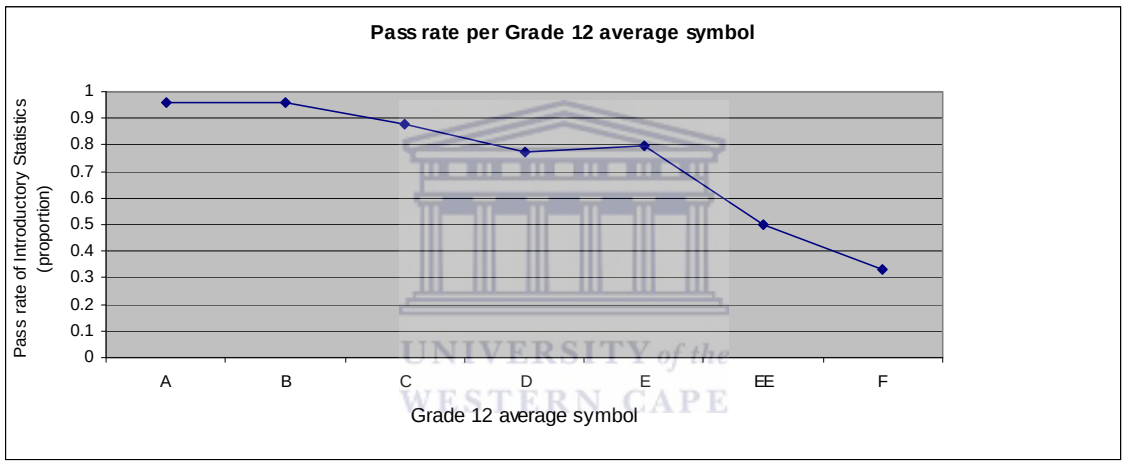


Figure 31: Pass rate of Introductory Statistics course vs average Grade 12 symbol

Figure 31 indicates that the average Grade 12 symbol impacted on the performance of the students in the IS course

(x) Predicting indicators of performance using selected Grade 12 subjects

A logistic regression model was run to predict the performance of the students in IS using selected Grade 12 subjects as predictor variables, (see Chapter 3 for information on logistic regression analysis). Each of the subjects Mathematics, English, Physics, Commerce, Accountancy, Economics, History, Biology and Agriculture was used to predict the

performance in IS using the final mark. Students were also flagged to have taken a specified subject in Grade 12 (1) or not to have taken the subject in Grade 12 (0). Further, a 2x2 frequency table giving the number of passes/failures (1/0) against the number of students who had taken/not taken a specified subject in Grade 12 is also presented to give the reader an overview of the Grade 12 subjects of the students taking the IS . The logistic model gave as some of the test statistics the chi-square, Fischer's exact test and the odds ratio. Physics (p=0.0002), Mathematics (p=0.0005) and Accounting (p=0.0023) stood out as the predictor subjects in the performance of the students. All the other subjects were insignificant at a 5% significance level. Physics came out as the strongest predictor variable (p-value was 0.0002), (see Table 37, Appendix E).

4.2.2.6 MONITORING DROP-OUT RATE USING DEMOGRAPHICS AND INTRODUCTORY STATISTICS FINAL MARKS

One of the objectives of the study was to see if there had been a decrease in the number of students who dropped out of the IS programme. Felter (1997), states that school hiring policies have an impact or influence on student success. He also states that the relationship between the drop-out rate and teacher qualifications is independent of some of the socio-economic factors like poverty, location of the school and student numbers. He suggests several ways of minimizing drop-out rates such as student mentoring, support for new teachers and giving students fair assignments or tutorials.

The researcher felt that prior to the initiation of the study, there was little support provided to students. There was no laboratory specifically allocated to the Statistics Department students although they were expected to submit monthly tutorials. This unavailability of resources, shortage of computers and insufficient support also emerged from the student interviews that were held prior to the study. The Hot Seat project was initiated so that all the students who needed additional support could obtain the extra assistance that they were looking for during office hours. Furthermore, the ADM laboratory was refurbished with computers and laboratory time was extended. All the tutors and students assistants had to undergo training. These initiatives were taken in an attempt to increase the pass rate whilst at the same time

reducing the drop-out rates. Drop-out rate is defined as the number of students who are registered for the course but fail to write all tests, tutorials and the final examination across semesters.

Table 5: Monitoring Drop-out of the Introductory Statistics Students Over Time

Table of period by finalmark			
Period	**Finalmark**		
Frequency Row Pct	**No**	**Yes**	**Total**
2003sem2	31 3.17	948 96.83	979
2004sem1	24 13.87	149 86.13	173
2004sem2	71 8.65	750 91.35	821
2005sem1	38 20.11	151 79.89	189
2005sem2	52 11.61	396 88.39	448
Total	216	2394	2610

Table 5 presents the drop-out percentage of the students over time. The 'No' responses represent all the students who could not write both the examination and/or the supplementary examination. Students write a final year examination. Sometimes due to sickness or examination clashes or family-related problems, they are unable to write the examination. Under those circumstances, they qualify to write a supplementary examination together with other students who qualify for supplementary examinations. To calculate the drop-out, all the students who could not write both the examination and the supplementary examination were categorized as drop-outs. The drop-out rate fluctuated over time. Very few students failed to write the examination in 2003(3%). There was an increase in the drop-out rate in the first semester of 2004 (14%), to decrease in the second semester of the same year (9%). There was a further increase in the number of students who could not write both examinations in 2005

semester 1 to decrease again in the second semester of the same year (20% and 12% respectively).

4.2.2.7 UNDERSTANDING THE CHARACTERISTICS OF SUCCESSFUL STUDENTS

The students were further divided into three groups using the final Introductory Statistics results and were compared. The groups were 'drop-out', 'fail' and 'pass'. The discussion follows below.

(i) Selected Demographics by Final IS Profile

For the three age groups, the pass rates were 88%, 82% and 84% respectively (Table 1, Appendix F1). It must be remembered that for this analysis, the university database had many missing values; in fact more than half of the total number of students had missing information. A Chi-square test of the IS symbol for the three age groups was significantly different (p=0.0067) (see Tables 13 and 14, Appendix E).

When considering the gender variable for pass rates, there was no difference between males and females; both categories were 84% (Table 2, Appendix F1). Again the large amount of missing information for gender may have impacted on the final result (see Section 4.2.2.5 for the testing of the difference between genders).

4.2.2.8 CHAPTER FOUR SUMMARY

In this chapter, the study objectives were investigated and all the necessary feedback the researcher wanted was extracted from the data using descriptive statistics, tables, and statistical reports in percentages and relationships that might have existed between variables explored using statistical tests. Chapter 5 is a discussion of the qualitative analysis of the end of course evaluation, online questionnaires and completed query forms.

CHAPTER FIVE

ANALYSIS AND INTERPRETATION OF QUALITATIVE DATA

5.1 INTRODUCTION

In Chapter 4, the following analysis of quantitative data was done: descriptive statistics, graphs, reports and statistical tests. Chapter 5 is the analysis of the qualitative data collected using the online questionnaires, the evaluation, the ADM and the Hot Seat query forms. There was a need to use a mixed model of PE (qualitative and quantitative) as quantitative data provide one with numbers which give an overall picture of a situation that is sometimes limited by statistical assumptions. In qualitative research, the researcher is directed or guided by the data and is able to establish patterns and themes emerging from the data, (McMillan & Schumacher, 1993; Onwuegbugie, 2003; Denzin & Lincoln, 2007). Qualitative data assist one to assess situations in their natural setting. One other aim of using a mixed model of PE was for triangulation as the researcher wanted to compare the results obtained from the quantitative instruments with those obtained from the qualitative instruments, to see if there were similarities between instruments (qualitative-qualitative, quantitative-quantitative and qualitative and quantitative data analysis).

Trochim (2006), describes credibility as judgmental standards that involve communicating the wealth of the results of qualitative research from the participants perspective, or from the participants' eye. In the context of the study, Lussier's process model (see Figure 4) was used in monitoring the quality of the Introductory Statistics offering. The web-based tutorials, the course-notes and the lecturers are some of the components making part of transformation process used to optimize the quality of the IS offering. As perceived by the researcher, they are credible for the following reasons: The course-notes, the web-based tutorials and the lecturers are the drivers of the success of the IS offering. Students attend lectures three times a week; they have the course-notes that they can use when on their own to revisit what was done in class as well as to broaden their understanding of the subject matter without any pressure. In this instance the researcher believes that the course-notes serve the purpose of filling in gaps when students are studying on their own. There are examples that students can attempt to test their understanding, both at the end of each chapter and at the end of the

course-notes. The tutorials are multi-functional; they are for learning enhancement and prepare students for tests and examinations as the researcher believes that students should be given an opportunity to learn and explore. Each time a student accesses a specific tutorial, the student is presented with a different data set. The feature of a different dataset each time a tutorial is accessed makes a problem new and fresh to the student. Students can repeat the tutorials as many times as they want or until they are satisfied with their performance. This approach is believed by the researcher to be an enhancement of learning. It presents a student with an opportunity to learn independently. It can also help a student to understand and to pick-up concepts that were not clear in class. The effectiveness of the tools will be transparent through the tutorial marks, the test marks and finally, the examination marks which analyses were done in Chapter 4. The question to answer is: "Do students have the same perception as the researcher with respect to the processes used to make the IS offering effective? If they differ, what is it that students think is not right? This is one of the gaps that Chapter 5 is trying to cover.

The quantitative results from the Grade 12 information and the final IS results would not be sufficient feedback as perceived by the researcher (McMillan & Schumacher, 1993; Onwuegbugie & Daniel, 2003, Wong, 2007). The data collected through the online questionnaires, the evaluation, the ADM query forms and the Hot Seat query forms try to fill the gap that the quantitative data or analyses failed to generate. Several methods can be used to analyze qualitative data including typology, taxonomy, constant comparison, analytic induction, logical analysis, quasi-statistics, events analysis, metaphorical analysis and domain analysis. This research uses the quasi-statistics method. The chapter will not cover all of the above mentioned methods in detail, but will instead focus on the quasi-statistics method (Bernard and Ryan, 2003).

Qualitative responses were captured using the pre-questionnaire, the post-questionnaire, end of course evaluation, the Hot Seat query form and the ADM query form. The data were captured for five semesters beginning at the second semester of 2003 and ending at the end of the second semester of 2005. For the purpose of neatness and reading ease, the five semester groups have been abbreviated by reporting the results using the following abbreviations:

2003sem2 (for the second semester of 2003), 2004sem1 (for the first semester of 2004), 2004sem2 (for the second semester of 2004), 2005sem1 (for the first semester of 2005) and 2005sem2 (for the second semester of 2005).

Figure 32 is a presentation of the summary of the instruments used: the pre-questionnaire, the end of course valuation, the ADM laboratory query form, the Hot Seat query form and the post-questionnaire. Each of the research instruments is summarized briefly.

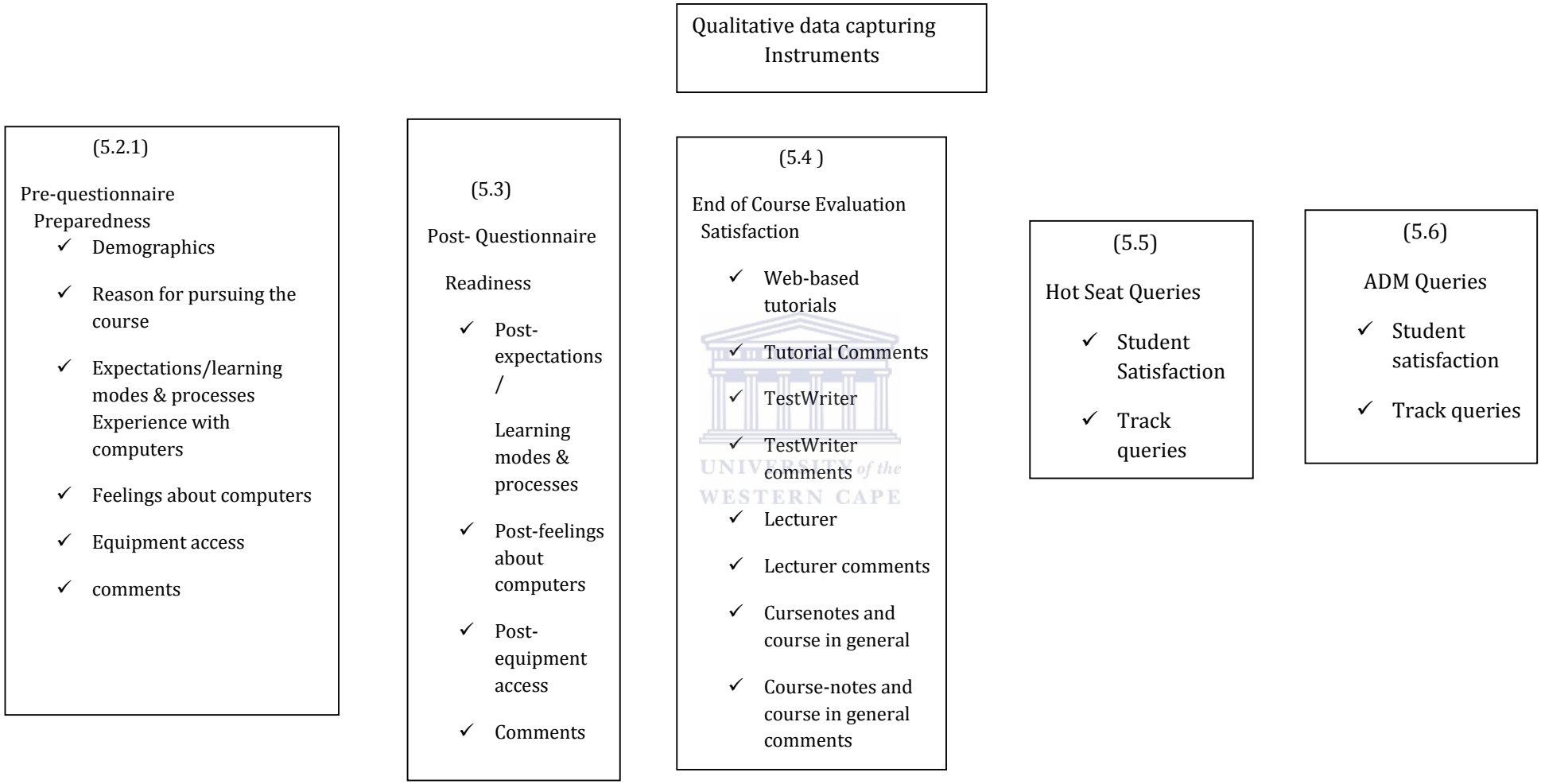


Figure 32: Summary: qualitative data instruments

For each of the instruments; online questionnaires, evaluation, the ADM and the Hot Seat; ATLAS TI was used to create codes which were further grouped into categories that were quantified using the quasi-statistics method. Sections 5.2 to 5.6 provide the reader with a detailed analysis of the instruments summarized in Figure 32.

5.2 MONITORING OF PERCEPTIONS OF INTRODUCTORY STATISTICS STUDENTS

Feedback prior and post to doing the course to monitor student perceptions was captured from the pre- and post-questionnaires. The pre-questionnaire data were captured before the student obtained exposure to the course and the post-questionnaire was administered on completion of the last tutorial. Both questionnaires were online. The information was quantitative and presented in graphs and reports. Numbers reflect responses in percentages.

5.2.1 PRE-QUESTIONNAIRE ANALYSIS

The students completed the pre-questionnaire prior to accessing the first online tutorial. In their first lecture (first day of the course), they were encouraged to log onto the tutorials so that they could see if they are able to access them whilst familiarizing themselves with the web-page. Questions asked included, home address, their attitude to computers, experience with online course tutorials, reason(s) for pursuing Statistics and how they perceive the course in general.

Looking at this instrument in more detail, the pre-questionnaire had five sections, the demographics, the expectations of the students prior to starting the course, experience with computers, perceptions about computers and equipment access, and a comments section. The demographic information included, gender, age, citizenship, ethnic group, and financial information. In the section 'expectations /learning modes and processes', students were asked to select a response that mostly suited them using a four point scaling '*strongly agree*' '*agree*' '*disagree*' '*strongly disagree*', where '*strongly agree'* meant student satisfaction and '*strongly disagree'* meant opposition/dissatisfaction. The section on experience on computers had categories: '*novice, occasionally, frequently* and *daily use*' and students had to select a

single option. There were a variety of options that students were presented with to indicate their perceptions on computers (See Appendix7_1, pre-questionnaire section on '*current feelings on computers*'), and, the last section 'equipment access', had yes/no options following a question whether students were employed and had access to a personal computer and a modem or not. The last part of the pre-questionnaire was the student comments where students could comment on anything (qualitative data). The analysis of the pre-questionnaire was two-fold; firstly the student responses to the scaled data were summarized and reported in percentages of how many students selected a particular option and secondly graphs were created to give one a broader picture.

5.2.2 PRE-QUESTIONNAIRE RANKED RESPONSES

A total of 2238 students completed the pre-questionnaire. There were more females who responded to the pre-questionnaire compared to male students (54% against 46%). Most of the Introductory Statistics students fell into the age group 15-19 and a few students were 35 years of age and over across semesters . The majority of the responses were from Coloured students, followed by African and Indian students across periods (55%, 33% and 9% for Coloureds, Africans and Indians respectively). The course as reflected by the pre-questionnaire responses was dominated by the Bachelor of Commerce students across semesters and very few of the students were registered for non-degree purposes. As expected, above 75% of the students were first year students in all semesters, followed by second year students (percentages not greater than 20 percent across semesters). In semesters 2003sem2 and 2004sem1, a few post-graduates students were doing the IS course (see Tables 54-141, Appendix C6_2).

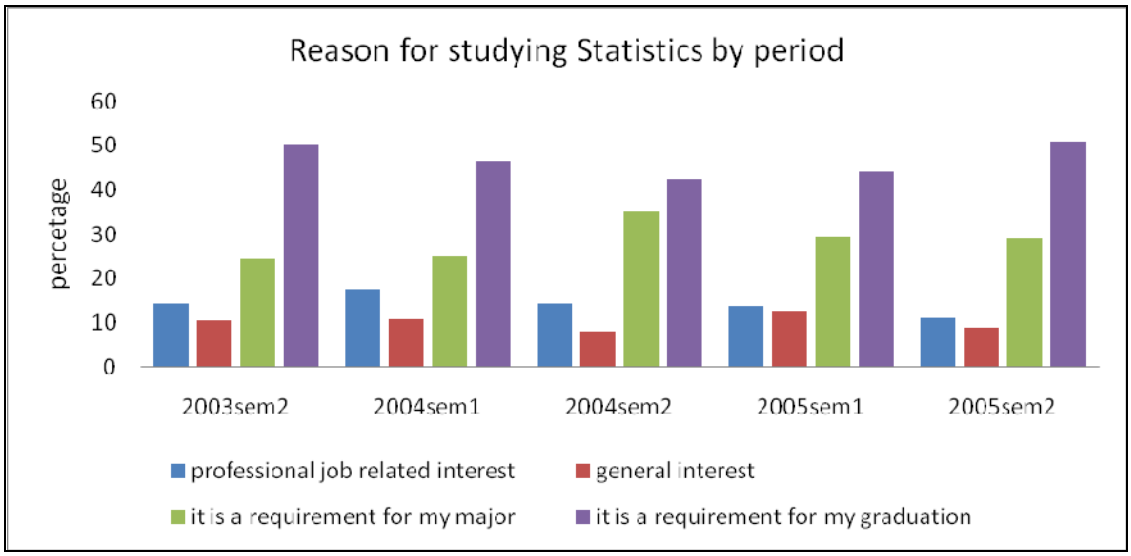


Figure 33: Reason for studying statistics by period

Figure 33 is a bar chart summarizing reasons for studying Statistics by semester. Across periods, the majority of the students pursued IS to fulfill graduation requirement followed by students who were taking the course as a major requirement and a few of the students pursued the course because of a general interest.

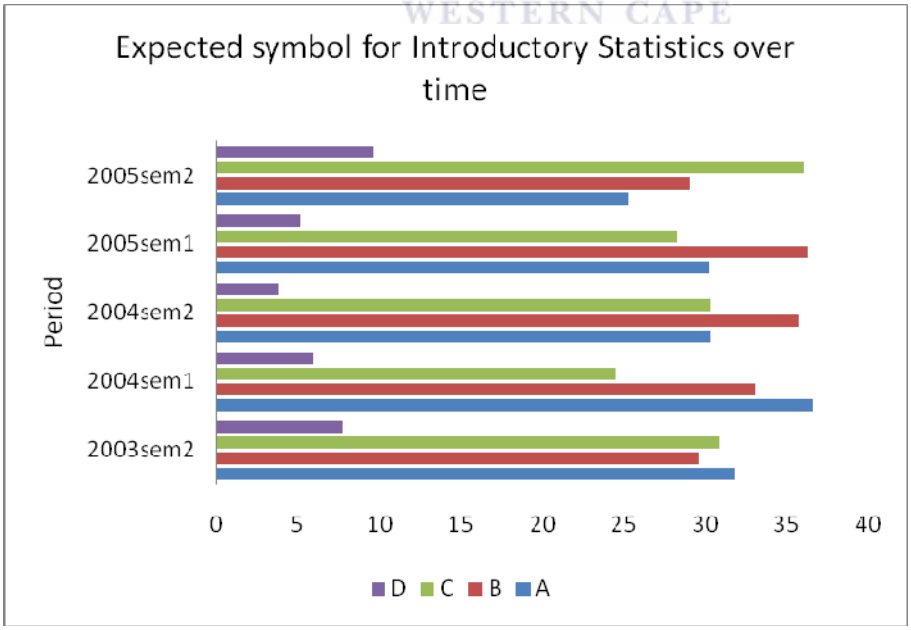


Figure 34: Expected symbol over time (weights of symbols explained in Chapter 3)

Figure 34 is a graphical presentation of the students' perceptions on the symbol they expected or wished to obtain when they started the course. The 2004sem1 students were optimistic as the majority thought they would get an A symbol (36%), whilst 30% of the group thought they would obtain a B symbol. Overall, the majority of the students expected a B symbol (32%) followed by an A symbol (31%) and a C symbol (30%). Students who expected to pass with a D symbol were in small percentages across periods.

In response to the question "*How easy or difficult do you expect this course to be?"* the majority did not expect it to be easy. All the students who selected the 'easy' option over time were less than ten percent across periods. Overall the students chose the '*not easy*' option (50%), followed by the '*not so difficult*' option (42%). Although the two options '*not so easy*' and '*not so difficult*' seem similar, they are not in the sense that one measures the extent to which the course is easy, whilst the other one measures the extent to which the course is difficult.

5.2.3 PRE-QUESTIONNAIRE COMMENTS

A total of 665 students responded to the comments section where 319 comments (48%) were course related, 181(27%) were comments on the questionnaire, 150 (23%) were comments on the online tutorials and computers, 10 (2%) of the students indicated they had nothing to say and a few of the comments were related to the lecturer, classes and tests. Of the 319 comments that were course related, 238 (75%) were positive, 56 (18%) negative and, 25 (8%) were mainly student concerns. The majority of the students with positive responses were looking forward to doing the course. Some, although they had never done Statistics, were excited and hoped to obtain distinctions. Some of the students who responded positively did acknowledge that the course seemed challenging and would need hard work. Some of the course comments are listed below:

> *"This is a challenging course and in order for me to pass it I have to attend classes and practice it all the time".*

"I am somewhat afraid about doing the course because I have heard from many people that it is difficult and many of them have failed. However, I am willing to make an effort in order to be successful at the end of the day".

Comments on the pre-questionnaire were largely positive (75%) with only negative (15%). Some of the students were critical when answering the questionnaire and, indicated that it was too long. Some thought the questionnaire would give the researcher an understanding of their background in terms of computer skills and the course itself and some thought it was irrelevant and a waste of time. Some of the questionnaire-related comments are listed below:

"*I think this is a good thing so that the lecturers know how to deal with certain people and for the tutors to know which people to help most".*

"The questionnaire is quite detailed…and somewhat long…Please shorten it".

Comments on online tutorials and computers were positive (77%), negative (10%) and some indicated student concerns (13%). Positive comments from students indicated that students thought the tutorials could enhance their understanding of the course and would empower them in terms of computer skills. Negative comments were from students who were scared of computers and thought the use of computers was a redundancy. Some of the students, although they were pro-computers, were concerned about the number of students registered for the course. The concerned students thought the ADM was small and there were too few computers which would result in them not meeting the deadlines. Some of the concerned students thought of students who were disadvantaged and were staying far from campus which would impact on the tutorials. Working students had concerns as well. They indicated that some of the employers blocked access of programmes/software that was not work-related and this would impact on the online tutorials and consequently, their marks. Some of the comments are listed:

"I would prefer to do my tutorials the normal way, with paper and pen! This is quite efficient but not for people who do not like computers that much".

"The fact that we have to do these tutorials on our own teaches us independence, but at the same time is aggravating because we are a large group of B.Comm. students doing statistics therefore there is a shortage of computers. Making more computers available or providing a good system so that all students have an equal chance at the computers will make it much easier for everyone".

5.3 POST-QUESTIONNAIRE ANALYSIS

Feedback on the course was captured using the post-questionnaire administered online on completion of the last tutorial. The data collected using the post-questionnaire was purely qualitative in nature. It is shown in Figure 32 that the post-questionnaire consists of three sections. The first section explored student expectations about learning modes and processes. Students, were required to select a response that suited them most, from four scaled options '*strongly agree, agree, disagree, strongly disagree,*' where strongly agree indicated satisfaction/like and strongly disagree indicated a dissatisfaction/dislike. Students were asked to indicate the symbol they expected to get selecting either an 'A', 'B', 'C', 'D' or 'other' indicating a symbol lower than a D. The question on expectations and attitudes asked the students about the level of difficulty of the course, presenting them with options '*easy*', '*not easy*', '*not difficult', 'difficult*'. The second section of the post-questionnaire, questions eight to twelve, explored student perceptions on the use of the computers post to doing the course, (See Appendix C6_4 for the options on current feelings on the use of computers). The last section had eight questions, exploring equipment access, mainly focusing on tutorials and the number of times a student did tutorials. Questions 14 to 17 dealt with the equipment access, the questions required students to select one of the rankings '*always', 'occasionally', 'seldom', 'never'*. Question 19 explored student preferences and focused on online tutorials and classroom tutorials where students had to select the tutorial type that suited them most. A comments section followed the ranked sections. Both quantitative and qualitative in nature and the responses were presented in graphs and reports (numbers represent the percentage of responses).

Fewer students completed the post-questionnaire compared to the pre-questionnaire. A total of 1001 students submitted the post-questionnaire. Table 6 is a breakdown of the student

response numbers by semester. All the chi-square tests were significant at the 0.05 percent significance level. It was believed that the number of respondents influenced the chi-square tests, for that reason, the chi square values were not reported.

Table 6: Comparison of respondents between the pre- and the post-questionnaires over time

Period	Pre-questionnaire	Post-questionnaire	Number of students
2003sem2	907	523	1430
2004sem1	263	46	309
2004sem2	500	262	762
2005sem1	139	66	205
2005sem2	429	104	533
Total	2238	1001	3239

Table 6 presents the responses of students over time. More students completed the pre-questionnaire compared to the post-questionnaire. This might have been due to the fact that students could not proceed to do their tutorials unless they completed the pre-questionnaire. Added to this, students were naïve when they started the course, by the time they had to complete the post-questionnaire, they had learnt all the tricks of bypassing some of their responsibilities; resulting in a poor response.

5.3.1 RANKED POST-QUESTIONNAIRE ANALYSIS

The post-questionnaire had two sections: closed questions that were ranked and an open-ended comments section. The full details of the structure of the post-questionnaire can be obtained from Section 5.3. In this section, the analysis of the ranked questions is covered.

Students in the second semester of 2004 seemed to have gained confidence towards mastering of the course. The majority thought they would obtain an A-symbol (40%) whilst

only a few thought they would obtain the lowest passing symbol (E, 7%). In the first semester of 2004, both the first and second semesters of 2005, the majority of the students thought they would obtain a B-symbol, 40%, 35% and 35% respectively. The majority of the students in the second semester of 2003 thought they would obtain a C-symbol (33%), (see Table 105, Appendix C6_4).

The majority of the students were of the opinion that the course was neither '*easy*' nor '*difficult'* across semesters (82% in 2003sem2, 85% in the first semester of 2004, 67% in the second semester of 2004, 64%, in the first semester of 2005 and 68% in the second semester of 2005 when the two options '*not easy'* and *'not so difficult'* were collapsed. (see Table 106, Appendix C6_4).

The students' perceptions on using computers were positive across semesters (there was an increasing trend from '*threatening*' to '*not threatening*'). The percentage of the not threatening option was above forty percent for all semesters. The percentage had a decreasing trend from 2003sem2 to the second semester of 2005, (see Tables 107 to 112, Appendix C6_4).

Most of the students were able to work out the problems without assistance by selecting the '*occasionally*' category (60% in 2003sem2, 79% in 2004sem1, 64% in 2004sem2, 60% in 2005sem1, 66% in the second semester of 2005). Over the study period, a decreasing pattern was observed as students changed their response from '*always'* to '*never'* able to work out the problems without the assistance of a tutor. This indicates that the students were positive about their work, (see Table 117, Appendix C6_4).

The results revealed the existence of a general problem with tutorial access across semesters. The majority indicated that they occasionally had problems in accessing the tutorials (55% in 2003sem2, 52% in the first semester of 2004, 37% in the second semester of 2004, 44% in the first semester of 2005, 45% in the second semester of 2005). It would have been

interesting if the question had had a follow up question with the type of problem the students experienced, (see Table 115, Appendix C6_4).

The majority of the students were in favour of the use of online tutorials compared to classroom tutorials across semesters, 68%, 79%, 68%, 81% and 59% from the second semester of 2003 to the last semester of 2005, (see Table 119, Appendix C6_4).

About 91% of the study group indicated that they enjoyed doing the tutorials to enhance their learning, (see Table 118, Appendix C6_4).

5.3.2 POST-QUESTIONNAIRE COMMENTS

The post-questionnaire comments were on the web-based tutorials, the TestWriter©, the lecturers, the course-notes and notes in general. The majority of the students were more open to comment on the tutorials, the notes and the course in general. Students indicated a great satisfaction on the web-based tutorials. They indicated that the tutorials enhanced their learning, improved their understanding of the course and, the fact that they could do the tutorials over, prepared them for tests and examinations.

> *"Online tutorials enhanced my learning and make the stats very easy! If online tutorials were not an option, I would have found statistics difficult".*
>
> *"If online tutorials were not integrated I would have failed my statistics. Online tutorials are very helpful and I hope you will continue using them. I like Statistics very much and even consider majoring in Statistics".*

Some of the students indicated that the tutorials were effective compared to what they were taught in class and the help received from tutors.

"These tutorials have replaced my lecturer who I did not learn anything from. I never attended class because of him and the tutorials are the only thing that gave/gives me hope of passing this course. Thank you online tutorials".

"Keep online tutorials and chase tutors away".

Although the students acknowledged the usefulness of the web-based tutorials, some complained about the laboratory and condition of the computers which tended to hinder the effect and purpose of the tutorials.

"There were quite a few problems I experienced with the tutorials".

"These computer tutorials are good practice, but damn tutorials are not programmed correctly, like some incidents you do all the correct calculations and still do not get your mark of 100. I am very disappointed in this program although it is good help for tests and examination, daaaaamn".

There were students who thought the laboratory was overcrowded and suggested the need for more computers, extended laboratory hours, more tutors to assist in the laboratory or that the online tutorials be replaced by classroom tutorials until such time that the system errors were fixed:

"I would like to suggest more computers be available to the students. It seems as if there are hundreds, if not less than 50 computers. This makes it difficult to get tutorials on time. I remember being there for almost 2.5 hours waiting for a computer. More assistants to help with problems would also be helpful".

"I think there should be more computers in the laboratory. The tutors should be of more help and lecturers should make sure the computers are working properly. This will lead to the laboratory not being so full and everyone will have a fair chance to do the tutorials".

Not every student was pleased with the use of the web-based tutorials. Some of the students wanted them to be completely removed from the course, and thought they were a waste of time. The following are some of the negative comments:

"Online tutorials are inconvenient and time consuming and not all the assistants are as helpful as they should be".

"I don't like these online tutorials because I find them very difficult and not so easy to work on. If I fail Statistics, I will blame the online tutorials and test".

There were a few comments on the lecturers, both positive and negative. Some indicated a need for the lecturer teaching style to improve:

"I would like to thank the lecturers for their teaching strategies....."

"Thank you for your nice lecture".

"I think the lecturers should make the lectures more exciting and not as they are".

There were also comments on the course-notes and course in general. The majority of the students seemed to have enjoyed Statistics as a course, some acknowledging that the course impacted positively on them:

"Statistics is great".

"I like the course very much, keep it up".

"Statistics is my greatest subject and I like it the most".

"Nothing except it was nice and good to do Statistics 132, thanks".

"I really enjoyed everything about the course. To start with, the lecturer was well

organized and prepared and the online tutorials as well as the lecture and test materials were carefully selected and up to our needs. I can lastly say that carry on with the good work and good luck guys".

Whilst some hated the course:

"Statistics must be banned..."

"I don't like Statistics".

There were students who indicated that the course needed one to work hard to succeed:

"I think statistics is not that difficult but needs hard work and understanding the theoretical applications of Statistics in everyday life...."

"It has been difficult but helpful. I did put in a lot of work so I expect to pass. I must say that I do not intend on doing the course anytime soon".

There were indications that improvements were needed in the course:

"I found the course not easy but also not difficult if upon effort in our work but I also would like to make a request to the department that they should employ laboratory assistants who are well trained and able to assist students in an effective way and students will produce good results at the end of the year. I enjoyed the programme thank you. I wish that my opinion will be taken into consideration by the department".

"I think this is a great course. There just needs to be improvement of communication between the lecturers, tutors and students. I personally enjoy, especially the online tutorials although they can be a pain in the neck and a lot of frustration and headaches. Anything else that improves the whole environment around the course would be highly welcomed by all. All the best for the future".

Although there were not many comments on the course-notes, the few that were indicated, were not positive. There were indications that the course-notes were not user friendly:

"Can information in the notes be made more understandable? Especially formulas".

"I would have understood the work better if the course reader was clearer!"

5.3.3 PRE- AND POST-QUESTIONNAIRE COMPARISONS

The objective of the pre-questionnaire was to explore and capture student readiness prior to doing the course in terms of computer knowledge, expected symbol and perceptions about the course and equipment access. The post-questionnaire's objective was to trace change in perceptions with respect to the similar listed items in the pre-questionnaire. The following section is a cross comparison of the pre-post-questionnaire responses presented in the form of graphs, tables and reports in percentages.

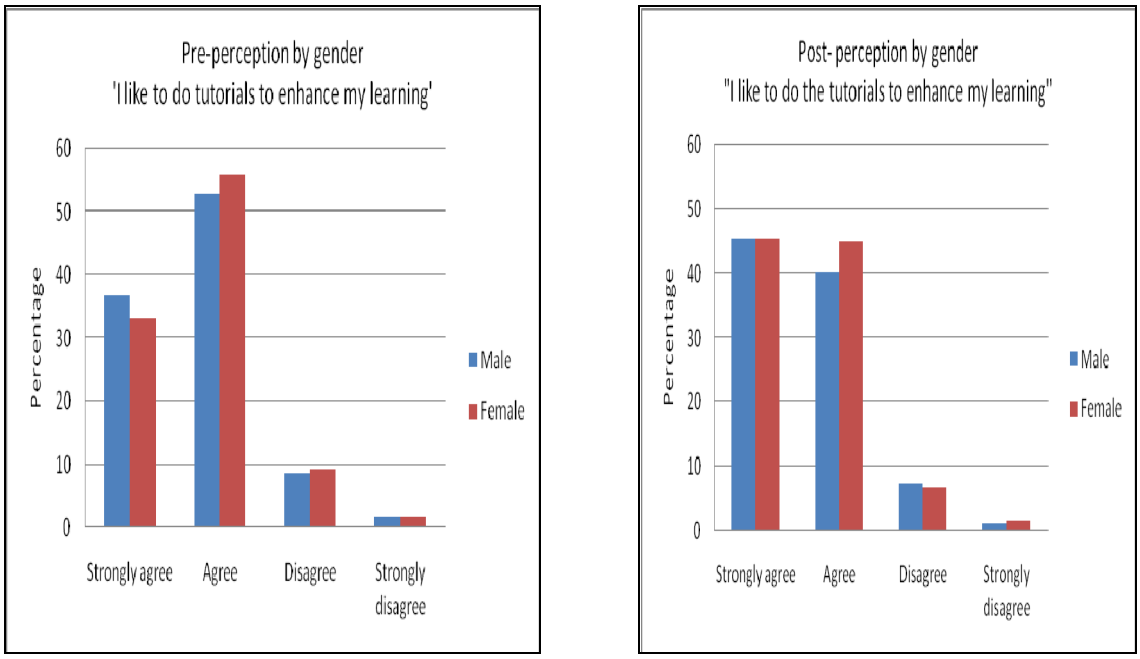


Figure 35: Perceptions by gender

Both genders liked to do the tutorials as indicated by the distribution of student perceptions in Figure 35. Both males and females strongly agreed that they liked to do the tutorials to enhance their learning. More students strongly supported this claim towards the end of the course; above 40% for both genders, whilst at the beginning both genders indicated '*strongly agreed*' less than 40% of the time. However males seemed to be more adamant compared to females at the beginning in terms of supporting the claim whilst there was no observable difference towards the end of the course. There was a drop in student perceptions for the '*Agree*' option for both groups; above 50% for both groups agreed that the tutorials enhanced their learning at the beginning of the course, whilst this dropped to below 50% towards the end of the course. However student perceptions towards the online tutorials remained positive both before and after exposure to the course; there was a decrease in the percentage of students who selected the '*Agree*' option towards the end of the course. More than 80% of the students were positive ('*Agree*' and '*Strongly agree*' percentages) and indicated that the tutorials to enhanced their learning.

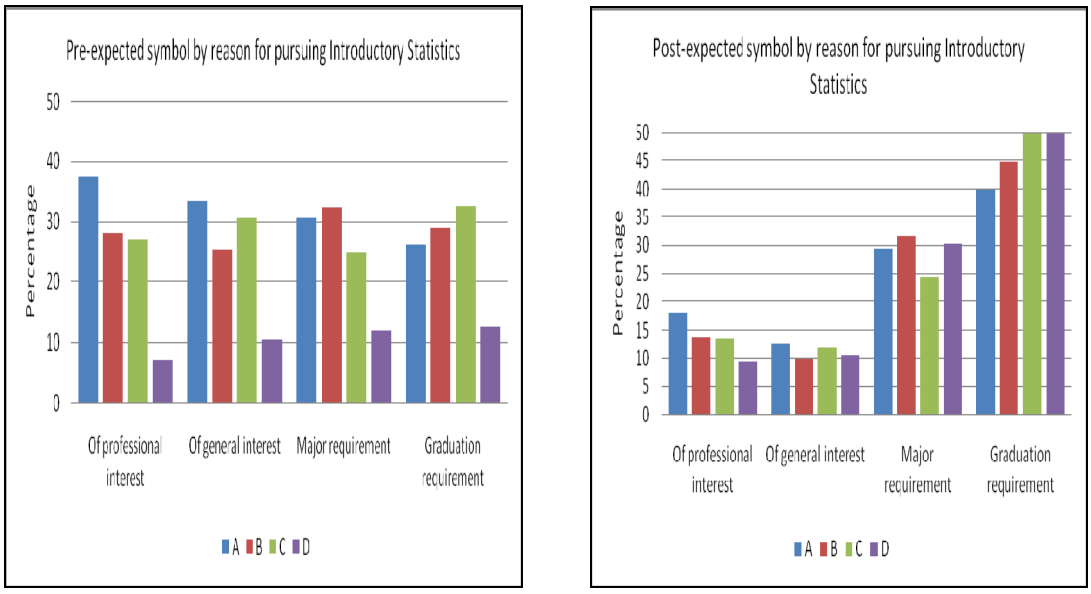


Figure 36: Comparison of the pre- and post-questionnaire expected symbol by reason for pursuing IS

In Figure 36, the possibility for a change in the perceptions of students after doing the course is explored. At the beginning of the course, the students seemed enthusiastic about pursuing the course. Students who thought they would obtain a D symbol were less than 15%. The majority of the students thought they would perform above average. This is shown by the high percentage of students who thought they would get an 'A', 'B' or 'C'. However, there was a change in student perceptions as the course neared the end. Students who were pursuing Introductory Statistics due to a professional interest were more enthusiastic at the beginning of the course, above 35% of these students hoped to get an 'A'symbol, above 25% expected to get B's and C's and a few expected to obtain a D. Towards the end of the course, above 15% of the same group expected to get A's, below 15% expected to obtain B's or C's and the percentage of students who expected to obtain a D had increased slightly although below 10%. When observing students who had taken the course because of a general interest, the majority expected to obtain good grades, and only a few (10%) expected to obtain an average symbol. Students who were doing the course to meet a graduation requirement were more motivated towards the end of the course than they were at the beginning; there was an improvement in the expected symbol.

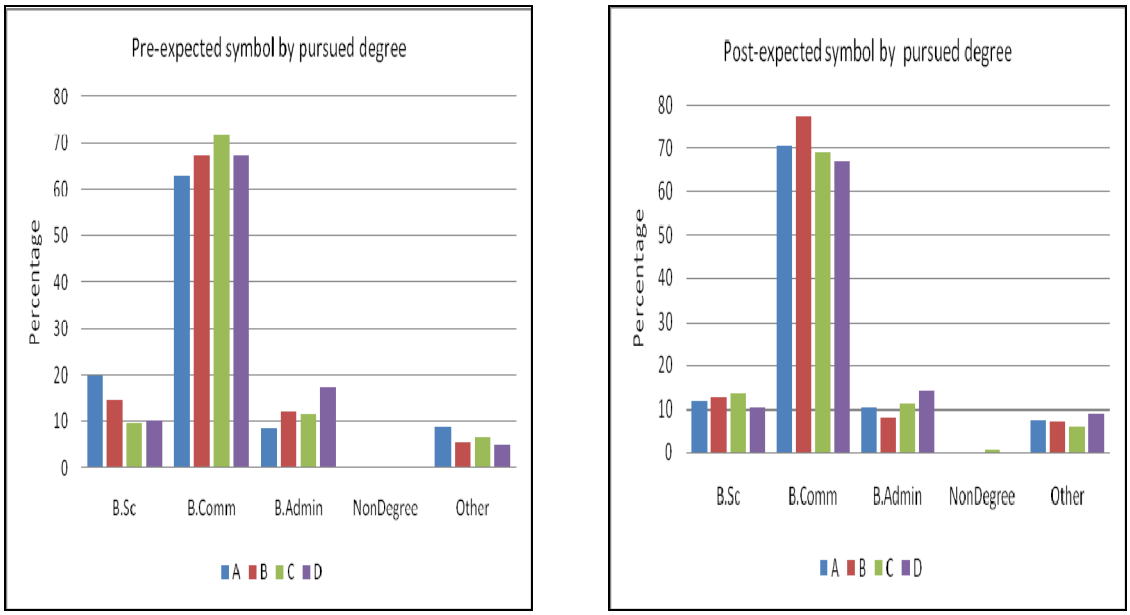


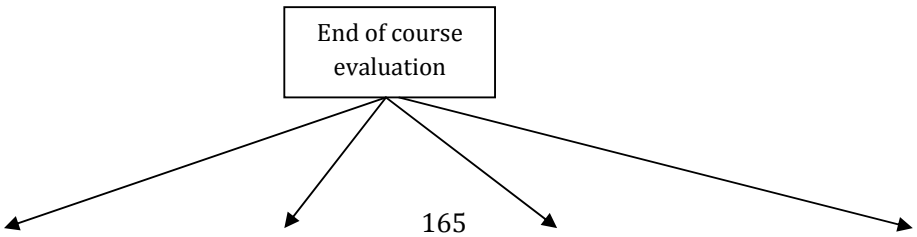
Figure 37: Symbol distribution of pre-post expected symbol by pursued degree

Figure 37 is a comparison of the symbol distribution of the expected symbol at the beginning of the course and towards the end of the course. Overall, there seems to have been a change in the expected symbol by 'pursued degree' after exposure to the course. There was a decrease in the number of students expecting to obtain symbols A and B towards the end of the course for students registered for the B.Sc. degree. On the other hand, students registered for the B.Admin. degree, although their symbol expectancy had decreased towards the end of the course, was not as drastic as that of the B.Sc. students. The symbol expectancy decreased for the B.Comm. students; there was an improvement in the number of students expecting to obtain a B symbol compared to those who expected to obtain a B at the beginning of the course. When observing students registered for the B.Admin. degree; the symbol expectancy had decreased with a slight improvement in the percentage of students who hoped to obtain distinctions. There was a slight increase in the expected symbol for students registered for degrees other than the listed although the percentage remained below 10%.

Age groups were used to explore student feelings towards the tutorials; all age groups enjoyed the tutorials which enhanced their learning over time, (see Table 123, Appendix C6_4).

5.4 END OF COURSE EVALUATION ANALYSIS

The students completed an evaluation towards the end of the course. The end of course evaluation had four sections: tutorials, tests, lecturer, course-notes and the course in general. Each of the sections had rankings from '*strongly-agree'* to '*strongly disagree'*, sometimes rankings '*poor'* to '*excellent'* that students had to choose from to indicate their satisfaction/dissatisfaction. The ranking sections were followed by comments. The lecturer and web-based tutorial comments were not as comprehensive as the course-notes and course in general comments. The course-notes and course in general comments were a combination of the tests, the tutorials and the lecturer items. As a consequence, there were three themes that were captured from the codes created using the original students' comments for all four sections. Figure 38 tries to give the reader a summary of all the processes done to capture student satisfaction and perceptions, with regard to the course using the end of course evaluation.



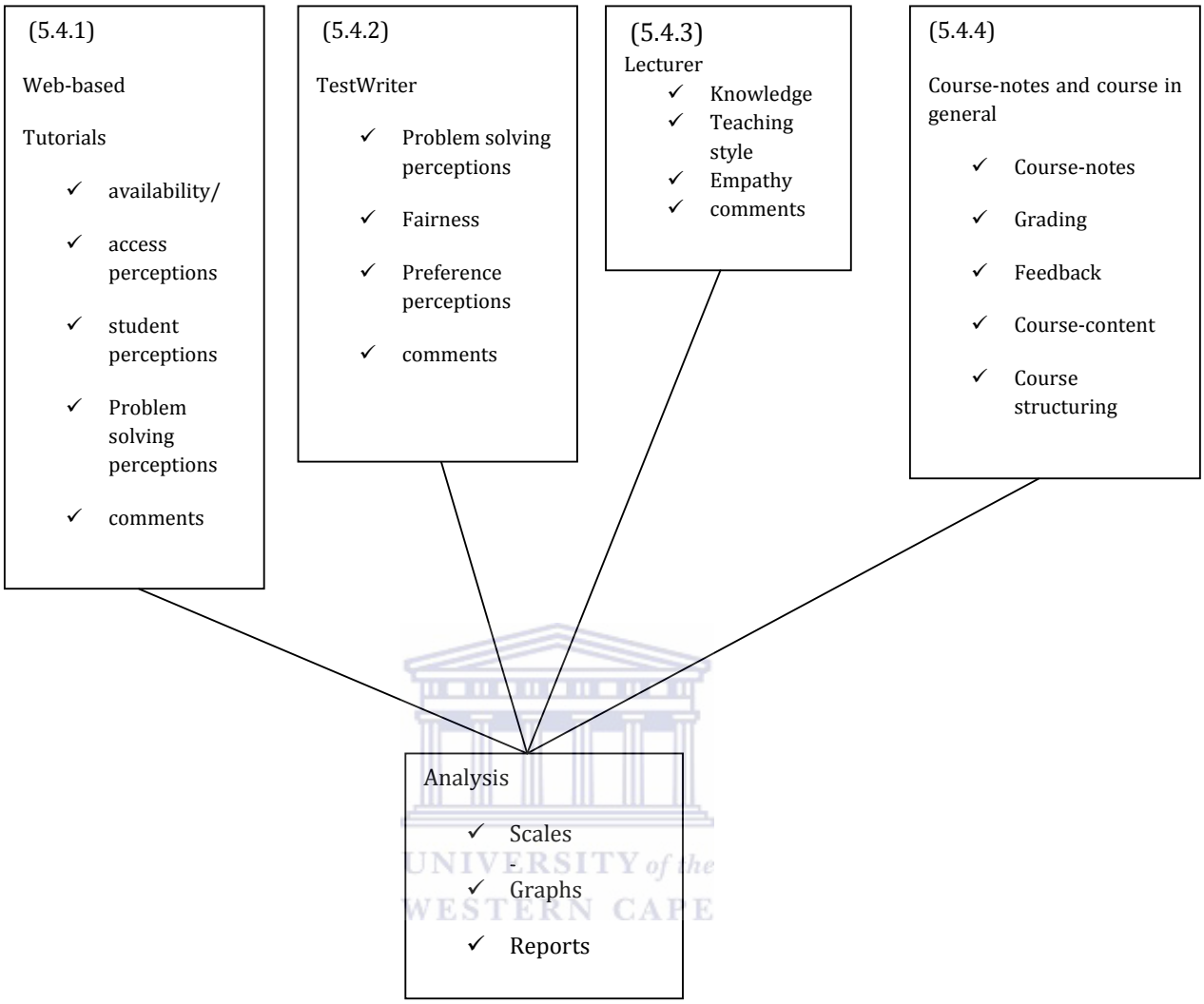


Figure 38: Summary covering the breakdown of the end of course evaluation data-capturing and analysis

5.4.1 WEB-BASED TUTORIAL ANALYSIS

Students submitted four sets of web-based tutorials as part of the course requirement. The objective to introduce students to the tutorials was to enhance their learning, for revision purposes and exposure to technology. Each student had the opportunity of exploring the questions as each student got a different dataset each time they accessed the tutorials. Students were also given the opportunity to repeat the tutorials to improve their marks as much as they wanted. The option, to allow students to improve their marks, made the tutorials

one of the most important tools of learning enhancement and revision. Senior students are on duty in the ADM laboratory, to assist with challenges that the Introductory Statistics students might have encountered whilst attempting the tutorials.

The evaluation covered three concepts when exploring student satisfaction and perceptions on the tutorials, access and computer availability, tutor skills and the extent to which the tutorials could assist in improving their problem-solving skills. A comments section was also included, where students could report anything relating to the ADM laboratory as a resource, computers, tutorials and tutors who were assisting in the laboratory.

There were eight questions aimed at evaluating and monitoring the effectiveness of the tutorials, the first question required the students to rank the availability of computers in the ADM laboratory using rankings '*poor - excellent*', where '*poor*' indicated dissatisfaction and 'excellent' indicated satisfaction. The second question, was a follow-up of the first question and prompted the students to select an option they thought was best as to why they thought computer availability was poor or excellent in the ADM laboratory. Questions three and four evaluated the usefulness and knowledge of the tutors. Rankings '*strongly disagree', 'disagree', 'neutral', 'agree', 'strongly agree'*, were used to evaluate the extent to which the tutors could assist the Introductory Statistics students. Question four tried to capture student perceptions regarding the tutor knowledge level. A five-point scale ranking poor–excellent was used to capture the information. In questions five and eight, students were presented with options '*strongly disagree', 'disagree', 'neutral', 'agree', and 'strongly agree'* from which to select one. Question five explored perceptions on whether students thought the tutorial material improved their understanding of the subject, whilst question eight prompted students to indicate whether or not they thought the tutorials were effective in covering what was taught in the notes. The comments section of the tutorials prompted students to express their views on the value of the web-based tutorials. The section to follow is the analysis of the web-based tutorials.

5.4.1.1 RANKED WEB-BASED TUTORIALS

In Question five, students were asked to indicate whether or not the tutorials and self-help material on KEWL was helpful in improving their understanding of the subject, using rankings *'strongly disagree', disagree', neutral', 'agree*' and *'strongly agree'*. The majority of the students tended to settle for the middle *'neutral'* and *'agree'* options across periods, (see Table 9, Appendix C2). On collapsing *'strongly agree with agree'* to indicate *'true'* and '*strongly disagree*' with '*disagree*' to indicate 'not true', students did think the tutorials improved their understanding of the course.

(i) Tutorial/Access-related Perceptions

Overall, the majority of the students, about 39% ranked the availability of computers in the ADM laboratory '*poor*', , 46% in 2003sem2 and 40% in 2004sem1 r ranked the availability of computers in the ADM laboratory '*poor*', whilst 40% in 2004sem2 and 38% in 2005sem2 ranked the availability of computers in the ADM laboratory as '*average*', (see Table 1, Appendix C2).

Many of the students in semesters 2003sem2 (64%), 2004sem2 (53%) and 2005sem2 (43%), thought that whenever computers were not available in the ADM laboratory, it was due to too few computers, (see Table 3, Appendix C2).

(ii) Learning enhancement Perceptions

Students were asked to indicate whether the questions in the tutorials were reflective of what was taught in class by selecting one of the options '*strongly disagree*', '*disagree*', '*neutral* , '*disagree''* and '*strongly agree*'. The results revealed that they mostly agreed with the statement. This was reflected in the student responses who selected the '*strongly agree'* option in the second semester of 2003, both semesters of 2004, and both semesters of 2005, (62%, 32%, 55%, 58% respectively. The majority of students in the second semester of 2003 selected the '*agree'* option (see Table 11, Appendix C2).

Overal 38% of the students selected the '*neutral*' option and 33% selected the '*agree'* option when asked to indicate whether they thought the tutorials and self-help material on KEWL was helpful in improving their understanding of the subject, (see Table 9, Appendix C2).

(iii) Tutor-related perceptions

Above 34% of students were '*neutral*' when asked to rank the helpfulness of the tutors, (34% in 2003sem2, 35% in 2004sem2, 30% in the first semester of 2005 and 37% in 2005sem2). Above 30% of the students in 2004sem1 thought that the tutors were not helpful at all, (See Table 5, Appendix C2).

The majority of the students in semesters: 2003sem2 (38%), 2004sem1 (92%) and 2004sem2 (39%), rated tutor knowledge level as 'average' whilst students in the latter semesters rated tutor knowledge level as '*good'* (34% in the first semester of 2005 and 38% in 2005sem2, see Table 7, Appendix C2). This may be due to the fact that ongoing training took place over semesters.

5.4.1.2 ANALYSIS OF THE COMMENTS ON THE WEB-BASED TUTORIALS

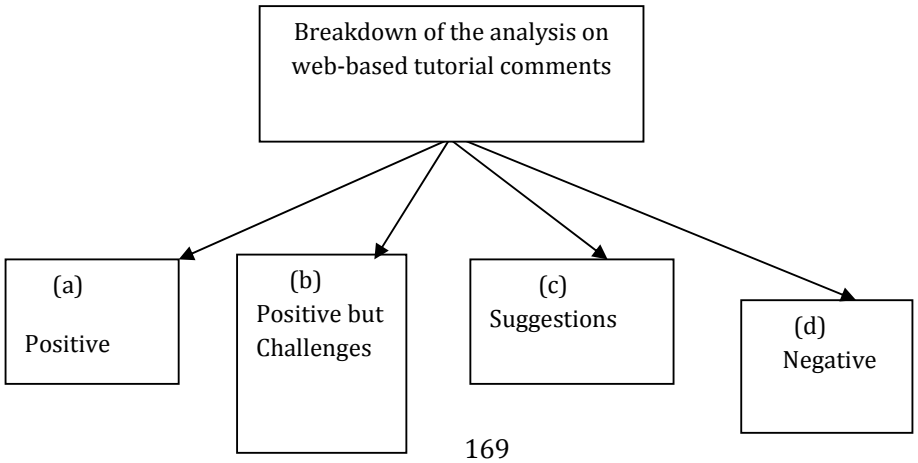


Figure 39: Outline of the analysis of the web-based tutorial comments

An outline of the comments on the web-based tutorials and students' perceptions on the ADM laboratory and the tutors assisting in the laboratory is presented in Figure 39. Comments were categorized as either positive, positive with challenges, suggestions and negative. A total of 479 students commented on the value of the tutorials out of 538 who responded to the comments section, with 59 students having nothing to say about the tutorials. Of the 479 students who had comments 44% were positive about the value of the tutorials, 13% although positive about the value of the tutorials, thought there were challenges that needed to be addressed, (18%) had suggestions that would optimize the effectiveness of the tutorials, 18% had suggestions and 19% were completely dissatisfied.

Students who thought tutorials added value to their learning experience but had challenges, listed these challenges as laboratory time, the number of computers, laboratory capacity and access outside campus. They indicated that addressing these challenges would result in optimum satisfaction.

On the other hand students who were completely dissatisfied did not deviate from the challenges listed by the satisfied students. They were also concerned about the laboratory time, the efficiency of the computers, the laboratory capacity and the tutors. The majority of the completely dissatisfied students were technologically challenged and thought the use of computers put them under pressure. These are some of the student comments:

> *(a) Complete satisfaction:* "I think it was great because you can do tutorials over and over again until you are satisfied with your work and this makes you learn from your mistakes"

(b) Satisfied but challenges exist: "The internet tutorials are great and helpful most of the time. My only disappointment is that there are a few computers for the number of students doing IS. Also there are time table clashes which prevent us from completing our tutorials. Sometimes tutors are not helpful, do not get me wrong, these are a selected few"

(c) Suggestion: "I think there should be at least two hours a day just for the tutorials, because sometimes when you want to complete your tutorials, there is a class in progress which is very disturbing. Laboratory assistants should be taught and encouraged to assist when needed and being on duty for that matter".

(d) Complete dissatisfaction: " The internet tutorials were a waste, due to the fact that we could only access the tutorials in the ADM labs. Only when there were problems were we able to access them in other labs. Even if we could, we still needed the tutors which were only available in the ADM lab."

5.4.2 RANKED TESTWRITER© ANALYSIS

TestWriter© is a programme that was used to write online tests. Each student is presented with a unique test, although the level of difficulty for all tests was the same. When TestWriter© was introduced, the objectives were to reduce cheating, to minimize the administration and to expose students to technology. A timer is set as soon as a student begins the test, to remind a student about the time left to complete the test. An important and unique feature of TestWriter© is for students to go back and change their options when they see a need to do so. Students then submit their tests and no further changes can be made. Students get their marks immediately after completing the test, which is an important feature of TestWriter©. Students on completion of the test are also presented with their incorrect options as well as the options they should have selected so as to learn where they went wrong.

There were six questions used to evaluate and monitor student perceptions and views on the value of TestWriter©. The first three questions explored student perceptions on the fairness and problem-solving skills assumed by the researcher to have been considered whilst compiling the test questions. The last three questions monitored student preferences and explored whether students would prefer to write their tests on paper or continue with the TestWriter©. There was a comments' section evaluating student perceptions on the usefulness of TestWriter©. All the TestWriter© questions were ranked using the five point scale '*strongly disagree'*, '*disagree'* , '*neutral', 'agree', 'strongly agree'*, where '*strongly disagree'* indicated complete dissatisfaction whilst '*strongly agree'* indicated complete students' satisfaction.

The sections to follow present the analysis of the TestWriter© analysis in graphs and reports in percentage form. Some of the student comments have been included to expose the reader to the raw perceptions of the students with respect to the TestWriter©.

5.4.2.1 RANKED TESTWRITER ANALYSIS©

The questions discussed in Section 5.4.2 were answered using the quantitative part of the evaluation. There were six questions that were based on the electronic test writing system. In this section, the quantitative responses of the students are discussed. When asked to rate the degree of difficulty of the questions on TestWriter©, the majority of the students thought the level of difficulty was *'neutral'* overall 52%. In exploring the student responses by semester, 62% in the second semester of 2004, and 54% of the students in the second semester of 2005 were not sure of whether or not the degree of difficulty was fair by selecting the '*neutral'* option whilst, 35% of the students in the first semester of 2005 '*agreed'* that the degree of difficulty in the test was fair, (see Table 13, Appendix C3).

Students were mostly of the opinion that the questions asked in the test reflected the coursework. This was shown by the ranked responses which were centered between the '*agree'* and the '*strongly agree'* options, (see Table 15, Appendix C3)

5.4.2.2 ANALYSIS OF THE COMMENTS ON TESTWRITER©

The TestWriter© section of the end of course evaluation had a comments section where students were open to provide suggestions both positive and negative as well as perceptions with respect to the functionality and usefulness of the TestWriter©. The comments on TestWriter© are summarized in Figure 40 and a full discussion follows after Figure 40.

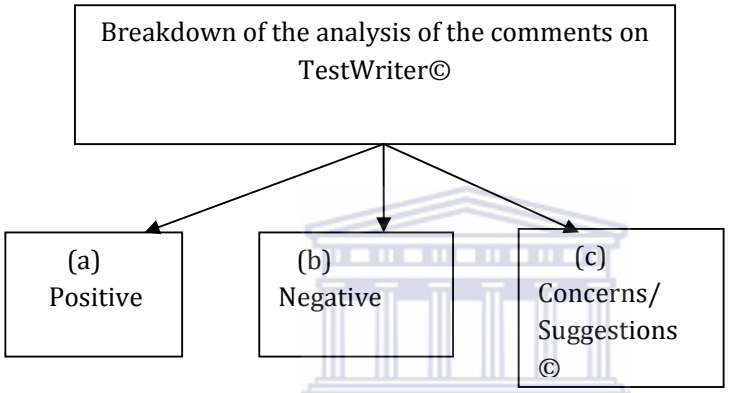


Figure 40: Outline of the analysis of the TestWriter© comments

Figure 40 is a presentation of the outline of the TestWriter© comments in themes. A total of 148 out of the 159 students who responded to the comment's section commented on TestWriter© whilst 11 indicated they had nothing to say. Many of the students had positive attitudes towards the TestWriter© (46%). They thought it was good and saved paper. Some thought it was effective, easy and exposed them to technology. Some of the students who were positive about the TestWriter© thought the paperless idea was great and the fact that they obtained immediate feedback impressed them. Some indicated that it reduced cheating as each student was presented with a different test.

There were students who although acknowledging the worthiness of the TestWriter©, were not completely satisfied (28%). They questioned the efficiency of the software and were against the timer. Some of the students suggested a querying system as they feared they might have lost marks unnecessarily. There was a group of students who suggested optimizing the

effectiveness of TestWriter© (14%) by increasing the test time and correcting the system errors as they were of the opinion that the test time was not sufficient and that they were not getting appropriate marks.

A few students were completely dissatisfied and negative about the electronic testing system (12%). Reasons pertaining to the dissatisfaction as indicated were: the time limit and preferred to write their test on paper. Some of the students who were negative were technologically challenged and thought the electronic test put them under pressure compared to a paper test. Some of the students' negative students were not against the electronic testing system, but were completely against multiple choice testing.

5.4.3 LECTURER ANALYSIS

The end of course evaluation had two sections aimed at extracting feedback on the lecturers from the students. There were ranked questions and an open-ended comments section. The analyses of the two sections are done in Sections 5.4.3.1 and 5.4.3.2.

5.4.3.1 ANALYSIS OF THE RANKED LECTURER-RELATED PERCEPTIONS

When asked to rate the lecturer knowledge level using rating *'poor', 'average'* 'good', '*very good*', '*excellent'*, the students were positive across periods. A few thought that the lecturer's knowledge level was *'excellent'*. Thirty-seven percent in the second semester of 2003 and 43% of the students in 2005sem2 thought that the lecturer knowledge level was *'good'*. In 2004sem1, 2004sem2 and 2005sem1, the majority of the students ranked the lecturer knowledge level as '*very good*', 50%, 41% and 37% respectively, (see Table 24, Appendix C4). Students were also positive about the lecturer teaching style, (see Table 26, Appendix C4).

There were no clear patterns across periods as to whether the lecturer responses to questions were clear and complete. Although the majority of the student responses fluctuated between

the *'neutral'* and *'agree'* options, the majority of students in the first semester of 2004 selected the '*strongly disagree'* option (66%). In periods 2003sem2, 2004sem2, and 2005sem2, the majority of the students selected the *'neutral'* option, 27%, 35% and 31% respectively. Most of the students in the first semester of 2005 *'agreed'* that the lecturer responses to questions were clear and complete (see Table 28, Appendix C4).

5.4.3.2 COMMENTS ON LECTURERS

Student's comments on lecturers were grouped into positive, positive with challenges, suggestions and negative patterns as presented in Figure 41. The full analysis of the lecturer comments follows after Figure 41.

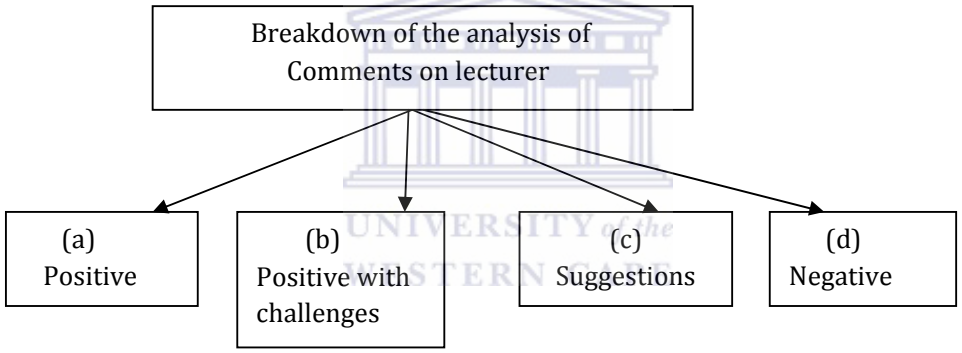


Figure 41: Outline of the analysis of lecturer comments

Lecturer comments were grouped as positive, positive with challenges, suggestions and negative as shown in Figure 41. Of the 571 students with feedback on the lecturer comments section, 466 had comments whilst 106 indicated that they had '*no comment*'.

(a) Positive Comments

About 59% of the students indicated complete satisfaction with the lecturer. Some of these comments suggested that the lecturer was '*knowledgeable*', '*good*', '*motivating*', '*committed*' and '*well-organized*'.

(b) Positive with Challenges

When students were asked to comment on the '*value*' of the lecturer, 23% indicated that they were satisfied but thought there could be some improvements. This group of students thought the lecturer was too fast and suggested that presenting something different from the course reader/ slides would be more effective.

(c) Suggestions

Some of the student's positive suggestions were coupled with challenges (38%). This group of students indicated that the fast pace of the lecturer resulted in confusion and difficulty in understanding important concepts. There were suggestions from students (10%) on how to add value to the lecturing process; lecturing at a steady pace, interacting with students whilst lecturing, adding and discussing more practical examples in class and may add more lectures.

(d) Negative

Twenty-three percent of the students were completely dissatisfied with their lecturers or classes. They felt they saw no point in attending classes as they gained absolutely nothing. Amongst the completely dissatisfied students were those with no Mathematics background. They did not understand or see the need to pursue Statistics, thus causing them to be negative. Negative comments from the students also pointed to the lecturer reading from the slides. Students also complained about not getting examples in class. Some of the students' comments indicated that the lecturer was poor, boring, and useless and did not care about the students.

These are some of the student comments on the value of the lecturer:

> *(i) Complete satisfaction*: "The lecturer was great in explaining, provided lots of examples which helped us, was very approachable and had an open door policy for all. Because of the lecturer, the course was great".

(ii) Satisfied but challenges exist: "The lecturer is fine and he does a good job. I think he can work on his relationship with students, because sometimes he talks without getting the attention of the class, which makes it boring".

(iii) Suggestion: "Lecturers are trained well, but one hour per day, one period is too little. If we had a double stats period, then we could focus better, and the lecturer would be able to explain the work better and have more time for questions and answers. There is nothing wrong with the lecturers; the only problem is with time".

(iv) Complete dissatisfaction: "The lecturer is too fast. Rushing through the work makes you confused and does not help you understand".

5.4.4 COURSE-NOTES AND COURSE IN GENERAL ANALYSIS

The last section of the evaluation was on course-notes and the course in general. Ten questions were used to explore and monitor student perceptions and satisfaction. Eight of the questions employed a five-scale '*strongly disagree'* to '*strongly agree'*, whilst the remaining questions employed the five-point scale '*poor'* to '*excellent*', indicating complete dissatisfaction to complete satisfaction. The first three questions focused on the notes, with the first question prompting students to express their views by selecting an option as to whether they thought the notes were clear and helpful in understanding the coursework. The second question on the course-notes sought student opinions as to whether or not they thought more worked out examples could be added. The third question, monitored student opinions on the quality of the course-notes. Two questions were directed on grading and feedback to students. Perceptions on the grading were on fairness and consistency of the course grading whilst the next question was on whether or not students thought feedback on the quality of student's work was useful, timely and relevant. Question 25 was on the content and prompted students to indicate their perceptions on the level of difficulty of the course. Question 26 was on whether students thought the course was more teacher or student centered. Question 27 sought student opinions on the amount of time required for the course compared to other courses. Question 28 focused on course objectives and student expectations and the last question prompted students to rate the course overall. The last section was a comments section which allowed students to express their views on what they thought was wrong with the course and how they thought they would correct it. The sections

to follow cover the analysis of the data, (see Appendix C5 for the course-notes (notebook) and course in general ranked questions).

5.4.4.1 RANKED STUDENT PERCEPTIONS

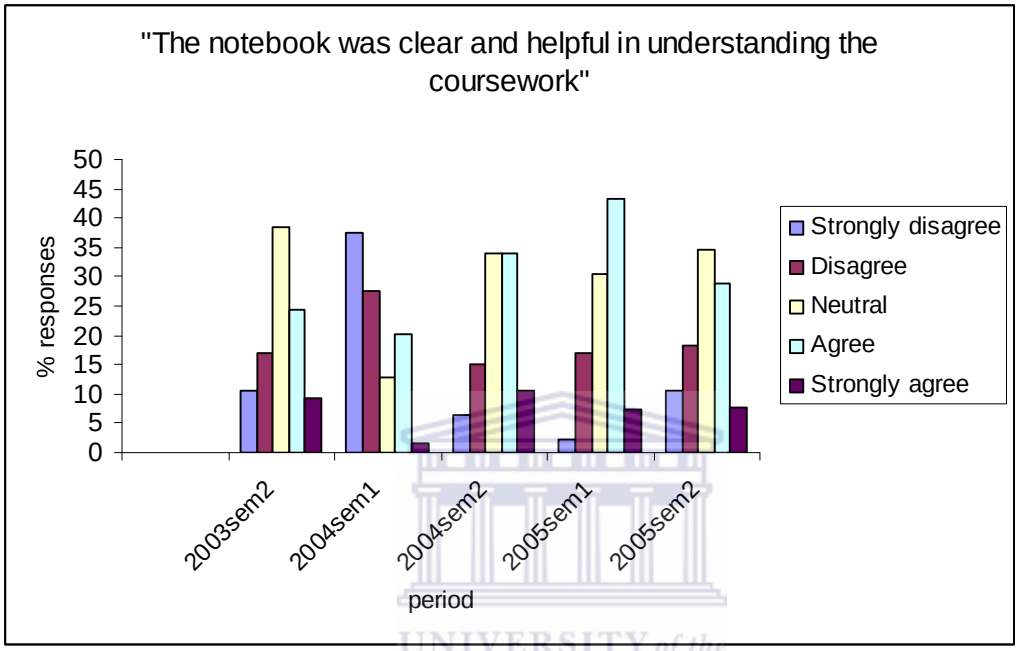


Figure 42: Perceptions of students on clearness of the course-notes

Figure 42 is a pictorial representation of the student's perceptions when asked to rank the notebook's clearness and helpfulness using ranking '*strongly disagree*' to '*strongly agree'*.

In the first semester of 2004, the majority of the students were dissatisfied with the course-notes ('*strongly disagree*' and '*disagree*' options were more than 60%). From 2004 semester 2 onwards, the dissatisfaction decreased to below 30% each semester. The neutral category increased to above 30% (in 2003 and 2005 students selected the '*neutral'* option, 39% and 35% respectively) and the '*agree*' and '*strongly agree*' options together improved to above 30%, (see Table 34, Appendix C5).

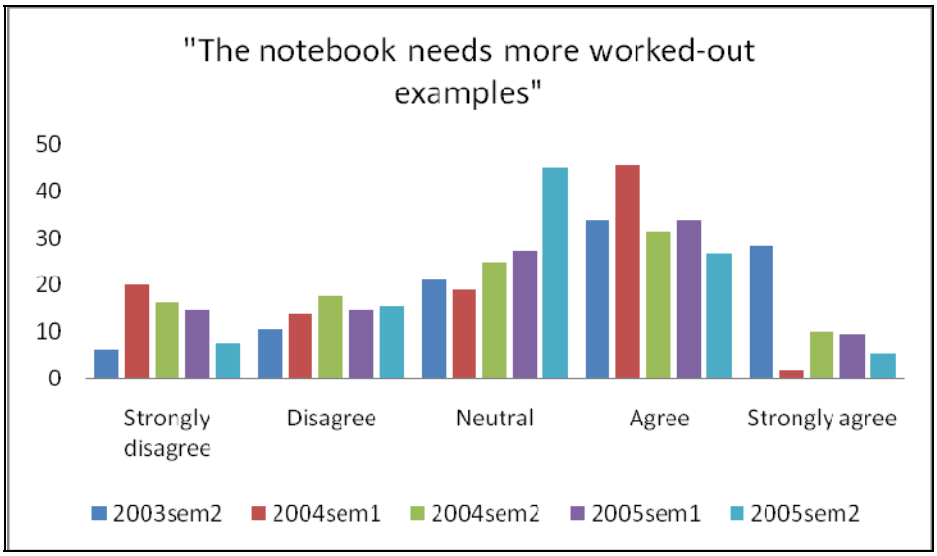


Figure 43: The notebook needs more worked-out examples

Figure 43 shows the distribution of student perceptions over time on whether or not the notebook needed more worked out examples. Students were asked to select from the five options '*strongly disagree*' '*disagree*', '*neutral*', '*disagree*' and '*strongly disagree*' one that suited them most. According to Figure 43, the notebook needed more worked out examples, the peak of the student responses is towards the right although it decreased after the '*agree*' option indicating that students settled mostly for options '*neutral*' and '*agree*', see Table 36, Appendix C5).

When asked to indicate whether the quality of the notebook was acceptable for the course or not, the majority of the students could not decide. Student's opinions were centered between the '*neutral*" and '*agree*' options, 45% 30%, 33% and 44% of the students in 2004sem1, 2004sem2, 2005sem1 and 2005sem2 selested the '*neutral* ' option whilst 41% of the students in the second semester of 2003 '*agreed*' that this was so, (see Table 38, Appendix C5).

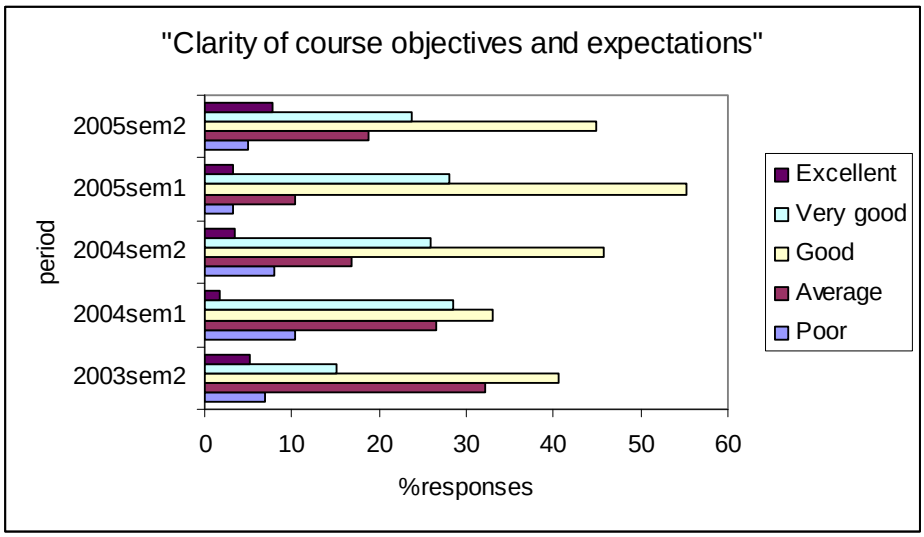


Figure 44: Clarity of course objectives and expectations

The students were asked to rank their satisfaction on the clarity of course objectives and expectations using rankings '*poor-excellent*', (see Figure 44). The majority of the students thought that the clarity was '*good*', 55% in 2005sem1, 46% in 2004sem2, 45% in 2005sem2, 40% in 2003sem2 and 33% in the first semester of 2004. A few of the students were less satisfied though (below 10% across periods, a few students (10% and below) thought clarity of course objectives and expectations was '*poor*'). The student results shown in Figure 44 indicate student satisfaction (see Table 50, Appendix C5).

5.4.4.2 COMMENTS ON COURSE-NOTES AND COURSE IN GENERAL

The comments on the course and course-notes in general were based on the question "What is wrong with the course and how would you fix it?" Five hundred and forty-nine students responded to this question. Although the question was aimed at addressing challenges on the course-notes and course in general as perceived by students, students responded positively, negatively and there were creative suggestions as well. The comments to this question were thus divided into three sections according to the student responses. After thoroughly reading

all the comments, codes were created to transform text into quantitative data that could be counted. The transformation would help to answer the question 'how many'. The codes were further categorized into themes: course-notes and course in general, course administrative matters which covered lecturers, tutorials and all the processes involving the ADM laboratory and assessment matters which were the tests and examinations. Further within the themes, there were positive, negative and suggestive/neutral codes created according to Figure 45, which is an outline of the comments on the course-notes and course in general captured using the evaluation.

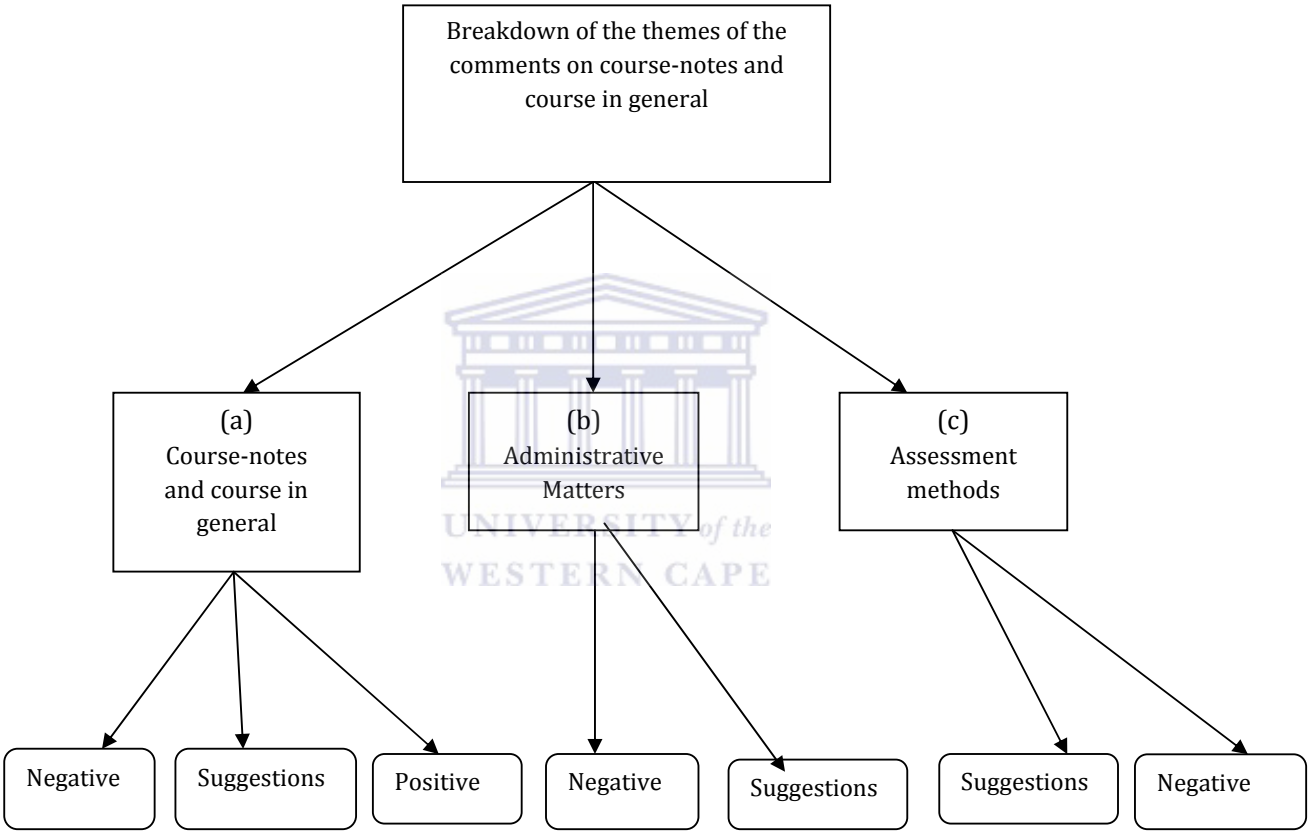


Figure 45: Outline of the themes of the comments on course-notes and course in general

(a) Course-notes and Course in General Comments and Suggestions

Of the 549 students who responded on the comments section on course-notes and course in general, 136 (25%) indicated they had no comments or had nothing to say whilst 413(75%) commented on the course-notes and course in general. In Figure 45, the breakdown of the student comments is outlined.

Of the 413 students who commented on the course-notes and course in general, 22% had positive comments on the course-notes and course in general, about 17% gave suggestions of how the course and course-notes could be improved for the benefit of the student and, 21% represented comments from students who were completely dissatisfied with the course and course-notes. Below are some of the comments on the course-notes and course in general:

"It is good because everyone has a choice whether to study or not. All the facilities are there, although the lab closes early".

"Everything with this course was fantastic, the lecturer was always organized and well prepared, the material carefully chosen and was up to standard. I enjoyed the course, good luck for the future".

"I think if I had a mathematical background, I would understand better".

"Statistics 132 should be a 1st and 2nd semester module. There was too much to learn in such a short space of time. Statistics is a very good module just that it needs time for the tutorials".

"Please try to write the note book in English not in Statistic language, first years do not understand statistics language as of yet".

"The text book is a bit difficult to understand; unless you have someone to help you though studying alone can be quite difficult".

"It is boring".

"I do not think the course is relevant to my other subjects. I do not understand what the objective of the course is supposed to be".

(b) Administrative Matters

Comments on the course administration matters were on tutorials and all the processes that constitute the tutorial administration, the tests and the lecturers. About 19% of the students out of the 413 were completely dissatisfied with the course administration. Many of the students highlighted overcrowding, which made it difficult to control students both in class and at the laboratory. Students indicated that many students were registered for the course whilst resources were limited. The laboratory was also highlighted as one of the resources that needed urgent attention. Sixteen-percent of the students provided suggestions which they thought would improve the administration with respect to lecturing and resources. As a suggestion to the laboratory overcrowding, students thought extended laboratory time, more tutors, more computers and dividing the students into small tutorial groups would be the solution. One other suggestion that was frequently raised was the introduction of interactive tutorials other than the online tutorials that students did on their own. System errors came up as one of students' frustrations especially when doing the tutorials and writing tests. Students thought the administrative challenges needed immediate attention as they thought their marks had been compromised.

There were complaints about the lecturers and lecturing style and students thought some lecturers were boring and called for improvement in lecturing styles. Suggestions included interactive lecturing as they thought some of the lecturers' lecturing style was one-way communication and did not give students interactivity. A few of the students, about 1%, were completely satisfied with the administration. Following are some of the student comments:

"The teaching methods. Use more practical examples, not only when doing revision".

"Use the time more effectively in teaching. Move at a steady pace and define the work well so that we don't go to lectures, coming out not knowing what happened. Really, a waste of time".

"More computers. More tutors who understand and can explain the work more clearly to students".

(c) Assessment Methods

Themes around assessment methods were both negative and suggestive. Students thought the multiple choice question (MCQ) testing system was not challenging. Some were against MCQ's as they thought if marks were given for each correct step that a student did when solving a problem, they would gain more marks compared to the single mark they obtained in the MCQs.

> "*We should be tested more on line, actually work out the problems on paper instead of being encouraged to guess all the time*".
>
> "*Multiple choice tests: they get complicated and confusing*".

5.5 HOT SEAT QUERIES

The Hot Seat was used as a form of support system to the IS students. A Hot Seat query form was designed to monitor the success or usefulness of the Hot Seat and to follow problems that the IS students encountered in order to minimize these problems in future, (see Appendix A7_1). A quasi-statistical analysis method was also used to track the Hot Seat queries where all queries related to a specific chapter in the course were grouped together. Figure 46 is a report of the queries.

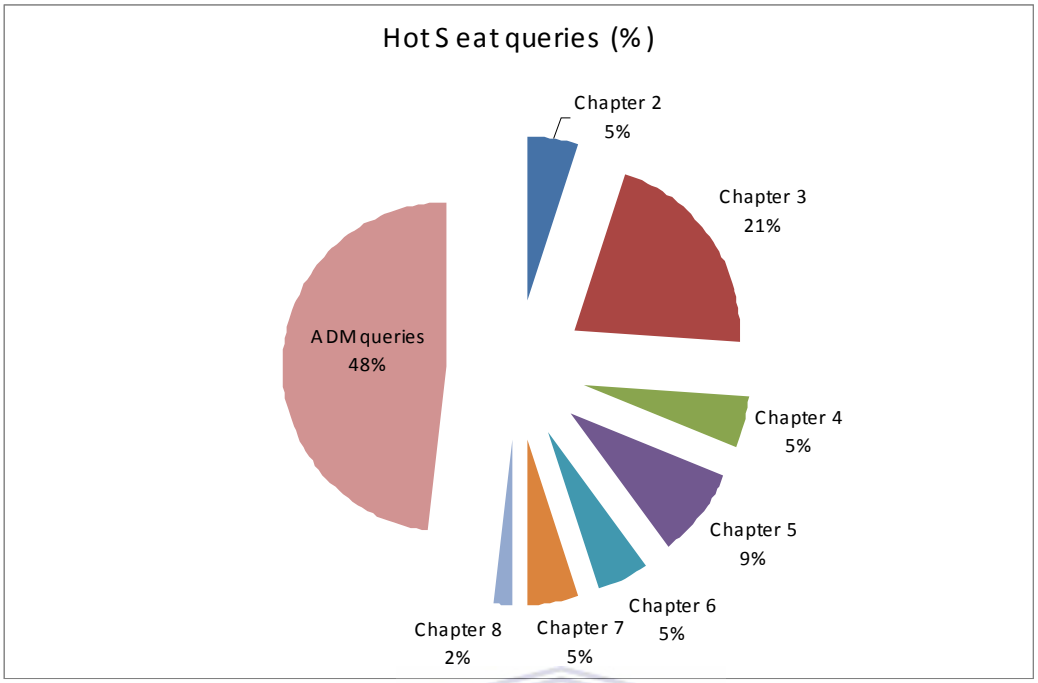


Figure 46: Summary of the Hot Seat Queries captured over time

Figure 46 reveals that although students could make use of the ADM query form to report problems encountered in the ADM laboratory, they were anxious for their problems to be resolved and used the Hot Seat facility to ensure immediate responses. All but one of the ADM queries reported at the Hot Seat were associated with system errors. Following the ADM queries were queries on Chapter 3 (21%). The queries were from students who could not understand the concept of measures of central tendency, how to calculate the mean, mode and median, differentiating between the three measures and identifying skewed data. Nine-percent of the queries were on Chapter 5 (the chapter covered *distributions of random variables*), five percent were on Chapters 6 and 7 (these chapters covered topics on *sampling distributions and confidence intervals*) and only two percent of the Hot Seat queries were on Chapter 8, (see Appendix A7_1).

5.6 ADM QUERIES

Students accessed the web-based tutorials and were supposed to be able to access them off campus as well. The ADM query form was used to monitor the processes revolving around

the ADM laboratory and tutorial administration, so that challenges could be tracked and resolved where applicable, (see Appendix 6_5 for the ADM query form). The ADM queries were grouped into five categories: log-in queries, system error-related queries, off campus access queries, course content related queries, pre-questionnaire related queries. Quasi-statistical analysis was used to obtain the percentage of queries per category as indicated in Table 7.

Table 7: ADM Queries by Category

Queries by category	**Frequency**	**% Frequency**
Log-in	50	14%
Out-of –campus access	2	1%
System errors	301	82%
Content-related	8	2%
Pre-questionnaire	4	1%
TOTAL	365	

Table 7 is a presentation of the grouped ADM queries. Each of the categories is described in detail in Sections 5.6.1 to 5.6.5.

5.6.1 LOG-IN QUERIES

Students, after registering for the course are registered by the department for the tutorials. Some of the students register late due to financial constraints and are thus not registered by the department unless they come to query. The course outline (see Appendix A11) provides the students with all the necessary information they need on the course including the log-on steps to access the tutorials. However some of the students do not read the information and resort to the ADM tutors for assistance. Of the 365 queries that were recorded over time,

14% were related to the logging process where some of the students registered late and some were not sure and failed to read the instructions provided on the course outline.

5.6.2 OFF CAMPUS ACCESS

The tutorials are web-based and any registered IS student with internet accessibility is able to access them anywhere. However, some of the work-places block their employees from accessing selected software and sites. Only two students, out of the 365 recorded ADM queries reported problems regarding off campus access.

5.6.3 SYSTEM ERRORS

This seems to be a major challenge hindering the success of the web-based tutorial system. Over time about 82% of the ADM queries were related to system errors. System errors included queries where students could not obtain full marks even when they used the correct techniques. Sometimes computers froze whilst the students were working on their tutorials resulting in students not obtaining the marks they deserved. System errors are beyond the departments control and the department relies solely on the university's ICS department. Students, whose marks were incorrectly recorded were adjusted as the researcher was aware of these problems.

5.6.4 CONTENT RELATED QUERIES

There are tutors at the ADM laboratory employed by the department, for the smooth running of the laboratory and to assist students who might have problems in understanding some of the concepts needed to resolve a specific question in a tutorial. Of the 365 recorded ADM queries, only 2% needed such assistance from the tutors.

5.6.5 PRE-QUESTIONNAIRE QUERIES

All the students are supposed to obtain the pre-questionnaire before they can get the first tutorial which is intended to measure their perceptions before exposure to the course. Students are encouraged to go and check if they can access the tutorials as well as familiarize themselves with the tutorial web-site on their first class. They are supposed to obtain access to the pre-questionnaire immediately after logging in. Only four out of the 365 recorded ADM queries reported pre-questionnaire related problems.

5.7 SYNTHESIS OF CHAPTER FIVE

In this Chapter, the student perceptions regarding the IS offering used five research instruments: the pre-questionnaire, the post-questionnaire, the end of course evaluation, the ADM query form and the Hot Seat query forms which were presented, analyzed and discussed. The objective was to monitor student perceptions and to see whether the perception changed or remained the same over time. Added to that, the perceptions were monitored to explore student satisfaction/dissatisfaction. The feedback obtained from the analysis of the tools would assist the department in introducing adjustments when needed and viewed by the students. It would also give the researcher an indication of whether the tools that the department designed were perceived by students as effective as the department thought and intended. In Chapter 6, the analysis performed in Chapters 4 (quantitative) and 5 (qualitative) will be combined and similarities and discrepancies between the two chapters will be discussed.

The next (final) chapter presents a synthesis of the study as well as the conclusions and recommendations based on the findings of the study.

CHAPTER SIX

SYNTHESIS, CONCLUSIONS AND RECOMMENDATIONS

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6.1 INTRODUCTION

The objective of the study was to monitor and evaluate the IS offering using the interpretive approach. The five-period exercise gave the researcher an in-depth understanding of all the processes involved in the running of the IS programme at UWC. At the end of the exercise, the characteristics of students pursuing the IS programme using demographic information obtained from the university database and the quality of the IS students using Grade 12 information obtained from the university database was revealed. Following the performance of the students using the IS final results was also possible as the Grade 12 background was used to see the extent to which it impacted on the performance of the students in IS. Students' perceptions were taken into account as they were given an opportunity to comment on the value and effectiveness of the programme. To explore student perceptions, the online questionnaires and end of course evaluation comments were analyzed. The information and insight obtained from this repetitive exercise enabled the researcher to develop a theoretical framework to be used as a guide to monitor the quality of IS programmes.

The data captured over a period of five semesters consisted of the Grade 12 results and demographic information (university database), the IS final results, the online questionnaires, the end of course evaluation and the ADM and Hot Seat query forms. Lussier's systems process model (Figure 4) was used to monitor the quality of the programme. The model's components namely: the IS inputs, the transformation processes and the outputs are the components that the department hopes to revisit from time to time, introducing adjustments where possible through the information obtained from both the feedback and the indicator components of the model. The interpretive approach was most the suitable method to employ in the study as it is explorative in nature and allows one to analyze a situation in its natural state, with no hypotheses.

Chapter 6 is divided into five sections. The first section is the introduction (see Section 6.1) and the discussion and synthesis of the results analyzed in Chapter 4 (quantitative data) and Chapter 5 (qualitative data) to identify associations existing between the two chapters and the literature covered in Section 6.2. In Section 6.3, the conclusions based on the results and the relationship existing between the literature and the results of the study are covered. Recommendations are made in Section 6.4 and include a theoretical framework for IS programmes which presents a contribution towards new knowledge; recommendations to UWC, recommendations to the Statistics department and future research recommendations. In Section 6.5 the outline of the study finalizing the discussion which connects research objectives to the results, is covered.

6.2 Discussion and Synthesis of the Results and intergration to the literature review

The aim of the study was to monitor and evaluate the first year IS offering using the interpretive approach to PE. The data collection instruments assisted in providing the information needed to understand all the processes encompassing the programme. It is through the analysis and interpretation of the patterns in the data, that the researcher could be enabled to make informed decisions about the programme future. In this section, similar and deviating patterns revealed by the data both through the quantitative and qualitative data are discussed and synthesized.

6.2.1 Patterns Emerging from the Ranked Pre-questionnaire, Post-questionnaire and the End of Course Evaluation

It was difficult to find themes that could link all five instruments. However, there were possible links between the pre- and post-questionnaires and the evaluation. This section will bring together all three instruments, looking at the rankings of the tutorials and the course (preparedness, expectations, attitudes, enhancement of learning). The pre-questionnaire as described previously, measured student preparedness, expectations and perceptions before students were exposed to the course. The post-questionnaire measured student preparedness,

expectations and change/no change in perception after exposure to the course. The sections that follow try to synthesize student ranked responses comparing the pre- and the post-questionnaires and the end of course evaluation where there are existing relationships between the three instruments, both complementary and contradicting. The quantitative data analysis results obtained from Chapter 4 (Grade 12 background and IS final results), are also incorporated in the discussion where applicable.

6.2.1.1 WEB-BASED TUTORIALS

(i) Experience with computers (pre-and post-questionnaire)

Students were asked to give an indication of the number of online courses they had registered for. It was not surprising to see that more than three-quarters of the students who responded across periods were not registered for any online courses as they mostly come from previously disadvantaged backgrounds where computers are hardly used (see Table 72, Appendix C6_2). However, question 37 of the pre-questionnaire, showed that the majority of the students, although not registered for an online course, felt computers were stimulating/somewhat stimulating. Tables 90 to 95 of Appendix C6_2, further confirmed the positive attitudes students had towards computers. Students thought computers were helpful across periods. This was an indication that students were excited and eager to learn, and this enthusiasm brought about encouragement to the researcher, that the students would have benefited from the IS programme, irrespective of whether they passed/failed the course as their semester mark was composed of the online tutorial marks (20%) and the online tests (80%). Added to this, the fact that students attained and improved their computer skills at the end of the IS programme, was an achievement for the department.

(ii) Expectations/learning modes (pre- and post-questionnaires)

Table 69 of Appendix C6_2, shows that the majority of the students across periods pursued IS either as a requirement for a major or that it was required for graduation. A few of the students pursued IS because of an interest, either job-related or general. This raised a concern that if students were not passionate about the course, they were likely to be demotivated to study or learn, specifically if they did not have a Mathematics background. This is some of

the vital information that the researcher wanted, both to prepare the first year lecturers for the type of student that they were dealing with whilst at the same time setting up support structures that would assist students who were forced to do IS not out of interest or passion but as a major requirement. It was important that students were not delayed in their studies as a result of failing the course. Consequently, this would result in improved throughput and more students considering majoring in Statistics due to a change of perception from negative to positive concerning Statistics.

Question 17 of the pre-questionnaire explored student perceptions on the symbol they expected to obtain. The student responses were optimistic as the majority selected mostly symbols, A, B and C. A few of the students selected symbol D across periods. This was a positive sign as students, even when experiencing difficulties, would have this enthusiasm and a constant reminder that they were looking forward towards obtaining good symbols (see Table 70, Appendix C6_2). On exploring student perceptions towards the end of the course, on the symbol they expected to obtain, there was a slight shift to the negative in expected symbol, though the majority of students selected mostly symbols A, B and C.

Question 6 and Question 18 of the pre- and the post-questionnaire explored the extent to which the students thought the course would be easy or difficult. Table 8 summarizes data that compare responses reported in percentages.

Table 8: Pre- and post-questionnaire expected level of difficulty

Q18/Q6: ”How easy / difficult do/did you expect/find the course to be”		
	Pre-questionnaire	Post-questionnaire
Easy	8%	12%
Not so easy	50%	45%
Not so difficult	42%	31%
Difficult		11%

This perception is not different from perceptions reported in the literature and there are many reasons linked with the assessment (Hahn, 1988; Watts, 1991; Higgins, 1999). The majority of the IS students are from the EMS faculty and they do Statistics as a requirement either to proceed to the senior level or as a major.

The results indicate that students did not think the course would be easy, and this perception or concern increased over time as there were students who thought the course was challenging. This feedback calls for the department to set up structures and teaching methods, that will bring about motivation and enjoyment to the challenged students whilst at the same time, ensuring that the students realize the essence and role Statistics play in everyday life. This supports the trend identified in the literature covered that Statistics as a course is found to be challenging by students especially those without a mathematical background (see Section 1.2). This perspective needs to be changed and, new methods need to be implemented; this was one of the objectives of the study.

(iii) Enhancement of learning through online tutorials (pre- and post-questionnaires and end of course evaluation)

The aim of introducing the online tutorials, an innovative and novel application at the time in an applied mathematical field, was to expose students to real world problems, to expose them to technology through the use of computers and to prepare them for tests and examinations. The tutorials were set up in a manner that students could improve their marks which would result in the enhancement of their learning. The marks obtained from the tutorials assessed

and monitored understanding of their subject mastering. Student perceptions needed to be drawn in to see how students viewed the tutorials and, to look for suggestions from students that would optimize the usefulness of the tutorials. One question (statement to be investigated) exploring student perceptions and satisfaction with respect to the online tutorials linked the pre-questionnaire, the post-questionnaire and the end of course evaluation. The content from the three sources are presented below:

Pre-questionnaire: "I like to do tutorials to enhance my learning".

Evaluation: "The tutorials and self-help material on KEWL was helpful in improving your understanding of the course".

Post-questionnaire: "I like to do tutorials to enhance my learning".

In Table 9 the student responses with respect to the three instruments are compared. For all three, the student responses revealed that students thought the online tutorials enhanced their learning. In Chapter 4, using Figure 10 feedback, it was found that the ability of the students improved with the number of tutorials completed by students. This was further confirmed by analysis of the average tutorial mark which increased as the number of tutorials completed by students increased (see Figure 11). It is clear from this feedback that the online tutorials are an important integral part of the IS offering contributing towards the success of the students in IS.

Table 9: Enhancement of learning using online tutorials, pre/post-questionnaires and end of course evaluation

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
Pre-questionnaire	35% (771)	55% (1210)		9% (198)	2% (38)
Evaluation	13%(307)	34%(786)	38%(896)	9%(215)	6%(154)
Post-questionnaire	46% (416)	44% (398)		7% (63)	2% (21)

Although the student tutorial marks and perceptions indicated that the online tutorials served the purpose they were intended for, feedback from the pre-questionnaire, the evaluation, the

Hot Seat and the ADM laboratory revealed that students were discouraged by computer unavailability, access was challenging and students were distressed because in some instances, they were marked incorrectly due to system errors (see Tables 1 and 3, Appendix C2; Table 114, Appendix C6_4, Chapter 5, Sections 5.4.1.1 and 5.4.1.2 and Figure 46) for evidence. This is an alert from the students to the department and structures need to be put in place with the ICS department to ensure that the success of the tutorials is not hindered by these challenges.

iv) Assessment methods (tutorials, tests and final Introductory Statistics)

The tutorials and tests serve as continuous assessment methods (formative), whilst the end of semester examination is summative (taken once). Students had the opportunity to repeat the tutorials hopefully improving their scores and understanding of the subject matter. As discussed previously, the tutorials were also aimed at preparing students for tests and eventually the examination. A strong positive relationship between the tutorials and tests and consequently the semester mark and examination mark were expected by the department.

Figure 20 showed a relationship between the tutorials and tests where the correlation coefficients indicated that more work needs to be done to improve the performance of students, as the relationships ranged from weak positive relationships to weak negative associations. In addition, Figures 23 and 24 revealed that students with high tutorial and test marks were likely to score better marks in the final examination. This indicates that continuous assessment contributes towards improving the performance of students and suggests that students need to be encouraged to use the facilities available to enhance their learning for optimized results.

6.2.2 PATTERNS EMERGING FROM THE PRE-QUESTIONNAIRE, THE POST-QUESTIONNAIRE, THE END OF COURSE EVALUATION COMMENTS, ADM AND HOT SEAT QUERIES

Students had to comment on course content and services at the end of the pre-questionnaire, the post-questionnaire and the end of course evaluation. As discussed in Chapters 1, 3 and 5,

the pre-questionnaire explored student perceptions and computer skills prior to doing the course and students are encouraged to acquaint themselves with the IS tutorial webpage in an information session done during the first lecture. The post-questionnaire was intended to measure student perceptions and computer skills towards the end of the course. The end of course evaluation explored student perceptions with respect to the course-notes and course in general, the online tutorials, the TestWriter© and lecturers. Comments from the students were positive, some positive but pointed to challenges, some were purely suggestions/concerns from the students and some of the comments were negative. The sections that follow are comparisons intended to reveal or show patterns of the different research instrument's using the categorized comments. The sections that follow discuss the positive patterns, suggestions or concerns and negative patterns followed by the comments, the ADM and Hot Seat queries. Comments which were positive but suggested improvements or dissatisfaction to some extent were observed from the end of course evaluation; a few originated from the pre-questionnaire. As a result the latter were not included in the discussion.

6.2.2.1 POSITIVE PATTERNS

Due to the capturing of five semesters of data, it was possible for the first time in the teaching history of IS to establish longitudinal patterns in the data. The patterns displayed in Tables 10 to 12 show the group reporting positively with respect to the specific category as a percentage of the total number of responses in the group.

Table 10: Patterns of positive comments/queries

Instrument / Category	Pre-questionnaire	Post-questionnaire	Evaluation	ADM Queries	Hot Seat Queries
Course-notes & course in	82%	27%	22%	-	52%

general					
Online tutorials	45%	16%	44%	-	-
TestWriter©	-		46%	-	-
Lecturers	5%	2%	59%	-	-
Pre-questionnaire	67%		-		

Table 10 is a presentation of the trend of positive comments of the students from the pre-questionnaire, the post-questionnaire, and the end of course evaluation, the ADM queries and the Hot Seat queries in percentages. From Table 10, one can deduce that positive student responses were mostly centered around the course-notes and the course in general, the pre-questionnaire and the lecturers (all three above 50%). It is not surprising to have no positive comments for both the ADM and the Hot Seat as students were supposed to use the facilities only when they were encountering problems or had concerns. The high percentage of positive feedback from the students on the pre-questionnaire is also a good indication that students were enthusiastic about what they were going to do. Having a high percentage of positive comments from the students, a few days after starting the process was also an indication that the students were excited and looking forward to the course. This is essential as the wellness and attitudes of students play a role on how they receive the course, irrespective of whether it is challenging or not.

6.2.2.2 CONCERNS/ SUGGESTIONS

The analyzed data from the comments revealed concerns/suggestions. It was now possible for the first time in the teaching of the IS course, to identify patterns in these responses due to the body of data collected and analyzed over five periods. The student concerns/suggestions are presented in Table 11 and are reported in percentages.

Table 11: Patterns of suggestions/concerns comments/queries

Instrument / Category	Pre-questionnaire	Post-questionnaire	Evaluation	ADM Queries	Hot Seat Queries
Course-notes & course in general	16%	3%	17%	2%	-
Online tutorials	53%	25%	18%	97%	48%
TestWriter©	100%	10%	14%	-	-
Lecturers	95%	0.3%	10%	-	-
Pre-questionnaire	11%	-	-	1%	-

In Table 11 the comments that led to concerns or suggestions from students from all five instruments are presented in percentages. The aim was to link this category of comments to a specific input or transformation process (see Figure 4 for the discussion of inputs, transformation processes and output). This would make the task of revisiting the processes encompassing the IS offering easy when it came to the need for revising them. The Testwriter© system and lecturer comments which had a few student responses in Table 10 (positive comments), had more responses in Table 11 (suggestions/concerns). All the students who commented on lecturers in the pre-questionnaire had concerns/suggestions and, almost all the students who queried at the ADM had concerns on the online tutorials (97%).

6.2.2.3 NEGATIVE PATTERNS

The negative aspects highlighted by data from the instruments provided the researcher with specific items that could be discussed for remedial implementation.

Table 12: Patterns of negative comments/queries

Instrument / Category	Pre-questionnaire	Post-questionnaire	Evaluation	ADM Queries	Hot Seat Queries

Course-notes & course in general	2%	-	21%	-	-
Online tutorials	1%	-	17%	-	-
TestWriter©	-	-	12%	-	-
Lecturers	-	-	23%	-	-
Pre-questionnaire	17%	-	-	-	-

In Table 12, a comparison of comments of dissatisfied students by research instrument are reported in percentages. There is a shift of student responses from negative to positive comments: more students were positive compared to the concerned and dissatisfied students (Tables 10, 11 against Table 12). This is an indication that students recognize the value of the resources but would like to see improvements.

6.2.2.4 AREAS OF IMPROVEMENT

(i) Course-notes and course in general

The ranked course-notes responses from the students indicated that the course-notes needed more worked out examples (see Figure 43). There were concerns that the course-notes language was not user-friendly and students urged lecturers to improve the notes so that they were easier to understand.

(ii) Lecturers and classes

Some of the pre-questionnaire comments clearly showed that students were concerned about the large class sizes (EMS) which resulted in a lack of discipline. This is a concern as the EMS group consists of students who already have a negative perception and attitude towards Statistics as a course. Some of the student comments indicated concerns and frustration at the pace at which lecturers presented the content. They thought some of the lecturer presentations were too fast making it difficult for students to follow what was being said in class.

(iii) Online tutorials and tests

The majority of the students, as shown by the ranked pre-questionnaire, the ranked post-questionnaire, the end of course evaluation, the ADM queries, the Hot Seat queries and student comments acknowledged their usefulness in enhancing their knowledge. System errors and the difficulty of obtaining marks that students deserved due to system errors, however, disappointed and discouraged students. This is a challenge beyond the department that ICS need to address. One other challenge is the lack of facilities (computers) at the ADM laboratory. This challenge has to be weighed against the fact that the ADM laboratory was set up by the department through donor funding after 2001 with less than the full capacity at the onset of the study. In the first semester of each year about 300 students from the EMS and Science faculties register for the IS programme. In the second semester, the numbers double and sometimes triples. The ADM laboratory that IS students use for tests and tutorials has 65 computers (if all computers are functional) and the laboratory caters for senior students as well. Lack of facilities is a major challenge and frustrates students.

As revealed by the results in Chapter four (Figure 20), the relationship between tutorial pairs 4-7 and test 2 weakened over time. This is an indication that the challenge for students to understand the probability section was worsening. It is a call upon the Statistics department to find methods to make the probability section easier and understable to students.

6.2.2.5 MONITORING THE INTRODUCTORY STATISTICS INDICATORS USING THE GRADE 12 SUBJECTS

UWC attracts mostly students coming from previously disadvantaged communities, mostly with an average C, D and E Grade 12 symbol. The majority of students with Grade 12 symbols other than Ds and Es pursue their studies at other South African tertiary institutions like UCT, Wits and Stellenbosch. The department services the course for the EMS faculty and thus has no control of who should be accepted into the course. This raises a concern when it comes to the preparedness of the students, particularly for the IS programme. In these sections, the Grade 12 status and the average symbol obtained by the IS students as well as the performance of the students in IS over all periods given these indicators are synthesized. It is expected that the information will serve as the basis for a proposal to the EMS faculty to improve the entry requirements of students intending to pursue Statistics. It is further expected that through observation of the results from the study, the EMS faculty will have to revisit their programmes and see whether it is really necessary for their students to pursue Statistics at first year level. If there is a need, the EMS faculty in collaboration with the Statistics department should develop proper support structures that will prepare the students for the challenge of pursuing Statistics.

(i) Grade 12 Status and Average Grade 12 Symbols

In Chapter 4, (see Table 34, Appendix B10), the analysis of the Grade 12 status showed that the majority of the IS students, obtained a full exemption (77%), and 10% obtained a conditional exemption at school level; the remaining 13% was shared by other status groups, that merited the students to study at UWC. This is also a first in the history of the IS course where Grade 12 data was captured from the university database to investigate information on the background of students in the course.

Added to this, the majority of the IS students obtained a C average symbol in Grade 12 (43%) followed by a D-symbol (31%), and an E-symbol (8%). Only 3% of the students obtained an A symbol in Grade 12 (see Table 30, Appendix B10).

On monitoring the performance of the students in IS given a specific Grade 12 status and the average Grade 12 symbol, it was discovered that students with a conditional exemption were

challenged. The students obtained mostly “Fs” and “Gs” as the average IS symbol whilst the majority of students with a full exemption managed to do well (see Table 7, Appendix E).

The information from the departmental organizational chart (see Figure 1), showed the average Grade 12 symbol required both for the EMS and Science Faculties. The Statistics department together with the Mathematics department have been proposing a review of the entry symbols for a possible increase of the level of requirement. The results from the study support both the Statistics and the Mathematics department’s notion, that the entry requirements be reviewed or be improved, or that proper structures be put in place to secure the future of the under-prepared students with below standard entry requirements. Physics, Mathematics and Accounting at school level proved to be indicators for good performance in the IS course. These three subjects are some of the subjects that are needed in the scarce skills field. Whilst Statistics as a subject is employed in all spheres of life, it is also a scarce skill. This is an indication that students with the indicator subjects occur in small numbers whilst Statistics is one of the scarce skills needed for professional services. This means that proper structures need to be set in place to assist the challenged students if it is not easy to obtain students with Physics, Mathematics and Accounting as some of their Grade 12 subjects.

One of the objectives of the study was to monitor the drop-out rate to see whether it had increased or decreased over time. A high drop-out rate could result in too few students registering for the programme which could lead to a decision to discontinue with the course. There is a need to follow up on drop-outs and see whether it increased or decreased over time.

In the analysis performed in Chapter 4, about 8% of the students were defined as drop-outs (no final mark). Over time the drop-out rate did not show a clear pattern but fluctuated between low and high to be more than the 3% starting with 2003sem2 to about 12% in 2005sem2. Through investigation of the data and exploring possible outcomes, it was

possible to create three profiles to further explore the successful/ underperforming students in IS using the IS final mark coded as namely: drop-out, fail and passing students.

6.3 CONCLUSIONS

Each of the conclusions is linked to the research objectives and attempts to indicate to what extent each of the objectives have been achieved. There were seven objectives and each of the conclusions is covered in sub-sections (i) to (vii) discussed below.

(i)Monitoring the quality of the Introductory Statistics offering through a strategic management process

The first objective was to monitor the quality of the first year component through a strategic management process. It can be concluded that it was possible to monitor the quality of the IS offering by adopting Lussier's system process, (see Figure 4) and the discussion of the components of the model in Section 4.2.1).

(ii)Monitoring the characteristics of the Introductory Statistics body intake using demographic information

Various factors, as revealed by existing literature, impact on the performance of IS students, (Higgins, 1999; Hahn, 1988; Conners et al. 1998). Some of the demographic characteristics of the IS students and the performance of the students in IS given these characteristics were monitored. For the first time in the history of the IS offering at UWC, data in five consecutive semesters were gathered for this investigation. Six variables were used namely, age, gender, area of residence, ethnic group, home language and academic language. Detailed analysis of the listed demographic characteristics was done in Section 4.2.2.1.

Based on the results discussed in Section 4.2.2.1, it can be concluded that looking at the demographic variables for the first time during the existence of the IS programme gave the

researcher a better understanding of the demographic characteristics. The diverse background of students is a factor worth reckoning with.

(iii)Monitoring the quality of the Introductory Statistics body intake using Grade 12 background

The study was dominated by students from the Western Cape examination board (77%) followed by the Eastern Cape (8%). There were students from the Foreign examination board (5%) and the remaining 10% was shared by other examination boards within South Africa. The Western Cape is one of the provinces that usually do well and produce good results in Grade 12.

The right combination of subjects: Mathematics, English, Business subjects and Science subjects at Grade 12 are some of the core subjects that can aid a student to do well in Statistics particularly the IS course as it needs the skills to understand a concept well, analyze and interpret content and to be able to manipulate numbers. Lacking one or more of the listed subjects in Grade 12 can impact negatively on the performance of a student in IS. To make a more detailed analysis of results, an innovative construction of seven profiles were created using the Grade 12 subjects to monitor the quality and thus, preparedness of the students (see Figure 7 for the listing and analysis of all seven profiles). It can be concluded, as revealed by the results that a few of the students did not have the right combination of subjects as in the Fine Arts profile. Both the Social Science and Natural Science students roughly had the same shape and students with at least one subject from the Business profile almost dominated the IS offering (see Figure 7).

As expected, 'Languages other than English' and 'English' had the highest percentage of students. The conclusion is self-explanatory (high percentage of students taking English) as English is one of the official languages in South Africa.

Above three-quarters of the students obtained a full exemption in Grade 12 although a few had an excellent Grade 12 average symbol (A-B). The study was dominated by students with a C-symbol (above 40%).

Based on the above, it can be concluded that the standard of students who had taken Mathematics at school level decreased over time with fewer students obtaining symbols A and B whilst the majority obtained symbol C(see Section 4.2.2.2 for the analysis of the Mathematics symbol and average Grade 12 symbol).

(iv)Monitoring first year pass rate which was less than 50% (1999-2002 before the launch of the study). The objective is to have a pass rate of 50% and above.

On monitoring the pass rate over the five-semester period, the results showed that the pass rate remained above 50% compared to the below 40% pass rate before the study commenced. It can therefore be concluded that the objective of obtaining a pass rate of 50% and above was achieved (see Figure 26).

The analysis on performance in IS by age group showed that the performance of students with a delay of one to two years weakened over time, (see Figure 27). Based on the analysis, it can be concluded that students with a delay of one to two years did not perform well in IS. (Descriptive Statistics on the age groups were summarized in Section (i) of 4.2.2.5).

There were significant differences in the performance of the students by race (see Figure 29). African students obtained mostly Fs and Gs. It was possible therefore to determine challenged groups as can be seen with respect to the results of Africans compared to the other races.

Important results from Chapter 4 surfaced when the innovative construction of profiles was used to investigate student performance further. In this chapter, each of the profiles was taken and performance, given that a student had taken at least one subject from the profiles, was evaluated. The analysis of the six profiles revealed that students from the Fine Arts had a p-value of 0.3607 when testing the hypothesis of the profile impacting on performance in IS. One can therefore conclude that the Fine Arts subjects are not the correct combination for a student to pursue IS as a course unless proper structures are put in place for the students to cope.

The performance of the IS students was further explored using the Grade 12 status (see definition of terms for 'Grade 12 status'). It can be concluded based on the analysis of the results, that the Grade 12 status impacted on the performance of the students as there were significant differences between the groups by Grade 12 status.

The analysis of the performance of students in IS given the Grade 12 average symbol was done in Chapter 4 (Section 4.2.2.5). The results revealed that students with high Grade 12 average symbols did well in IS and almost all of them passed. From the analysis, 96% of the students with an A average symbol in Grade 12 passed, whilst 77% students with a D average symbol in Grade 12 passed IS. Based on these findings, in can be concluded that the Grade 12 average symbol impacted on the performance of the students in IS (see Table 12, Appendix F).

(v)Monitoring the drop-out rate. The aim is to observe the trend on the drop-out rate over time, to see that it will be decreased in future

A detailed analysis of the drop-out rate in IS was done in Section 4.2.2.6. In Table 5, students with a final mark were compared to those without a final mark. Most of the students who dropped out belonged to age group 20 to 24 (Table 1, Appendix F1) and these were students with a delay of one to two years. Based on this analysis, it can be concluded that although many of the students did write the examination, the percentage of students who did not write the examination (dropped out) increased over time. Further students with a delay of

one to two years before starting their studies proved to be part of the group that were challenged by the IS course.

(vi)Monitoring of student's perceptions over the study period using student comments

One of the objectives of the study was to monitor student's perceptions to find out whether the IS programme was serving the purpose it was intended for. These perceptions gathered for the five semester period were also a first in the history of the department. Suggestions as well as criticism from the students would assist the department in improving the programme. Student's perceptions were monitored prior to exposure to the course, during the course and towards the end of the course.

Students were positive when they started the programme as revealed by the analysis of the pre-questionnaire ranked responses and comments. The analyses in Sections 5.2.2 and 5.2.3, showed that the majority of the students were looking forward to doing the course that they did not think the course would be easy; they thought it would be challenging although they were excited and looking forward to doing it.

From the analysis of Tables 10-12, students were mostly satisfied with the services rendered to them by the department although there were challenges that students indicated needed to be addressed. Based on the synthesis of the results done in Section 6.2.1.1, one can conclude that students did not think the course was easy. The results also support the literature covered in the study on IS programmes, namely that IS programmes are not easy.

The aim of introducing the IS students to the online tutorials was to expose them to technology and the use of computers as the tutorials are computer-based whilst at the same time giving them independence to seek knowledge. This was also the first of its kind in the history of the department, where students could complete practical exercises on the system from home using the Internet. The tutorials had an added benefit as students could repeat a given tutorial, obtaining a different problem on each attempt. Students could, as perceived by

the researcher, enhance their knowledge independently and improve their understanding and consequently, the course better. To investigate student's perceptions on the effectiveness of the tutorials, the questionnaires, the ADM laboratory query form, HotSeat query form and the end of course evaluation were used.

The analysis of student perceptions on how students felt about the effectiveness of the tutorials (see Sections 5.3.2 to 5.4.1.2), showed that students enjoyed the online tutorials and acknowledged that mastering of the subject was possible through the use of the tutorials. System errors, computer unavailability and access were major challenges to the students. The quantitative analysis also showed that student marks improved as students repeated the tutorials. Based on this feedback, one can conclude that the online tutorials, with all of the novel applications in the IS course, served the special purpose for which they were intended.

The analysis of the student comments on online tutorials and tests revealed that it was not easy for students to access computers due to too many students registered for the course and computer unavailability. The ADM laboratory is used by Statistics students from all levels (first year to third year). Presently, it has 65 computers and, this does not constitute even half of the number of STA131 first semester students. It can be concluded that the department has a shortage of resources (laboratory and computers) and this affects students as they sometimes cannot meet deadlines due to the unavailability of computers.

The synthesis of the results of the student comments both from the pre-questionnaire, the post-questionnaire, the evaluation, the ADM and Hot Seat involved following patterns reported in percentages. Three patterns could be identified: positive, concerns/ suggestions and negative patterns, (see Tables 10-12). From the results it can be concluded that the majority of the students were mostly satisfied with the services rendered to them as the majority of the patterns emerging from the student comments were more positive than negative. The percentage of students decreased in the direction of negative patterns indicating minimum dissatisfaction.

(vii)Developing a framework for evaluating Introductory Statistics programmes

At the end of the five-period repeated monitoring process, the feedback and insight gained was integrated and used to develop a framework that would be used as a guide or a model to evaluate IS programmes. The framework is presented and discussed in Section 6.4.1. The researcher therefore concludes that a framework for a quality IS delivery could be succesfully developed.

6.4 RECOMMENDATIONS

Four categories of recommendations based on the synthesis and conclusions of the study are introduced namely: the theoretical framework for evaluating and monitoring IS programmes, recommendations to UWC, recommendations to the Statistics Department and recommendations for further research. The four categories are discussed in Sections 6.4.1 to 6.4.4.

6.4.1 THEORETICAL FRAMEWORK FOR EVALUATING INTRODUCTORY STATISTICS PROGRAMMES

It was possible to develop a theoretical framework for the IS programme during the course of the study that could be used by the department or interested audiences for the implementation of a quality delivery over time.

It has therefore been possible for the department to understand the IS student body intake for the very first time through this intense analysis over five semesters of the demographic background, the Grade 12 background and linking the two with the performance of the students under observation.

The tools, particularly the innovative online tutorials, the availability of course material, useful links to other material for students through KEWL served as tools for bringing about independence and responsibility to students at the first year tertiary level.

Through the five-period process undertaken by the researcher to evaluate and monitor the IS offering, a recommended theoretical framework (see Figure 47) to evaluate and monitor the quality and effectiveness of programmes, particularly IS, resulted and is discussed in the paragraphs to follow.

The Framework (see Figure 47) is made up of four layers, the first (inner) layer attempts to answer the questions '*who?*' or '*what*?' and, these are the building blocks of the programme. The students and staff (who), technology and academic course content (what) came to be the building blocks of the IS programme. The building blocks could then be further broken down into the second layer where customers were the students (EMS, Science and Arts), the technology building block is made up of the internet tutorials, the online testing system, the Chatroom, the academic course content components were the recommended textbook, the course-notes compiled by the department, the Hot Seat, the course-notes tutorials and the web links that students could access whenever they needed to expand their knowledge on the subject matter. The components making up the users building block were the academic staff, the non-academic staff, the ICS personnel, the laboratory managers, the EMS academics and the tutors who assist in the laboratories.

Processes and methods need to be set in place to understand and satisfy the customers, to ensure that the academic content is sustainable and of quality, to ensure that the technology resources are well maintained, and, to also ensure that the people involved are well informed and the staff members are skilled and knowledgeable in order to bring about satisfaction to the customers. In the third layer, the tools needed to monitor the smooth running of the processes are listed.

The fourth layer contains the suggested time frames and processes needed to evaluate or monitor the effectiveness of the programme presented in characters (these represent tasks or actions to be taken in monitoring the process). The theoretical framework is presented in Figure 47.

The framework is recommended for audiences involved in the teaching of IS programmes although it can be used in other courses as well. It is clear from the framework that staff involved in the teaching of IS should have a good understanding of the students taking the course from the beginning, as challenges arising may have their root causes in school education. As step one, it may be possible to explain possible challenges timeously through the analysis of the Grade 12 background demographics and explain possible influences on the first year results in the next phase. This will lay a foundation for lecturers to design programmes with a clear vision and develop courses to meet specific student needs.

The second step is for the users to decide on the resources needed to realize their visions and this can be achieved by breaking down programme aspects of IS offering into small pieces that are easy to discuss. By following this process, challenges and solutions are understood in manageable pieces that will not overwhelm the people dealing with them.

Step three will make it possible for staff to decide on the time frames to revisit the programmes as they will see whether the challenge might be on a short term or long term basis. The framework is an ongoing process which can be evaluated in short-term and long-term periods. The researcher believes that through its implementation and monitoring, an excellent teaching and learning environment can be created.

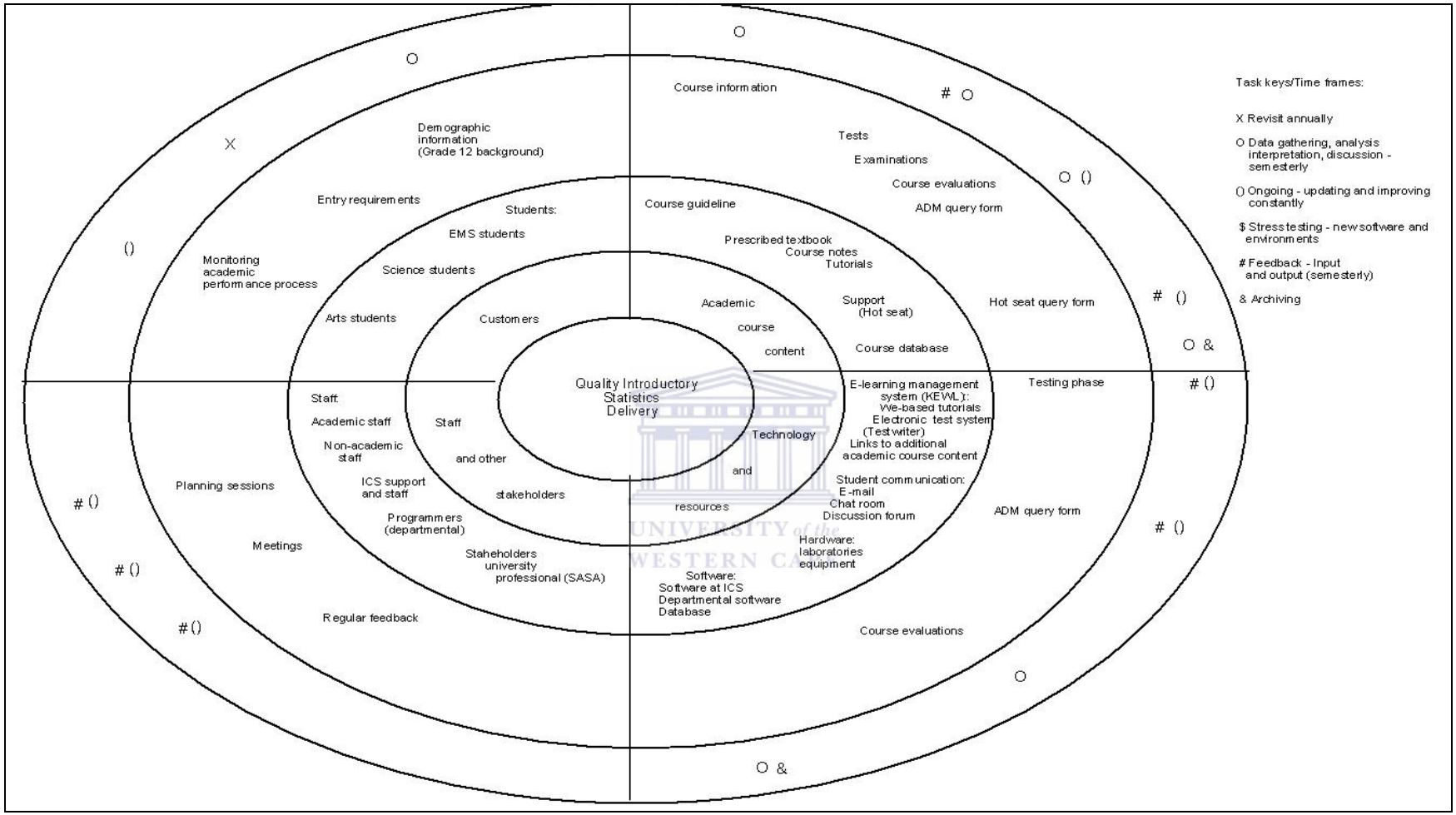

Figure 47: Framework for quality IS delivery

6.4.2 RECOMMENDATIONS FOR THE UNIVERSITY OF THE WESTERN CAPE

The data management process took more time than anticipated due the fact that the data were obtained from the university database, (see Section 3.) The differences in the variables and formats of the university database presented the research team with unnecessary challenges thus delaying the study as time was spent cleaning and trying to understand the data. Furthermore this complicated the analysis of the results as missing values were exaggerated. It is thus recommended that proper structures and improved methods of capturing data be used in future research or projects to ensure and maintain data integrity.

The Chapter 4 analysis of the performance by Grade 12 status showed that the Grade 12 status impacted on the performance of the students in IS. From Figure 30, one can see that the performance of students who had a conditional exemption got worse (percentage increase from A to a G symbol whilst that for students with a full exemption generally decreased from A to a G symbol). Furthermore, students with a good Grade 12 average symbol (Symbol A to symbol C) did well in IS and Figure 31 shows that the pass rate in IS decreased as the Grade 12 average symbol decreased. Based on these findings, it is recommended that there is a need to revisit the entry requirements of students who take IS as one of their courses. There seems to be progress made thus far as the institution has introduced a four year degree extended programme for Science and EMS students, which caters for the underprepared students and instead of six months (semester), they complete the IS course over a full year. There is also an extra period (one hour), instead of the previous three hours in a week that is used for tutorials and added assistance.

Discussions between the EMS faculty and the Statistics department have resulted in an added period of the IS course also four periods instead of the three – hour periods per week as from 2009. The extra period is intended for more open and interactive participation from the students. These are a few steps taken towards addressing the challenges confronting the IS programme.

6.4.3 RECOMMENDATIONS FOR THE DEPARTMENT

The analysis of the student's ranked pre-questionnaire responses and comments showed that although students were excited and looked forward to doing the course, they did not think it was going to be easy. The post-questionnaire analysis of the students after exposure to the course also revealed that the majority of the

students did not think the course was easy. Though students were positive, they still thought it would be challenging, particularly those without a Mathematics background. It can be recommended that there is a need for the department to design structures and implement techniques aimed at the IS students and teach them the importance and role Statistics as a course plays in their daily lives.

The overall impression obtained from student feedback about the IS offering and processes around this was mostly positive. There were, however, concerns and suggestions from the students particularly on the course notes, the tutorials, the laboratory capacity and TestWriter©. One can recommend to the department to strengthen the good work and to find ways of dealing with the challenges that students indicated in order to keep students happy and satisfied as clients. Furthermore, the department has to bring awareness to the UWC for a need to build a new laboratory. Statistics is a course that involves the manipulation of data. Students need the skills to process and analyze data using statistical software and this can only be achieved through the use of computers. The bulk of the first year work (tutorials and tests) already press for the need of computer facilities. The university authorities have to assist the department to achieve all of the goals, especially those of improved computer facilities.

More than a quarter of the IS students fall within the age group 19 to 24 (Table 1, Appendix F1) and the results showed that students within this group were struggling. Furthermore, the majority of the drop-out students were from this age group. It is recommended that the department develop strategies to understand the background of the students, the reasons pertaining to their delayed studies, and their status whilst registered for the IS programme in order to improve their performance, and consequently, the IS pass rate.

The analysis of performance by race showed that African students performed poorly in IS compared to the other ethnic groups (see Figure 29). It is therefore recommended for the department to follow this group and try to investigate the reasons for the poor performance. Support structures have to be set in place to assist African students who do not study in their mother tongue.

The study was dominated by females and the analysis of the results using the three IS profiles '*pass*', '*fail*', '*drop-out*' showed that the females dominated all three groups (percentage of females was above 50% in all

three groups, see Table 2, Appendix F1). It is recommended that workshops and seminars be organized by the department to understand the challenges confronting female students whilst encouraging them at the same time as these challenges might impact on their performance.

In Chapter 4, the t-test was used to test the performance of the IS students given that they had taken at least one course from a specific profile (see Tables 14 to 32, Appendix E).

The tutorials as revealed by the student results and perceptions, are one of the essential tools for learning enhancement in the IS programme. Students appreciated the availability of the component and acknowledged its power towards improving their statistical skills. It is thus recommended that the department ensures that all the processes needed for smooth running and functioning of the tutorials are in place.

The objective to increase the pass rate to 50% and above was achieved (see Figure 26). The results however showed that the pass rate dropped towards the end of the study. It is recommended that the department needs to strengthen its methods to keep the pass rate to 50% and above. The information obtained from the demographic characteristics and from the Grade 12 background has given the department added value as the performance of the students in IS, given a selected Grade 12 subjects can be predicted.

Students taking Physics as a subject at school level performed well in IS. This is an indication that students pursuing Physics at tertiary level should be considered as a pool from which IS students can be drawn. However, clash groups prohibit students in the Physics department of including Statistics as one of their courses. This needs further investigation by both departments.

6.4.4 RECOMMENDATIONS FOR FURTHER RESEARCH

Students in the age group 20-24, did not perform well in IS and they were the majority of students who dropped out (Table1, Appendix F1) To determine why students from this age group did not perform well

and were the majority of the students who dropped out of the IS programme, it is recommended that a longitudinal study be done to try to understand the reasons that lead to the delayed studies at tertiary level.

It is also recommended that future research through a properly designed experiment be planned to compare online tutorials to classroom tutorials as this may provide more useful results.

It may be worthwhile to set up a computer-based e-learning course in future where students can access all teaching material and tutorials online (for the study, only Internet tutorials were available online). If a sufficient pool of students prefers to do the theoretical and tutorial part online where data will be captured immediately through the system, capacity pressures may be relieved and students with sufficient discipline can complete their work online any time of day or night. It is suggested that this exercise be investigated with a carefully planned experimental design to be truly able to conclude the hypothesized statements.

With the new Outcomes-Based Education system (OBE), the previous Grade 12 information will have to be adapted to make provision for new entrance requirements. The profiling of Grade 12 results may provide a good foundation for future analyses. It is recommended that the results of the current study be compared with those of students from the new system, to see whether patterns of the IS students have changed or not.

6.5 CONCLUDING REMARKS

The aim of the study was to monitor the IS programme at the University of the Western Cape (UWC) Statistics Department using an interpretive approach to PE. Five IS groups (five semesters) were used to monitor the IS programme as a single group would not be enough to capture the needed information and processes underlying Programme Evaluation in particular. The application of PE in Higher Education and IS teaching were focused on.

The research objectives presented in Chapter 1 (see Section 1.4) gave the researcher an opportunity to study and obtain a better understanding of the IS student body intake. This information can lead to a better pool of

students majoring in Statistics due to the fact that from the very onset, proper structures can be set in place for challenged students should there be need to do so.

It is clear from the framework that effort needs to be put into obtaining optimum results and consequently customer satisfaction. Administration and processing of Grade 12 information by the university, which is currently done by the university administration, needs to be done properly and meticulously. The department depends on this information to have an understanding of the demographic characteristics as well as the Grade 12 background of the students.

The preparedness and readiness of the students was captured through the pre-questionnaire which covers computer knowledge and perceptions and expectations of the students concerning the IS as a programme (see Section 5.2 for the analysis of the pre-questionnaire). The students are encouraged to access the IS website during an information session on their first day of attending classes. It makes it difficult with the current university time frames and staff-complement to keep up with all the demands timeously. In 2009 for instance, the registration process was extended to the end of the first term, which makes it difficult for the department to capture the information needed to obtain the student background data needed, in time. The Statistics department should be a research department with not a single but two and more administrators and analysts that will be responsible for the capturing and processing of the pre-questionnaire data before lectures commence.

- During the study period and since the completion of the study, several aspects were attended to: Improvements to the course have been implemented since the completion of the study and are still ongoing. A service level agreement has been signed between the EMS faculty and Statistics departments to monitor the quality of the IS programme.
- With respect to laboratory capacity and entry requirements, more laboratories have been built across campus and a review of the entry requirements with the new Grade 12 (OBE) has taken place and will continue to take place.
- Sections of the study have been presented at two national conferences hosted by the South African Statisticians Association in 2006 and 2007. Several publishable papers will also be written in future.

Monitoring all the different components of the course meticulously and acting on information gathered diligently, calls for good leadership and committed staff in this program on all levels. This may ensure optimum success of the implementation of the framework, not only for the department but for all the departments and universities who decide to use it.

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APPENDIX A: STRATEGIC PROCESS

A1: MEETINGS WITH STUDENTS

Agenda

For a 1st year meeting to be held on

Monday 17th May 2004

Tea Room-Statistics Department

1.	Test 4 feedback
2.	End of semester evaluation
3.	Feedback from students-as done in 2003 STA 132/125- NM to ask for suggestions to get more information/feedback from students
4.	Dewaar's report – copy
5.	Report on feedback from assistants-suggestions
6.	Update-STA131/111 demographic data- DK to extract information from database
7.	Assistants party-suggestions (to be further discussed with assistants meeting on 17/05/04)
8.	Update-Corrections to the 1st year notes- Wednesday 02/06.04 @ 09h00

A2: MEETINGS WITH TUTORS

1. Welcome

2.Contract forms

3.Previous workstudy challenges

i) ADM-assistants (identity crisis)

ii) Hot Seat

iii) Punctuality

iv) Absenteeism

v) lack of knowledge of the course material (unpreparedness)

4.Comments/suggestions

i)Training of assistants

ii)Groupwise/ KEWL

iii)Web-based tutorials

5.Self-teach problem solving (Hattas)

6. Meeting closed

VENUE: tea room, Statistics Department

TIME 13h00

1.	Welcome note
2.	Introduction of new TUTORS/ASSISTANTS
3.	Feedback on 1st semester processes
4.	Discussion of second semester processes
5.	Online testing system: Wednesday/21/07/ : 13h00
6.	Date of next meeting

Department of Statistics

Meeting on ADM lab and Web-based tutorials

Date: 6 November 2003

Present: Noma Makapela, Lloyd Corker, Dewar Smith, Renette Blignaout, Shrileen Hercules, Danelle Kotze

1. Members were asked to list ADM laboratory problems and Wed-based tutorial problems related to computers and laboratory matters:

I. Last two rows in lab experience problems. Students are advised to sit with computers in front rows.
II. Logging of results sometimes not recorded.
III. The number of users simultaneously logging in on network/KEWL needs to be tested. What happens when all computers are accessed across campus and from home?
IV. Stress-testing to be conducted in laboratory to determine traffic capability during high usage.
V. Overheating of circuits discussed.
VI. Internet proxies discussed/ bandwidth – (100 meg throughput sufficient?)
VII. KEWL passwords on KEWL not always available – sent back through e-mails.
VIII. Web cam – investigated for high range capabilities.
IX. Obtain a second webcam, place strategically – secured.
X. Server room to be secured – equipment to be locked/secured.
XI. Obtain dedicated computer for webcams.
XII. Maintenance of lab discussed – preferably Monday mornings.
XIII. Big notice board for information/notices.
XIV. Number of profiles to be checked (KEWL, SPSS. SAS)
XV. More training for assistants e.g. maintenance sessions, assertiveness training, communication skills.
XVI. Lab fee and implementation thereof for 2004. Only registered students can use laboratory who paid lab fee.
XVII. What happens when all computers are accessed across campus and from home.

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DEPARTMENT OF STATISTICS

Minutes of a meeting held on Friday 06/0/2004 at 10h00

	Present: DKotze, RBlignaut, LCorker, NMakapela, ASlabber Rlombard
1.	Welcome by DK
2.	Workstudy related Training of assistants to be done by LC & NM Ronelle to post advert in Dept a) Hot seat check list "Hot Seat check list.doc" b) ADM query form "ADM LAB QUERY FORM.doc" c) Hot seat query form "hot seat QUERY FORM.doc" d) Hot seat assessment form "hot seat assessment.doc"
3.	ADM lab related Lab rules and penalties to violation of rules discussed. Students violating lab rules will be removed immediately and their student numbers recorded. More lab coats to be ordered if needed/necessary
4.	Course material related

	Course outline sent to printers. 400 copies to be made. LC to take L1 & part-time class, NM to take STA 111 and AL to take L2. Results by DK indicate that student numbers dropped as the year went by. Dept should aim at improving the drop by 2.5%. Students to be encouraged to complete all the tutorials. Feedback on tests and tuts should be given to students after each test.
5.	Date of next meeting : Monday 09/02/04 11h00

A4: MEETINGS WITH ICS PERSONNEL

KEWL Meeting held on 13th of November 2003

Attendance:

Stats Department

Prof. Danelle Kotze, Lloyd Corker, Noma Makapela, Arno Slabber

KEWL development team

Hilton Flemming, Yaasier Philander

Discussed:

1. Stress Testing

i.No affordable stress testing tools available yet

ii. Looking into open source available tools

2.Password Problems – KEWL

i.Groupwise e-mail – possibly student numbers not registered on groupwise

ii. Anvar Natha – Spokesperson

3.Bandwidth

i.SQL Server Database Vs. Access Database

ii.Possible KEWL SQL Server Database for StatsTuts

4.Server Downtime

i.Backups, Virus Updates, Security Updates – Schedules

Spokesperson – Ian Stamp

5. Discussion Forum

Messages not being post in some cases – OLE DB error messages

6. Bug Checker

Mantice – Stats User Open Account – Track Bugs

Minutets of a meeting hed on Monday 19th July 2004

Venue: Statistics Department Tea Room

Time: 14h00

1.	Process management applied in a E-Learning Environment in Statistics Document " discussed
2.	Planning : 2003 results and info used (please see e-learning document)
3.	Action : 2004 1st semester (also see e-learning document)
4.	Observation: 2004 results (tutorials, tests and exam) compared with 2003 results(please see last 4 pages of e-learning document)

Chapter	Page	Correction(s)
Appendix		
1	7	Examples for parameters and Statistics given
2	12	All small *fs* for cumulative frequency replaced with big *F*s
	13	First paragraph to be moved to page 12 if possible
	14	Question on exercise 2.1 to be moved to bottom page 13 if possible
3	2	2002 to be changed to 2004 in example (a)
	3	To include mean, median and Mode as a heading to" measures of central tendency or location of populations"
	4	Remove spacing before the sentence "The three measures…."
	12	Percentile positions to be corrected to $\frac{p_i * (n+1)}{100}$
		Example 3.9 solution to be supplemented with a line to try to emphasize Q_3 position
	13	Add interquartile range, cv and range to measures of dispersion as headings.

A6: TUTORS TRAINING PROGRAM

1st year tutor training program 2004

Administration

Hot seat (See Hot seat checklist and flow chart)

Sign-on @ Ronel's (Room 3.30): Collect white lab coat & Hot seat query form

Proceed to Hot seat

Record all queries for the day on the query form

Sign-off @ Ronell's (Room 3.30): Drop off white lab coat & Hot seat form

ADM Lab(See ADM checklist & flow chart)

Sign-on @ Ronell's (Room 3.30): Collect white lab coat & ADM query form

Proceed to Hot seat

Record all queries for the day on the query form

Sign-off @ Ronell's (Room 3.30): Drop off white lab coat & ADM form

Claim forms

Coursework

Course reader

Have blue course reader with you at all times @ hot seat

Tutorials

Tutors to be assigned distinct usernames e.g. Tutor1, Tutor 2….. to do Tuts

Tutors to attempt Tuts before … (date to be announced)

Tutors to only assist students who have their course reader open in front of them

Friday meetings

Attend all Friday meetings, lunchtime, no exceptions.

Discuss ADM, Hot seat queries and tutorials to be completed

A7: ADM RELATED INFORMATION DOCUMENTS

A7_1 PROFESSIONALISM CODE OF CONDUCT FOR ASSISTANTS

❖	➢ Assertive (See ADM lab Rules)
	➢ Tutors to ensure ADM lab rules are obeyed ➢ No students to be standing around in the isles ➢ Students waiting to use PC should do so quietly standing at the side of the wall by the entrance ➢ If the ADM lab is full Tutors are to verify each student's receipt at PC
	Punctual
	➢ To ensure the orderly exchange of Tutors at the Hot Seat and ADM lab, be punctual ➢ Hot seat and ADM lab be punctual.
	Communicate ➢ Tutors are encouraged to get to know one another and to share ideas and opinions freely on the delivery of the course to improve our service
	Friendly and Helpful ➢ Always assist with a friendly smile ➢ Don't forget to greet the student before assisting ➢ If not to busy seek out students who need assistance

A: 7_2 POLICY DOCUMENT FOR ADM FACILITY

- No eating and drinking (this includes fruit, water, sweets, etc). The area around each workstation is to remain as it was found

- No unauthorized installation of any software. Should a need arise for particular software to be installed, a timely request needs to made to the lab manager

- Cell phones must be switched OFF before entering the lab. The use of vibrating ring tones and silent profiles are thus disallowed. Should a monitor be damaged due to this rule being contravened, disciplinary action will be taken against the student.

- The lab is meant for academic purposes only (i.e. internet games and FreeCell are prohibited)

- Pornography is strictly prohibited. Failure to abide by this rule could lead to prosecution by the University's Proctor.

- It's requested from all lab users to maintain a reasonable noise level.

- The furniture in the lab (chairs etc.) is NOT to be moved. Also, ONE student is allowed per computer. This rule will be strictly enforced to prevent a fire hazard.

- Finally, the lab assistants and lab manager have been tasked with the responsibility of ensuring the correct use of the facility. Thus, their authority should be recognized all the times.

A7_3 : RULES AND REGULATIONS FOR ALL FIRST YEAR TUTORS WORKING IN THE ADM LAB AND HOT SEAT

- Tutors should wear their white lab coat at all times when working in the ADM lab

- Tutors should work the entire hour(s) for the time they are assigned to work. No leaving before your allocated work time is over because if you do leave before the time you will forfeit the hour(s) you worked

- If you are going to be late or will not be in for work, it's vital that you contact me beforehand to inform me about your situation.

- The ADM lab opens at 8h30 in the morning, so be punctual.

- There will be four senior tutors. There will always be one of them in the lab, sitting at the front. You will sign in and out with them. They are responsible for monitoring whether you are doing your job or not.

- A new policy will be put into place this semester. The policy is, if you are going to be late, stay out of work or come to work late three times without informing me each time, you will be fired effective immediately. This rule goes for both the tutors working in the ADM lab and the Hot Seat.

A7_4: ADM LABORATORY QUERY FORM

1. DATE:

2. TIME:

3. STUDENT NAME:

4. STUDENT NUMBER:

5. STUDENT EMAIL ADDRESS:

6. MACHINE NUMBER:

7.TUT NAME/NUMBER:

8. QUERY

9.RESOLUTION

Student's signature: Assistant's signature:

A7_5: ADM LABORATORY QUERIES

Period	Date	Topic	Query	Query Update
2004sem1	18/02/04		ask for login user name and password	Course work related problem
2004sem1	18/02/04		online tuts stats 131,what is my password	Course work related problem
2004sem1	18/02/04		student could not log into tuts,but did so the previous day	Course work related problem
2004sem1	18/02/04		Only stats 132 available.When logging in says he's not registerd.Student registed for 131 on print out.Reason:Added & deleted 132 & 131.Deleted 132 & Added 131.	Course work related problem
2004sem1	18/02/04		Could not log into statistics tuts	Course work related problem
2004sem1	18/02/04		student could not log into tuts	Course work related problem
2004sem1	18/02/04		can't access tuts outside ADM lab, the student gets an error page after clicking on the link to load online tutorials	Course work related problem
2004sem1	19/02/04		Query about log into system and password was asked for	Course work related problem
2004sem1	19/02/04		Student could not log into program	Course work related problem
2004sem1	19/02/04		Filled the questionaire but the computer said she is not registered	Course work related problem

A7_5: ADM laboratory Queries (Continued)				
Period	Date	Topic	Query	Query Update
2004sem1	19/02/04		Student could not log into system,system said not registered	Kewl login problem
2004sem1	19/02/04		Student is registered for stats 131.Only stats 132 tuts available on Kewl.She could lod into tuts for stat 132,but she's worried that it may not be recorded on the system	Kewl login problem
2004sem1	20/02/04		Problem solving the relative frequency distribution	Kewl login problem
2004sem1	20/02/04		I couldn't log on	Kewl login problem
2004sem1	20/02/04		Problem with a PC.Can't login	Kewl login problem
2004sem1	20/02/04	Tut 1	Kewl login problem	Kewl login problem
2004sem1	20/02/04		Couldn't access stats tuts through Kewl	Kewl login problem
2004sem1	20/02/04		First time log on	Kewl login problem
2004sem1	21/02/04		Not registered on Kewl system,for the tuts	Login tuts problem
2004sem1	21/02/04		Not registered on Kewl system,for the tuts	Login tuts problem
2004sem1	23/02/04	Tut 1	Relative frquency problem (how to calculate it)	Login tuts problem
2004sem1	23/02/04	Tut 4	Problem with expected value of profit question	Login tuts problem

A7_5: ADM laboratory Queries (Continued)				
Period	Date	Topic	Query	Query Update
2004sem1	23/02/04	Tut 1	The answer were right but the system had the problem, so he had to restart the tuts again	Login tuts problem
2004sem1	23/02/04		Student could not log in to groupwise,therefore she could not get her Kewl password	Login tuts problem
2004sem1	23/02/04	Frequency Distribution	Relative frequency questionm the program rejected the right answer therefore the student could not get a 100%.He had a problem with starting a new tutorial so he continued with the tutorial and settled for whatever mark he got	Login tuts problem
2004sem1	23/02/04		Problem logging in.was registered as stats 132 but he did change to stats 131 by add/delete from his faculty(EMS)	Login tuts problem
2004sem1	23/02/04		Cannot sign in to tuts	Login tuts problem
2004sem1	23/02/04		Did the signing in last week but now he can't go into the tuts,because last week couldn't sign in,but just went straight to the tuts	Login tuts problem
2004sem1	23/02/04	Tut 3	Student didn't know how to log into computer.Is a first time PC user	Login tuts problem

A7_5: ADM laboratory Queries (Continued)				
Period	Date	Topic	Query	Query Update
2004sem1	23/02/04	Tut 3	Student could not log into computer and was using wrong username and password	Login tuts problem
2004sem1	23/02/04	Tut 8	Student could not log into computer and was using wrong username and password	Login tuts problem
2004sem1	23/02/04	Stats 131	Student could not log onto tuts PC said she's not registered	Login tuts problem
2004sem1	23/02/04	Stats 131	Student could not log onto tuts PC said he's not registered	Login tuts problem
2004sem1	23/02/04	Stats 111	Student tried to log on for stats111.PC says he's not registered	Login tuts problem
2004sem1	23/02/04		The student only registered for stat 111 on Friday(20/02/04) and he has never used the computer before.He does not have a course outline.He does not have any notes yet	Login tuts problem
2004sem1	23/02/04		The student could not log into the tutorials, the program said he wasn't registered.I checked his registration print out and it reflects that he is registered for the course	Login tuts problem

A7_5:ADM laboratory Queries (Continued)				
Period	Date	Topic	Query	Query Update
2004sem1	23/02/04		Could not log into statistics tuts.The tuts webpage could not open.The player download was successful but the online tutorial page did not open	Login tuts problem
2004sem1	23/02/04	Frequency Distribution	Class interval question.The student was getting the question wrong because when he counted the values in a certain class interval he included the upper limit.The question asked for values between(A but less than B)	Login tuts problem
2004sem1	24/02/04		Login	Login tuts problem
2004sem1	24/02/04		Problem logging in	Login tuts problem
2004sem1	24/02/04		Needs to be registered for the tuts	Login tuts problem
2004sem1	24/02/04		Needs to be registered for the tuts	Login tuts problem
2004sem1	24/02/04		Needs to be registered for the tuts	Outside campus login problem
2004sem1	24/02/04		Can log in but when clicking on online tuts it does not work	Registration
2004sem1	24/02/04		Needs to be registered for the tuts	Registration
2004sem1	24/02/04		He is not registered	Registration
2004sem1	24/02/04		She could not log in to the tuts it gave her an error	Registration
A7_5: ADM laboratory Queries (Continued)				

Period	Date	Topic	Query	Query Update
2004sem1	24/02/04	Stats 131-Frequency Distribution	Apparently not registered for tutorials	Registration
2004sem1	24/02/04		Problem logging on	Registration
2004sem1	24/02/04	Statistics 131	Problem-loggon to Kewl tutorials	Registration
2004sem1	25/02/04		Student cannot use the password that was sent to his email to log in to Kewl.System says not registered	Registration
2004sem1	25/02/04		Student can't use the Kewl password	Registration
2004sem1	25/02/04		Student didn't have a password for the Kewl system	Registration
2004sem1	26/02/04		Used the proper formula for the relative frequency(f/n) but program indicates that the answer is wrong	Registration
2004sem1	26/02/04		Problem with logging in.Student not registered	Registration
2004sem1	26/02/04	Stats 2nd tut	PC doesn'twant to login on Kewl	Registration
2004sem1	26/02/04	Tut 1 question 3	Calculations of the first mode for grouped data	Registration
2004sem1	26/02/04		Not register on the tutorial	Registration
2004sem1	26/02/04	Tut 1	He did not know how to attempt grouped data questions	Registration
2004sem1	26/02/04		Log on to the computer.I did'nt know the password	Registration

A7_5: ADM laboratory Queries (Continued)

Period	Date	Topic	Query	Query Update
2004sem1	27/02/04		Student could not log into Groupwise	Registration
2004sem1	27/02/04		The formlula for 40th percentile was correct as I substituted everything correctly.My answer was 1547.6 and it seems that the computer is ignoring that whole figure.My score for my third tutorial of my second tutorial was 66.6667%	Registration
2004sem1	27/02/04	Tut 1	Calculating the frequency distribution and cumulative frequency	Rejection of right answer
2004sem1	27/02/04	Tut1	He had a problem calculating the median of the grouped data	Rejection of right answer
2004sem2	20/07/04		Did not get a questionnaire	
2004sem2	20/07/04		Did not get a questionnaire	
2004sem2	20/07/04		Did not get a questionnaire	
2004sem2	20/07/04	tut1(3d)	Computer cant take the correct answer	
2004sem2	21/07/04		Never got the questionnaire	

A7_5: ADM laboratory Queries (Continued)

Period	Date	Topic	Query	Query Update
2004sem2	22/07/04	tut1	Computer does not want to accept correct answer	try again
2004sem2	26/07/04		student cant access KEWL,	
2004sem2	29/07/04	tut1	Computer does not want to accept correct answer	
2004sem2	29/07/04	tut1	Computer does not want to accept correct answer	
2004sem2	29/07/04	tut1	Computer does not want to accept correct answer	try again
2004sem2	29/07/04	Tut1	Computer does not want to accept correct answer	student would be reinbursed for the mark
2004sem2	30/07/04		Computer doesn't record the mark	
2004sem2	30/07/04	tut1	Computer doesn't record the mark	
2004sem2	30/07/04		Computer does not want to accept correct answer	
2004sem2	30/07/04	tut1	There was an error that I failed to sort outincluding lecturer	
2004sem2	30/07/04	tut1Section2	Computer does not want to accept correct answer	
2004sem2	31/07/04	Tut1(q3)	Computer does not want to accept correct answer	
2004sem2	06/10/04	Confidence interval2 and Hypothesis testing	Computer does not want to accept correct answer	

A7_5: ADM laboratory Queries (Continued)

Period	Date	Topic	Query	Query Update
2004sem2	14/10/04	Regression	Computer recording a less mark, all answers correct	student would be reinbursed for the mark
2004sem2	21/10/04	time series 1	Computer recording zero mark	None. May be system programmed incorrectly
2004sem2	21/10/04	Regression	Computer recording a less mark, all answers correct	Asked lecturer to look at the problem
2004sem2	21/10/04	time series 2	Computer recording a less mark, all answers correct	student would be reinbursed for the mark
2004sem2	21/10/04	time series 2	Computer recording a less mark, all answers correct	student would be reinbursed for the mark
2004sem2	22/10/04	time series 1	Application error at 0X00456 cell, memory at 0X00000000, no mark recorded	Informed lab manager
2004sem2	22/10/04	time series 1	Application error at 0X00456 cell, memory at 0X00000000, no mark recorded	Informed lab manager
2004sem2	25/10/04	time series 1 and 2	Computer does not want to accept correct answer	
2004sem2	25/10/04	time series 1	No answers showing	
2004sem2	25/10/04	time series	No answers showing	
2004sem2	25/10/04	regression, time series 1 and 2	less mark recorded or no mark given at all, tried many times	
2004sem2	25/10/04	time series 1	reference memory error, error terminates the programme	Tutor will inform lecturers of this serious problem
2004sem2	25/10/04	time series 2	does not give full marks	
2004sem2	25/10/04	time series 2	does not give full marks	problem will be looked at by lecturers

A7_5: ADM laboratory Queries (Continued)				
Period	Date	Topic	Query	Query Update
2004sem2	25/10/04	time series 1	application error when student wants to record mark	problem will be looked at by lecturers
2004sem2	29/10/04	time series(tut15)	Computer recording zero mark	
2004sem2	29/10/04	time series(tut15)	Computer recording zero mark	suggested extension of due data
2005sem1	22/02/05	frequency 1	doesn't take the correct answer question3 no: a	
2005sem1	09/03/05	probability section 2		I could not resolve please email student guidelines.
2005sem1	16/03/05	probability section 2	the score remains the same regardless of what answer I fill in.	
2005sem1	17/03/05	probability 4	My working out and answer was correct but the computer would not accept my answer final question on probability.	
2005sem1	17/03/05	Probability	all answera are correct yet the mark remains at 96%not 100%	

A7_5: ADM laboratory Queries (Continued)				
Period	Date	Topic	Query	Query Update
2005sem1	17/03/05	probability 4	I was doing the final question in the tutorial and found the correct answer but the computer would not accept it.	
2005sem1	07/04/05	probability section4	tutorial no:4 of probability sectiones it does not register 100%	
2005sem1	23/03/05	probability section4	question 4: total colourblind doesnot take the correct answer.	
2005sem1	24/03/05	probability section4	the computer program gives me 33% for my set of work although everything is correct .when checking whether my answers are correct the computer indicates that it is.thus I donot get a clear reflection of my work.	
2005sem1	12/04/05	probability 3	Question 4(find p(A and B),Answer entered was not correct.	used formula and still answer was incorrect.

A7_5: ADM laboratory Queries (Continued)				
Period	Date	Topic	Query	Query Update
2005sem1	12/04/05	confidence interval 2	problem with question 5:I'm not getting a full mark all calculation are correct	Noma to check /report tuts to Lody and frans
2005sem1	13/04/05	Binomial distribution	there is a bug in question2,it does not wether the answer is correct or wrong the result are always 25%	restart the tut
2005sem1	13/04/05		the computer states that my account has been disable	
2005sem1	14/04/05	probability 4	all answers are correct but machine shows 67% eventhough answers are checked individually	

A7_5: ADM laboratory Queries (Continued)				
Period	Date	Topic	Query	Query Update
2005sem1	14/04/05	probability4 last question	computer doesn't accept answers together but does individually it gives /shows 67%	
2005sem1	14/04/05	prob.4 last rage	computer doesn't accept answers together but does individually it gives /shows 67%	you tell me.
2005sem1	15/04/05	1-distribution of random	question 2 at a maternity hospital 42% of all babies are born ia baby girl,if or a specific day,6babies are born what is the probability that 4 will be a baby boy.	
2005sem1	15/04/05	probability 3	I got everything correct but it gives me 80% for the last section.please correct it I want to obtain my 100%for this tutorial.	I want to obtain 100%for this tut.
2005sem1	15/04/05	probability 4 last question	same problem as always	

A7_5: ADM laboratory Queries (Continued)				
Period	Date	Topic	Query	Query Update
2005sem1	15/04/05	distribution of random	question3 an airline company usually book 8 passengers per flight the probablity is077 that a passenger will arrive for a flight.what ia the probability that,computer has already recorded the score of 75%	
2005sem1	15/04/05	probability 3	not accepting the answers shows 67%	
2005sem1	15/04/05	probability 1 last question	it gives the same percentage which is 51%for both the expected profit and varience profit which are correct.if I take out each it still give me the 51%	
2005sem1	19/04/05	confidence interval 1	my answer always ends up as 0% is right.	
2005sem1	23/04/05	confidence interval 1	question 5 not working at all	
2005sem1	26/04/05	confidence interval 2	question5 not working at all	

A7_5:ADM laboratory Queries (Continued)				
Period	Date	Topic	Query	Query Update
2005sem1	28/04/05	confidence interval 2	refer to question 5	
2005sem1	28/04/05	confidence interval 2	question 5 the system does not accept the correct answer.	
2005sem1	28/04/05	confidence interval 2	I used the right formula and put in the right answers but the computer won't accept it.	I would like you to give me my full marks for the question please.
2005sem1	28/04/05	confidence interval 2	question 5 does not want to accept my answers after I have repeatedly tried to calculate it.even the tutor on duty could not answer it.	I would like you to give me my full marks for the question please.
2005sem1	02/05/05	confidence interval 1&2	I have ettempted question 5 of the above mentioned tuts and my solution is not correct according to the system.i would like to know why,since I did use the correct formula.	I would like you to give me my full marks for the question the two questions,since it is technically correct.
2005sem1	03/05/05	confidence interval 2	question 5answer not the same as computer.	

A7_5: ADM laboratory Queries (Continued)				
Period	Date	Topic	Query	Query Update
2005sem1	03/05/05	confident iterval 2 questin5	the system does not take the answer.	
2005sem1	03/05/05	Binomial distribution	question 1answeras are correct but it gives me overall of 75%.	
2005sem1	03/05/05	confidence interval 2	used the proper formula and cprrect values but my answers still kept coming to 0%	
2005sem1	03/05/05	confident iterval 2 questin5		
2005sem1	04/05/05	confidence interval 2	answer not corresponding with computer	
2005sem1	05/05/05	confidence interval 2	answer not corresponding with computer	
2005sem1	05/05/05	confidence interval 2	question 5	

A7_5: ADM laboratory Queries (Continued)				
Period	Date	Topic	Query	Query Update
2005sem1	05/05/05	confidence interval 2	when I worked the question out it said the answer was wrong the tutors worked out the question and got the same answer as mine and computer still said it was wrong.	
2005sem1	05/05/05	confidence interval 2	question 5	correct the unreliable system.
2005sem1	05/05/05	confidence interval 2	qustion5 answers doesn't work all the answers I have tried does not work tutors also cannot find solution.	
2005sem1	05/05/05	confidence interval 2	question 3	
2005sem1	05/05/05		question 5 has a problen and can not be solved by me as well as assited by a tutor.	
2005sem1	06/05/05	confidence interal 1question 2	answer was right but the computer said it is wrong.	

A7_5: ADM laboratory queries (Continued)				
Period	Date	Topic	Query	Query Update
2005sem1	06/05/05	Confidence interal 1question 5	my answers were wrong.	I need the answers to be right.
2005sem1	06/05/05	Confidence interal 1question 4	my answers are wrong but whe check are correct.	I need the answers to be right.
2005sem1	06/05/05	Confidence interal 2question 5	I have the right answer but just does not want to work even tutors could not find a solution.	please check system.
2005sem1	06/05/05	Confidence interval 2 question 5	answers for question 5 does not want to work	redo the system
2005sem1	06/05/05	Confidence interval 2 question 5	answers does not want to work	correct the system.
2005sem1	06/05/05	Confidence interal 1question 5	does not take the right answer.	
2005sem1	06/05/05	Confidence interal 1question 5	does not take the right answer.	

A7_5: ADM laboratory Queries (Continued)				
Period	Date	Topic	Query	Query Update
	10/05/05	Hypothesis testing question 4	error an testing statistics.	
	10/05/05	hypothesis testing	computer does not accept the critica value.	
	10/05/05	hypothesis testing	computer does not accept the critica value.	
	11/05/05	time series 1&analysis1	the computer did not show my score of what I did and it didi not record my marks.the question showed the white blank picture.	
	11/05/05		kept giving me 17%eventhough the answers were correct.	
	12/05/05	regression analysis	I am positively sure that I had all the naswers right I even did the tutorial over again but kept on getting 17%	
	12/05/05	hypothessis question 4	It does not accept the critical value.	
A7_5: ADM laboratory Queries (Continued)				

Period	Date	Topic	Query	Query Update
	12/05/05	hypothessis testing question4&3	critical value	
	13/05/05	time series 1&analysis1	an error occurred on my PC. The following error is as follows"program error runa6w32.exe has generated errors and will closed by windows. You will need to restart the program .an error log is bang created.this occur after completion of this tut. This was my second attempt on this tut after i identified	
2005sem1	19/05/05	tut number 13		
2005sem1	19/05/05	hypothesis testing		
2005sem1	18/05/05	hypothesis testing		
2005sem1	18/05/05	time series 1&analysis1		

A7_5: ADM laboratory Queries (Continued)				
Period	Date	Topic	Query	Query Update
2005sem1	18/05/05	hypothesis testing question 4		
2005sem1	18/05/05	time series 1&analysis1		
2005sem1	18/05/05	time series 1&analysis1		
2005sem1	18/05/05	hypothesis testing/ 12 question 4		
2005sem1	26/07/05	Tutorial1 question 3.A	The question does not work with the relative frequency. I used the right formula as well as the tutor, yet the correct answer does not want to be accepted.	
2005sem1	28/07/05	2nd last Question 2A tutorial 1.	Your question does not work even if I put the correct answer it still wont be accepted by your PC-package	

A7_5: ADM laboratory Queries (Continued)				
Period	Date	Topic	Query	Query Update
2005sem1	29/07/05	Frequency distribution Question 3.A	The question does not work with the relative frequency. I used the right formula as well as the tutor, yet the correct answer does not want to be accepted.	I want the 100% I deserve.
2005sem1	26/07/05	The frequency distribution question 2.A tutorial 1	I did my tutorial correct but it is still giving me less than a 100%. The frequency distribution question 2.A	Someone maybe the assistant to check the problem with the question, the way the have been set and try to contact me with their solution or send it to my e-mail then I will try to do it again.
2005sem1	30/07/05	The frequency distribution question 2.A tutorial 1	I did my tutorial correct but I get less mark.	
2005sem1	2/08/05	Tutorial 1 Frequency distribution Question 3.A	Question 3.A what is the relative frequency of graduates earning a salary between 483 and 468 each week. The frequency is 10 and I worked it out 10/50 but the computer does not want to accept my answer. The tutors also tried and said it's correct but the computer still does not accept my answer.	

A7_5: ADM laboratory Queries (Continued)				
Period	Date	Topic	Query	Query Update
2005sem1	02/08/05	Tutorial no. 1	I was asked to find the relative frequency of graduates earning the salary between 528 and 542 each week. The frequency is 9. However the answer was said to be wrong on the computer/ was not accepted. The answer being 0.2368. Total n being 38 and class width being 14.	
2005sem1	03/08/05	Tutorial 1 Frequency distribution Question 3.A	My calculation are all correct but the score is below 100%	I want you to fix the question and give me my total marks.
	03/08/05	Tutorial 1 Frequency distribution Question 3.A	Question A what is the relative frequency of graduates earning a salary between 410 and 448 each week? But my total frequency given 36 My solution 0.2778, but my answer is disregarded whereas I know it is correct.	
2005sem2	03/08/05	Grouped data	I was using the right formulas to calculate but it just said that I have 0%	
2005sem2	03/08/05	Tutorial 1- frequency distribution	Found problem with first tutorial where I needed to calculate relative frequency between intervals 508 and 566.	

A7_5: ADM laboratory Queries (Continued)				
Period	Date	Topic	Query	Query Update
2005sem2	05/08/05	Frequency distribution is not working correctly.		
2005sem2	05/08/05	Frequency distribution s	a) what is the relative frequency of the graduates earning a salary between 692 and 714 each week.	
2005sem2	05/08/05	Tutorial 1 frequency distributions	Question what is the relative frequency between 608 and 644 frequency is 10.	f/n=10/35=0.2857
2005sem2	11/08/05	a) what is the relative frequency of graduates earning a salary between 320 and 336 each week. Answer 9/39= 0.2308(correct)		
2005sem2	12/08/05	Tutorial 1 frequency distributions	Relative frequency. The correct formula was used but the answers remain incorrect.	
2005sem2	12/08/05	Frequency distributions. No.3	The frequency distribution question number 3.A relative frequency is not working I am doing the right formula yet the PC is not accepting my answer. Therefore I got 75% for this question.	

A7_5: ADM laboratory Queries (Continued)				
Period	Date	Topic	Query	Query Update
2005sem2	16/08/05	Frequency distributions	For question 2(a) frequency of salaries for each week between (840<872)	9/36=0.2500
2005sem2	16/08/05	Frequency distribution	Machine does not take my correct answer.	0.4781
2005sem2	16/08/05	Frequency distribution	Machine does not take my correct answer.	0.2727
2005sem2	16/08/05	Frequency distribution	Question 3(a) wont accept answer asked question relative frequency between 522 and 536 frequency is 5 536-522*5/14=5	5/31=0.1613
2005sem2	16/08/05	Relative frequency	The machine won't accept my answer sample size =40 frequency =7 =7/40=0.175 this is the correct answer but machine won't accept.	
2005sem2	16/08/05		I received 100% for my entire test page except the last page I received 95% for last page of my test and I am very dissatisfied because all my answer are correct. My final mark of 98% has been recorded but I am supposed to receive 100%. Would really appreciate it if my mark was adjusted to 100% as all the answer is correct.	

A7_5: ADM laboratory Queries (Continued)				
Period	Date	Topic	Query	Query Update
2005sem2	18/08/05	Grouped data	Question 7 to calculate the 40^{th} percentile all calculations was done right but the computer did not want to accept answer after I calculated everything.	We have used the right formula Q40= lower =c (Q40position –F (<)]/fq Hypothesis testing, but all in vain.
2005sem2	19/08/05		Question A-tutorial records incorrectly.	
2005sem2	19/08/05	Frequency distribution	Question (A) of the exercise my answer is marked wrong in the computer but the formula I used was correct.	(a) sample size =36 Frequency =140 interval (580,660) Relative frequency =f/n=10/36=0.2778
2005sem2	19/08/05	Frequency distribution	Question (a) what is the relative frequency of graduates earning a salary between 600 and 640 each week.	Sample size= 38 interval (600,640), frequency =7 relative frequency = f/n =7/38=0.1842.
2005sem2	22/08/05	Probability section 1	My answer to the last question was correct however the computer refused to take it the tutor (Jimmy) also tried and got the same answer as I did. I used the right formula did my calculations correctly and my answer was still refused.	

A7_5: ADM laboratory Queries (Continued)				
Period	Date	Topic	Query	Query Update
2005sem2	30/08/05	Probability 4	I have done all the formula to be followed, but the system keeps on saying my score is less that 67% it says like this even if there is no answer.	
2005sem2	30/08/05	Probability 1	I can not get the marks after I followed everything in the formula.	Gave the formula.
2005sem2	31/08/05	Probability section 4	Suppose 31% of the population is female and 69%is male further suppose the 8% of male and 11% of female are colorblind, find the probability that a randomly selected individual is colorblind. © colorblind	P(m U f) = p(m) + p(F) =0.69*0.08) +(0.31*0.11) =0.0552 + 0.0341 =0.0893.

A7_5: ADM laboratory Queries (Continued)				
Period	Date	Topic	Query	Query Update
2005sem2	02/09/05	Probability 3	The last page of probability three is inconsistent; this is because upon consulting with the tutor and comparing answers from previous attempts, it is clear that the pc does not accept what should clearly be the correct answer. Further more on the same page it will give a lower % for your second try, even though you did not change any of the correct answers.	
2005sem2	13/09/05	Binomial distribution	The question asked to calculate the probability if n=11, p=0.78 and r=0, the tutor and myself got the same answer the computer said it was incorrect. Question 1b the answer was 0.00000005843183.	
2005sem2	15/09/05	Binomial distribution	Question 2a where less than 7 will be boys calculate the probability, my answer is 0.4316 but I will still get 75% for the entire question2. The tutor and I got the same answer.	

A7_5: ADM laboratory Queries (Continued)				
Period	Date	Topic	Query	Query Update
2005sem2	16/09/05	Confidence interval 2	Question 5 of this tutorial would not accept even with the help of a tutor. Question two sample (random) of size 38&19 are randomly selected. The information given is: 1.sample size 38.00, mean 590.00 &std 55.00.2sample size 19.00 mean 444.00&std 80.00.calculate a 90%confidence interval for the difference between the populations.	((mean1-mean2) +_z alpha/2*square root of std^2/n1+std^2/n2. answer (112.4305,179.5695)
2005sem2	16/09/05	Confidence interval, 1 page5 question 5.	I have been trying to work out the answer, and it would not accept my answer. The tutor helped me and got to same answer as mine. I want to know what is wrong. The question is: a random sample size of 26 with a mean of 112.32 and a std of 42.57. Calculate the 99% confidence interval .formula use: mean +_ t alpha/2 (std/square root of n) answer (89.0486, 135.5914).	

A7_5: ADM laboratory Queries (Continued)				
Period	Date	Topic	Query	Query Update
2005sem2	16/09/05	Confidence interval 2	I think I got 100% for my confidence interval 2 tutorial qu5: 1 sample size 29.00, mean 382 and std 60. 2 sample size 28, mean 570 and std 88.formula used ((mean1-mean2) +_ z alpha/2*square root of the std^2/n1+std^2/n2).	
2005sem2	16/09/05	Confidence interval 2, question5	I think I have to get 100% for confidence 2, question for left limit and right limit I had: 1 sample size 32, mean 678 and std 55. 2sample size 25, mean 556 and std 56. I had to calculate a 90% C.I for the difference between the populations. Formula used ((mean1-mean2) +_ z alpha/2*square root of the std^2/n1+std^2/n2). Answer left limit 97.6023, right limit 156.4179. I have to get 100%.	

A7_5: ADM laboratory Queries (Continued)				
Period	Date	Topic	Query	Query Update
2005sem2	16/09/05	Confidence interval	Question: a randomly samples of size 37 and 10 are randomly selected. The information is given below: 1 sample size 37.00 mean 702 and std 100. 2 sample size 10 mean 619 and std 48. Calculate a 95% C.I for the difference between the populations mean.	Formula used ((mean1-mean2) +_ z alpha/2*square root of the std^2/n1+std^2/n2).answer left limit 39.1459 and right limit 126.8541
2005sem2	19/09/05	Normal distribution	Question 2 weekly wages, mean R205, std R41 and random sample of 650 workers. How many workers do you expect will earn between R164 and R285.36. My answer is 530.595 and tutor is same.	
2005sem2	20/09/05	Confidence interval part 2	Question 5. Computer does not accept answer. Formula used ((mean1-mean2) +_ z alpha/2*square root of the std^2/n1+std^2/n2).answer left limit 213.5937 and right limit 256.4063	
2005sem2	27/09/05	Confidence interval 2	The last question that is question 5 does not work properly, I worked it all out correctly but the computer does not seem to agree. Can I please get 100%at this tutorial I took so long completing it; The tutor says it is right.	
A7_5: ADM laboratory Queries (Continued)				

Period	Date	Topic	Query	Query Update
2005sem2	27/09/05	Confidence interval 2	Question 5 I have tried it a many times, but still it does not want to accept the answer and I know that it is right.	
2005sem2	27/09/05	Tutorial number 4	Question 5 of that tutorial 4 did not work. All answer correct but computer said otherwise.	
2005sem2	27/09/05	Confidence interval 2	Question 5 of C.I 2. My calculations are right but the computer says it is wrong. The tutor checked it and said that is right. So please could give my 100%	
2005sem2	27/09/05	Confidence interval 2	Machine not giving correct answers. Tutorial 4 question 5.	Information: 1 sample size 34, mean 722 &std ^2:9025: sample size 13, mean 290&std ^2: 2304 alpha 2.575. Formula used ((mean1-mean2) +_ z alpha/2*square root of the std^2/n1+std^2/n2).answer left limit 387.2503371 and right limit 476.7496629
2005sem2	27/09/05	Confidence interval 2	Question 5 and question 2 was correct and the computer marked it wrong. The tutor checked it and I got 60%instead of 100%.i will try to do it again.	
2005sem2	27/09/05	Confidence interval 2	Question 5 it was marked wrong but I know it is right (did it like about 100 times)	

A7_5: ADM laboratory Queries (Continued)

Period	Date	Topic	Query	Query Update
2005sem2	27/09/05	Confidence interval 2	Tutorial 4 question 5 all the methods I tried I could not get an answer.	Information: 1 sample size 34, mean 722 &std ^2:9025: sample size 13, mean 290&std ^2: 2304 alpha 2.575. Formula used ((mean1-mean2) +_ z alpha/2*square root of the std^2/n1+std^2/n2).answer left limit 387.2503371 and right limit 476.7496629
2005sem2	27/09/05	Confidence interval 2	Question5 was marked wrong, but it was right when the tutor check it.	
2005sem2	27/09/09	Confidence interval 2	Machine does not give correct answer of question 5	Information: 1 sample size 34, mean 722 &std ^2:9025: sample size 13, mean 290&std ^2: 2304 alpha 2.575. Formula used ((mean1-mean2) +_ z alpha/2*square root of the std^2/n1+std^2/n2).answer left limit 486.1774 and right limit 377.8226
2005sem2	27/09/05	Confidence interval 2	Tutorial 4 question 5 answers not working.	Information: 1 sample size 22, mean 722 &std ^2:9025: sample size 25, mean 290&std ^2: 6400 alpha 2.575. Formula used ((mean1-mean2) +_ z alpha/2*square root of the std^2/n1+std^2/n2).answer left limit 230.2357 and right limit 363.4643
2005sem2	27/09/05	Confidence interval 2 question 5	Machine query	Formula used ((mean1-mean2) +_ z alpha/2*square root of the std^2/n1+std^2/n2).answer left limit 126.5557 and right limit 157.4443

A7_5: ADM laboratory Queries (Continued)				
Period	Date	Topic	Query	Query Update
2005sem2	27/09/05	Confidence interval 2	Machine does not give the correct answer.	Information: 1 sample size 22, mean 654 &std 100 sample size 25, mean 514&std 64 alpha 2.575. Formula used ((mean1-mean2) +_ z alpha/2*square root of the std^2/n1+std^2/n2).answer left limit 75.9666and right limit 204.0334
2005sem2	29/09/05	Confidence interval 2	Question 5 2 random samples of size 49 and 13 are randomly selected. The information is given below: sample size 1 is49, mean 568 and std 55 , sample size 2 is 13, mean 451 and std 80 Calculate the 99% C.I for the difference between populations mean.	Formula used ((mean1-mean2) +_ z alpha/2*square root of the std^2/n1+std^2/n2).answer left limit 93.462 and right limit 140.558
2005sem2	29/09/05	Confidence interval 1	None of the answers that I enter after I have calculated the question, which is asked, are correct the pc I tried all the formulas and still end up writing 0%.	
2005sem2	29/09/05	Confidence interval question 2	Not working.	
2005sem2	29/09/05	Confidence interval 2	Question 4&5. The machine can not accept my answer.	
2005sem2	29/09/05	Confidence interval 1&2	System problem does not accept my answer.	

A7_5: ADM laboratory Queries (Continued)				
Period	Date	Topic	Query	Query Update
2005sem2	28/09/05	Confidence interval 2	Question 5 was detected but the answer is right.	Information: 1 sample size 45, mean 424&std 100 sample size 22, mean 367&std 80alpha 1.645. Formula used ((mean1-mean2) +_ z alpha/2*square root of the std^2/n1+std^2/n2).answer left limit 19.7368and right 94.2632.
2005sem2	29/09/05	Confidence interval 2	Question 5i used the right formula got the right answer but it did not work even their tutors helped me. I have 50%at this moment for confidence interval 2	Information: 1 sample size 52, mean 590&std 80 sample size 10, mean 430&std 88alpha 2.575 Formula used ((mean1-mean2) +_ z alpha/2*square root of the std^2/n1+std^2/n2).answer left limit 2151.0031 and right 1097.1416.
2005sem2	29/09/05	Confidence interval question 4	Answered me the right question formula and got 0% from me machine.	Information: 1 sample size 29, mean 602&std 232sample size , mean 367&std 80alpha 1.645. Formula used ((mean) +_ z alpha/2*square root of the std^2/n.answer left limit 482.9551 and right721.0499

A7_5: ADM laboratory Queries (Continued)				
Period	Date	Topic	Query	Query Update
2005sem2	29/09/05	Confidence interval 2 , question 2&5	Worked out these questions many times but it does not want to work. Tutor and fellow students helped me checked it but the computer says it's wrong it is in fact correct. Measurements of the weights of random sample 74 mean 0.64 std 0.0384. 99% C.I	Mean +_ alpha/2 (std/square root of n) answer left 0.6285 and right 0.6515.
2005sem2	29/09/05	Confidence interval 2. question 5	Work out the answers the correct the pc does not accept my answer.	
2005sem2	29/09/05	Confidence interval 1 question 3	Used the correct formulae but the answer remains wrong. The tutor agreed that it was right formulae used.	
2005sem2	29/09/05	Confidence interval ,question 3	I used the right formula & instructions but the answer is still marked wrong.	
2005sem2	29/09/05	Normal distribution question 2	I used the correct formula and my answer was checked by two of the tutors who got the same answer as I did but the computer did not accept it.	Mean=295, std 33 and x great than 242.2. Answer 0.9452.
2005sem2	29/09/05	Binomial distribution	In question 3 I used the right formula and got the correct answers but the machine does not mark the answer to give marks it still give 25% not 100%	The solution was to change the machine to another machine and everything was absolutely fine.

A7_5: ADM laboratory Queries (Continued)				
Period	Date	Topic	Query	Query Update
2005sem2	30/09/05	Confidence interval 1	I had a problem with question 4 &5	
2005sem2	30/09/05	Confidence interval question 5	When I use the formula for the difference between the population means is not correct	
2005sem2	30/09/05	Confidence interval 2	The pc fails to accept a correct answer. Tutor helped and lecturers help did not work.	
2005sem2	30/09/05	Confidence interval 2	Error in question 5.	
2005sem2	30/05/09	Confidence interval 1 and 2	Question 4 &5, the computer is not accepting the correct answers. Correct formula used, rechecked as well.	
2005sem2	30/09/05	Confidence interval 2 question 5	Confidence interval 2 question 5	
2005sem2	30/09/05	Confidence interval 2 question 5	Confidence interval 2 question 5	
2005sem2	30/09/05	Confidence interval 1	Confidence interval 1	
2005sem2	30/09/05	Confidence interval 2 question 5	Confidence interval 2 question 5	
2005sem2	30/09/05	Confidence interval 2 question 5	Confidence interval 2 question 5	

A7_5: ADM laboratory Queries (Continued)				
Period	Date	Topic	Query	Query Update
2005sem2	30/09/05	Confidence interval 2 question 5.	Confidence interval 2 question 5.	Formula used ((mean1-mean2) +_ z alpha/2*square root of the std^2/n1+std^2/n2).
2005sem2	30/09/05	Confidence interval 2 question 5.	Confidence interval 2 question 5.	
2005sem2	30/09/05	Confidence interval 2 question 5.	Confidence interval 2 question 5.	
2005sem2	30/09/05	Confidence interval 2 question 5.	Confidence interval 2 question 5.	
2005sem2	30/09/05	Confidence interval 2 question 5.	Confidence interval 2 question 5.	
2005sem2	1/10/05	Hypothesis question4	Hypothesis question4	Start another question or record your mark.
	04/10/05	Confidence interval 2 question 4	Confidence interval 2 question 4	
	04/10/05	Confidence interval 2 question 4	Confidence interval 2 question 4	
2005sem2	04/10/05	Confidence interval 2 question 5.	Confidence interval 2 question 5.	I need marks please.
2005sem2	05/10/05	Hypothesis testing	Hypothesis testing	2.33
2005sem2	07/10/05	Confidence interval 2	Confidence interval 2	
2005sem2	07/10/05	Regression analysis.	Regression analysis.	

A7_5: ADM laboratory Queries (Continued)				
Period	Date	Topic	Query	Query Update
2005sem2	07/10/05	Confidence interval 2	Confidence interval 2	
2005sem2	07/10/05	Regression analysis.	Regression analysis.	
2005sem2	07/10/05	Hypothesis testing.	Hypothesis testing.	
2005sem2	10/10/05	Hypothesis testing	Hypothesis testing	
2005sem2	11/10/05	Index numbers	Index numbers	
2005sem2	11/10/05	Hypothesis testing	Hypothesis testing	N=23,df=22 and significance 1.0% answer:2.5083 (4) n=33+17=50 earning capacity between 2groups at 2.5% significance ,answer+_2.24 Test statistics: -7/square root of 22.0909=-0.8579.
2005sem2	11/10/05	Hypothesis testing	Hypothesis testing	
2005sem2	11/10/05	Time series analysis1	Time series analysis1	
2005sem2	11/10/05	Hypothesis testing question 3	Hypothesis testing question 3	2.5083=2/100=0.02/2=.01,df=23 T=sample mean- population mean/std=2.085-2.075/0.08/square root of n(23) Answer: 0.0261.
2005sem2	11/10/05	Hypothesis last question	Hypothesis last question	Formula used : z=(p1-p2)/square root of p^(1-p^)(1/n+1/n2)

A7_5:ADM laboratory Queries (Continued)				
Period	Date	Topic	Query	Query Update
2005sem2	11/10/05	Hypothesis testing	Hypothesis testing	Question3: Critical value:10/100=0.1, z=-1.289 , test statistics 0.27-0.40/8/square root of 114 =-0.13/0.7493 =-0.1735 Question 4 Test statistics z=(mean 1 – mean 2)/square root of std1^2/n1+std2/n2 = (1292-1284)/square root32.25^2/60+23.25^2/75 Answer: =1.6148.
2005sem2	11/10/05	Hypothesis testing question 4	Hypothesis testing question 4	Record your mark 92%.
2005sem2	11/10/05	Hypothesis testing question 4	Hypothesis testing question 4	1. Critical value 1.645 2. Test statistics z=(mean 1 – mean 2)/square root of std1^2/n1+std2/n2 n1-mean2) Answer=-1.0244 3. Conclusion: we accept
2005sem2	11/10/05	Tutorial 8 hypothesis testing	Tutorial 8 hypothesis testing	Record your mark and start over again.75%.
2005sem2	13/10/05	Hypothesis testing	Hypothesis testing	
2005sem2	13/10/05	Time series	Time series	
2005sem2	14/10/05	Hypothesis testing	Hypothesis testing	

A7_5 : ADM laboratory Queries (Continued)				
Period	Date	Topic	Query	Query Update
2005sem2	14/10/05	Hypothesis testing	Hypothesis testing	
2005sem2	14/10/05	Hypothesis testing	Hypothesis testing	
2005sem2	14/10/05	Hypothesis testing	Hypothesis testing	Critical value -1.64or 1.64 2. Test statistics z=(mean 1 – mean 2)/square root of std1^2/n1+std2/n2 n1-mean2) 1496-1500/square root of 39.25^2/42+47.5^2/30 answer=-0.3782 we accept.
2005sem2	14/10/05	Time series analysis 2	Time series analysis 2	
2005sem2	14/10/05	Time series analysis2	Time series analysis2	
2005sem2	14/10/05	Time series 2	Time series 2	
2005sem2	14/10/05	Time series analysis2	Time series analysis2	Must be given 100% I got every thing correct.
2005sem2	14/10/05	Hypothesis testing	Hypothesis testing	Correct all answers to correct % as it should be.
2005sem2	14/10/05	Regression analysis	Regression analysis	
2005sem2	14/10/05	Regression analysis 2 and regression analysis	Regression analysis 2 and regression analysis	
A7_5: ADM laboratory Queries (Continued)				

Period	Date	Topic	Query	Query Update
2005sem2	14/10/05	Time series analysis 1	Time series analysis 1	
2005sem2	14/10/05	Hypothesis testing ,question 4	Hypothesis testing ,question 4	
2005sem2	14/10/05	Hypothesis testing	Hypothesis testing	Give me my marks please.
2005sem2	14/10/05	Time series analysis 2	Time series analysis 2	
2005sem2	14/10/05	Time series analysis 1	Time series analysis 1	Give me the marks.
2005sem2	14/10/05	Time series analysis 2	Time series analysis 2	
2005sem2	14/10/05	Confidence interval 2	Confidence interval 2	Formula used ((mean) +_ z alpha/2*square root of the std^2/n.answer left limit -67.9835 and right 49.9834898.
2005sem2	15/10/05	Hypothesis testing	Hypothesis testing	A: n=114, mean=48, p(a)=48/114 B: n=123,mean=42,p(b)=42/123 Formula: (p1-p2)/square root of p1(1-p1)+p2(1-p2)*(1/144+1/123) Answer: 1.3667.
2005sem2	15/10/05	Hypothesis testing	Hypothesis testing	
2005sem2	15/10/05	Hypothesis testing question 4	Hypothesis testing question 4	
2005sem2	15/10/05	Time series analysis 1	Time series analysis 1	
A7_5: ADM laboratory Queries (Continued)				
Period	Date	Topic	Query	Query Update

2005sem2	15/10/05	Hypothesis testing question 4	I tried to do the test statistics part of question 4but it does not want to accept the answer. Given sample size =69, 69people in favor and sample =74, 67. significance level 7.5%	
2005sem2	15/10/05	Time series analysis 1	Failing to give final result.	
2005sem2	17/10/05	Time series analysis 1	The tutorial is not giving full marks stops at 51%.	
2005sem2	17/10/05	Time series analysis 1	After checking the score the computer Delong.	
2005sem2	17/10/05	Hypothesis testing	First question of hypothesis on slide 4, answer could not be found. The online tutorials confuse us even more as the answers never seem to be right.	
2005sem2	17/10/05	Hypothesis testing	Solved hypothesis testing slide 4 and answers not right.	

A7_5: ADM laboratory Queries (Continued)				
Period	Date	Topic	Query	Query Update
2005sem2	17/10/05	Time series analysis 1	I did this online tutorial I did all right way and checked several times, the answer must be correct but system just gave me 48% for it , it is unbelievable, I can not get the mark I should not get please check the system and give me right mark for this tutorial !! Please, I think I can get 100% for this tutorial. Thank you.	
2005sem2	17/10/05	Time series analysis 2	There is just one question I know this by heart. I check it once, checked it twice it still do not work, I am fed up with this tutorials, could not papers work out better. I got 48% by this tutorial a tutor came along asking me if I got full marks, so they are aware of this problem. Can you please give 100% I deserve it?	

A7_5: ADM laboratory Queries (Continued)				
Period	Date	Topic	Query	Query Update
2005sem2	17/10/05	Hypothesis testing	The last question (question4) of hypothesis got some problems. I just got 92%, I should have 100%, so please fix problems of computer make. Thanks!!	
2005sem2	18/10/05	Time series 2	I use the right formula but keeps on giving me 48% can not get 100%.	
2005sem2	18/10/05	Time series 2	I used the correct formula, but the computer kept giving me 47%.	
2005sem2	18/10/05	Hypothesis	Did all necessary calculation, using all formulas, I can possibly think off but still have zero. Do not understand why.	
2005sem2	18/10/05	Hypothesis testing question 5	Test null hypothesis between two groups. I have a problem with critical value it does not want to correct.	
2005sem2	18/10/05	Time series analysis 1(question1)	When I click on change, the values which are given change. I then receive a mark of zero every time.	
2005sem2	18/10/05	Time series analysis 1	Every time I press change the values which are given change. I obtain a mark of zero every time.	

A7_5: ADM laboratory Queries (Continued)				
Period	Date	Topic	Query	Query Update
2005sem2	18/10/05	Hypothesis testing	I have used the right formulas to get but it still gives me 48%. Confirmed with tutors present.	
2005sem2	18/10/05	Confidence interval 2	Calculate an 80% C.I between the populations mean. It does not give me the right answer for me to get my 100%. The calculation are correct so as the formula.	
2005sem2	18/10/05	Time series analysis 2	I did this online tutorial again, I got 61%, then I did again, and I found problem, the third row to ask us to find "T" we can not get mark it is system problem. I am sure I can get 100%for this tutorial. Please check! And give me correct mark!!(Please! Thank you!!)	
2005sem2	18/10/05	Time series analysis 2	I am getting 48% and everything is correct.	Everything is correct.
2005sem2	18/10/05	Time series analysis 2	The tutorial gives 48% but I did everything right the tutors checked it with me. I worked through it.	
2005sem2	18/10/05	Time series analysis 2	I keep on doing the tutorial and my method is right and I keep on getting 48%.	

A7_5: ADM laboratory Queries (Continued)				
Period	Date	Topic	Query	Query Update
2005sem2	19/10/05	Time series analysis 2	In the final tutorial, I fill the table correctly, but the mark I get is 48%.	
2005sem2	19/10/05	Hypothesis testing	I have had two questions in the test where I had to solve for the critical value and even with assistance from tutors in the stats lab the answers could not be found as the computer on denying my correct answer!!	1.960-critical value of 2.5% 2.05-critical value of 2.0%
2005sem2	21/10/05	Time series analysis	Moving average (I did it) time series I and 2 keep on getting 0%.	
2005sem2	21/10/05	Time series analysis	Keep getting 0% program finding.	
2005sem2	21/10/05	Time series 2	Keep on getting 48%.	
2005sem2	21/10/05	Time series 2	Keep on getting 48%.	
2005sem2	21/10/05	Time series 2	Keep on getting 48%.	
2005sem2	21/10/05	Regression and time series analysis.	Regression and regression did not want to work despite my effort.	
2005sem2	21/10/05	Regression and time series analysis.	Regression and time series analysis. They are not working at all.	
2005sem2	21/10/05	Regression and time series analysis.	Regression and time series analysis. I did it several times it keeps on giving me lower mark.	
2005sem2	22/10/05	Time series analysis 1 and2	Time series analysis 1 and2. I get lower marks.	

A7_5: ADM laboratory Queries (Continued)				
Period	Date	Topic	Query	Query Update
2005sem2	22/10/05	Hypothesis testing	Rejects critical value in hypothesis testing question 1 reject critical value in question 4 are not working.	
2005sem2	22/10/05	Time series analysis 2.	Time series analysis 2 gives me 48% and everything according to the tutor said it is correct.	
2005sem2	24/10/05	Confidence interval 1 and 2	Some questions I did over and over but the pc did not accept the answer.	Common problem.
2005sem2	24/10/05	Confidence interval 1 and 2	Some questions I did over and over but the pc did not accept the answer although it was the right answers.	Common problem.
2005sem2	24/10/05	Time series analysis 1	Did the tutorial but got 0% every time.	
2005sem2	24/10/05	Time series 1	Done it a few times and it only give a 0% every time.	
2005sem2	24/10/05	Time series 1	Gives me 0% every time.	
2005sem2	24/10/05	Time series analysis tutorial 16	Columns T and T/Y do not register the proper result.	
2005sem2	26/10/05	Time series analysis 2	Time series 2 is faulty it does not give more than 48% even though the answers are correct. And hypothesis testing page 4 and 5 even when entering correct answer it rejects the answer even after help from the tutors.	

A7_5: ADM laboratory Queries (Continued)				
Period	Date	Topic	Query	Query Update
2005sem2	26/10/05	Hypothesis testing	The hypothesis testing is faulty as it rejects the correct answer even with a tutors help.	
2005sem2	26/10/05	Time series analysis 2	This tutorial does not give more than 48% even if the answers are correct. Also the computer keeps on switching off!!	
2005sem2	27/10/05	Time series analysis 1	Application error did it four times, same ending .the instruction at 0*779017 referenced memory at 0*0085007. the memory could not be read click ok to terminate program.	Give me my 100%.

A8: HOT SEAT QUERY FORM

1. DATE:

2. TIME

3. STUDENT NAME:

4. STUDENT NUMBER:

5. STUDENT EMAIL ADDRESS:

6. QUERY

7.RESOLUTION

Student's signature : Assistant's signature:

PERIOD	DATE	QUERY	RESOLUTION
2004sem1	24/02/04	my problem is in chapter two with the relative and cumulative frequencies	i explained the difference between the 2 frequencies to pumza.she understood
2004sem1	24/02/04	on monday the 23 february 2004, the lab assistant madika very rudely dismissed us from the adm lab.we feel it could have been done in a much nicer manner.we were not busy with stats tuts, but academic work.she gave us a warning to get out but we were not finished yet.the lab was not at all full there was quite a few open seats.she then came over and closed thw work we were doing.we were not done.	None
2004sem1	26/02/04	question about chapter 3	i have understood the test
2005sem1	02/03/05	how to calculate the relative frequency given the class boundaries and their corresponding frequencies?	by using the formular from grouped data:upper limit of the class where the value given lies minus its lower limit,miltiply by the frequency of the class, and then divide by the class width &finally divide by it.
2005sem1	19/04/05	a random sample of 16 with a mean of 496 and a standard deviation of 184.calculate a 99% confidence interval	
2005SEM1	22/04/05	binomial distribution question 3 c and d answer calculated correctly but system only gives 50%	i want my 100% in this tutorial
2005SEM1	26:04/05	i was doing the confidence interval 2 tutorial and when i come to question 5 the tutors confirmed that i had the right answers but there was a problem with the program and i was not awarded the marks. i got 80%instead of 100%.	
2005SEM1	29/04/05	confidence interval 2 question 5,use correct formula but system denies my answer.	

A8_1: Hot Seat Queries (continued)

Period	Date	Query	Query Update
2005sem1	26:04/05	confidence interval question 3 and 5 the computer does not want to accept my answer.	
2005sem1	29/04/05	confidence interval 1,question 3	
2005sem1	26:04/05	confidence interval 2 question 5,use correct formula but system rejects my answer.	
2005sem1	29/04/05	confidence interval 2 computer not accepting my answer to question 5	
2005sem1	26:04/05	confidence interval 2 computer not accepting my answer to question 5	
2005sem1	29/04/05	confidence interval 2 question 5 correct formula used tutor checked computer do not accept answers	
2005sem1	29/04/05	confidence interval 2, question 5 correct formula being used tutor checked, computer not accepting.	
2005sem1	26:04/05	confidence interval 2, question 5 correct formula being used tutor checked, computer not accepting.	
2005sem1	29/04/05	confidence interval 2, question 5.	
2005sem1	26:04/05	confidence interval 2 & confidence interval 1 question 4& question 5, the computer does not want to accept my answer. even though the formula and method i'm using is correct.	
2005sem1	29/04/05	confidence interval 2 question 5.	
2005sem1	29/04/05	confidence interval 1 question 5	
2005sem1	26:04/05	confidence interval question 3 and 5 the computer does not want to accept my answer.	

A8_1: Hot Seat Queries (continued)			
Period	Date	Query	Query Update
2005sem1	29/04/05	question 5 on the confidence interval 2 does not work, used the right formula and still does not work.	
2005sem1	26:04/05	i have answered every question correct but the computer; pc 14 does not recognise answers for question 5 in confidence interval 2.	
2005sem1	29/04/05	hypothesis testing question 4,critical value and regression analysis.	
2005sem1	29/04/05	i have done the time series analysis 2 tutorials with the correct formula and which gave me the correct answers and the computer does not want to accept.	
2005sem1	13/05/05	i did the tutorial on time series and the solution was correct the computer did not recognise them pc 29.	please fix your systems.
2005sem1	13/05/05	all my answers were worked out correctly, i made a mistake and meant to change it, once i pressed backspace the whole tutorial closed.	
2005sem1	18/05/05	hypothesis testing question 4, critical value and regression analysis.	
2005sem1	13/05/05	i did the tutorial on time series and the solution was correct the computer did not recognise them pc 29.	please check your systems, need marks to pass.
2005sem1	20/05/05	all my answers were worked out correctly, i made a mistake and meant to change it, once i pressed backspace the whole tutorial closed.	
2005sem1	20/05/05	i cannot get more than 48%for time series analysis 2.	

A8_1: Hot Seat Queries (continued)			
Period	Date	Query	Query Update
2005sem1	20/05/05	i am not able to obtain more than 48% for time series analysis 2 and i wasted my time(65minutes)	
2005sem1	20/05/05	not able to get more than 48%for time series analysis 2	
2005sem1	20/05/05	not able to get more than 48%for time series analysis 2 tut	please check your systems, need marks to pass.
2005sem1	20/05/05	i cannot get more than 48%for time series analysis 2.	
2005sem2	26/07/05	frequency/sigma notation.	frequency is the number of observation between the lower limit and the upper limit in that ith class interval. the symbol is shorthand for “the sum of” which means that you sum all the entries from i from any number indicate to another number.
2005sem2	2/08/05	variance/sample variance/grouped data/ quartiles	i explained that the population variance is very much different from the sample variance and showed them the different formulas for each and illustrated on how to get the mode and the media and how to calculate

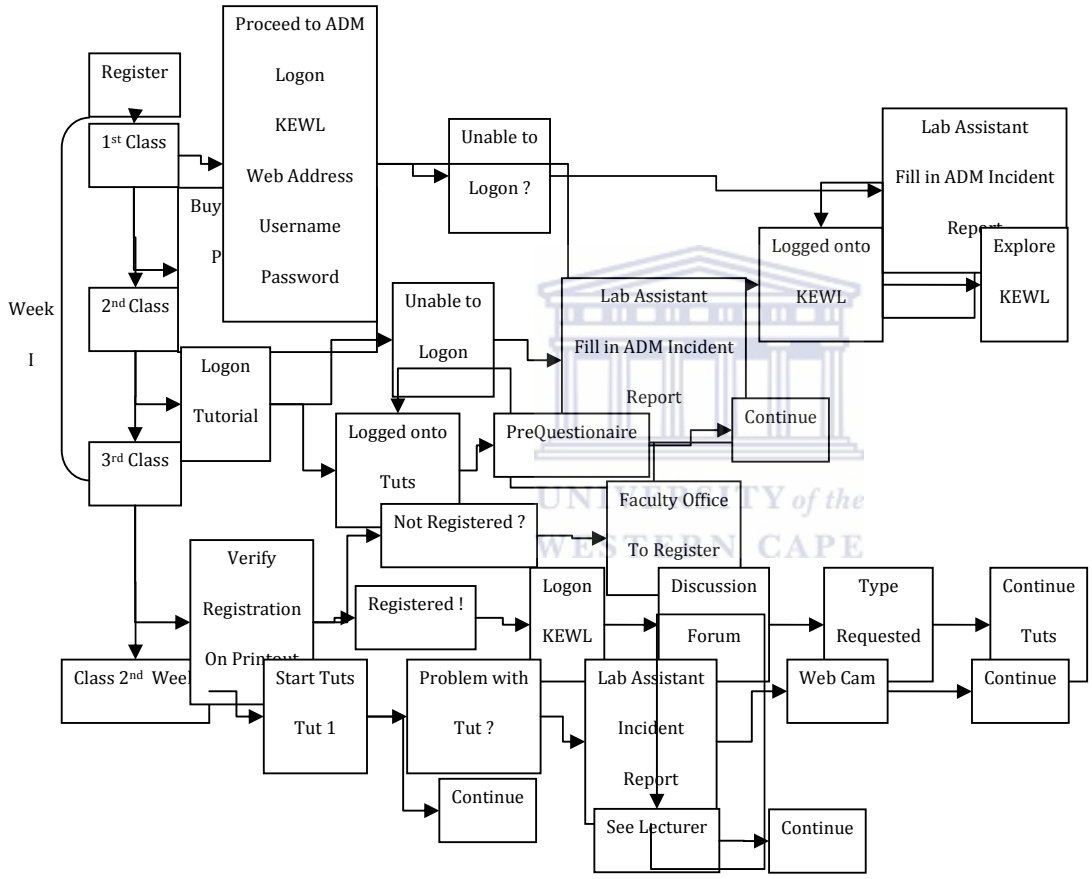
A8_1: Hot Seat Queries (Continued)			
Period	Date	Topic	Query
2005sem2	2/08/05	variance and sample variance and grouped data.	i explained that population variance is different from the sample variance and showed them the different formulas for each and illustrated with example in the notes. the grouped data, i elaborated on how to get the mode and the median and how to calculate them.
2005sem2	03/08/05	median, grouped data and ungrouped data modal interval.	i explained that how we can determine or select the median interval and how we can apply the formula. also about the modal.
2005sem2	04/08/05	about the stem and leaves and the quartiles.	the stem and leave is the display of data. i explained the third quartile and also how get their positions and to calculate them.
2005sem2	04/08/05	stem, leaves and relative frequency	i explained how to construct stem and leave table after that the double and multiple stem. i explained also how to calculate the relative frequency column.
2005sem2	04/08/05	interquartile range	interquartile range is the difference between the upper quartile and the first quartile, so that means-q3- q1.
2005sem2	05/08/05	mode and grouped data	i explained how to apply the formula and calculate the mode.
2005sem2	12/08/05	relative frequency fraction.	i explained how to calculate both of them and what is the different between them.
2005sem2	18/08/05	had problem understanding basic concepts.	i explained the basic concepts like mean, median, mode, variance, standard deviation and also how to calculate them using their specific formulas. i also explained the grouped and ungrouped data.

A8_1: Hot Seat Queries (Continued)

Period	Date	Query	Query Update
2005sem2	18/08/05	median, mode. mean, grouped and ungrouped data.	i showed her how to calculate the mean, mode, median using specific formulas for the grouped and ungrouped data.
2005sem2	23/08/05	Chapter4 probabilities concepts	i explained the concepts, events, definition of probability, permutation, and combination by doing examples.
2005sem2	19/08/05	skewness sample variance quartiles positions	i explained how to calculate sample and how to determine the positions.
2005sem2	23/08/05	Chapter 4 probabilities concepts	i explained the concepts, events, definition of probability, permutation, and combination by doing examples.
2005sem2	24/08/05	probability chapter 4.	explanation about the basics.
2005sem2	30/08/05	probability: concepts and understanding of how to use formulas: combination and permutations.	i sort of understood, but still unsure about my understanding advice to faculty: try to explain probability in more depth, use more examples in text book and spend more time in class on probability.
2005sem2	30/08/05	i had difficulties with probability ; concepts, combinations and permutation	i understand after explanation.
2005sem2	14/09/05	Chapter 5 and 6 and 7	work the examples in the book.
2005sem2	14/09/05	Chapter 5 and 6	work the examples in the book.
2005sem2	14/09/05	chapter5(whole chapter) student queried on normal distribution	worked the examples in the book.
2005sem2	19/09/10	Chapter7 (confidence interval) i do not understand the whole chapter.	they explained the definition of confidence interval, formulas and give examples.
2005sem2		continuation of chapter 5	i summarized the whole chapter by giving example s.
2005sem2		continuation of chapter 5 and 6	did more examples.

A8_1: Hot Seat Queries (Continued)			
Period	Date	Query	Query Update
2005sem2		hypothesis testing, the difference between rejecting and accepting hypothesis.	explained to the student type 1 and type2 error and when to accept and reject hypothesis.

A9: FLOW CHART TO SUCCESS



A10: INTRODUCTORY STATISTICS COURSE OUTLINE

INFORMATION FOR FIRST YEAR STATISTICS STUDENTS

Introductory Statistics

Welcome to the Department of Statistics. This is an Introductory Statistics course. Its main outcomes are: to recognise the importance of Statistics in both private and public sectors, data summaries (e.g. mean and standard deviation), perform simple statistical analysis and using a computer to analyse data. We hope that you will enjoy this field of study and that you will achieve success with your attempt. Please make use of the guide to success to obtain excellent results!!

1. GENERAL INFORMATION

Please read all information carefully and distinguish between compulsory work for your continuous evaluation mark and additional work for your academic development.

1.1 LECTURE TIMES & VENUES

FULL TIME STUDENTS

Period	Monday	Tuesday	Wednesday	Thursday	Friday
1	STA 131 (L20, L1)				
2	STA 111 (SC8)				
3			STA 131 (L2, GH2)	STA111 (SC8)	STA111 (SC8)
4	STA131 (L2, GH2)		STA 131 (L1, DL3)		
5		STA 131 (L2,GH2)	STA 131 (L1,L20)		
6					

PART-TIME STUDENTS

Every Tuesday in SC4, PERIODS: 8, 9 & 10 at 17h00

1.2 REGISTRATION: You must make sure that your registration for the particular course, which you are doing, is in order. The department cannot accept the responsibility of handling your marks if you are not properly registered. Your course is STA 111 with code 381111(Science) and STA 131 with code 395131 (EMS).

1.3 ASSESSMENT: Class tests and tutorials are compulsory. The three best results out of the four tests will be used in the calculation of the evaluation/semester mark. The tests contribute 60% to your semester mark. All tests commence from

09h00 to 16h00 and are written every hour on the hour in the ADM computer laboratory. On a Saturday, tests commence from 09h00-14h00. Tests are written under examination conditions. Under no condition will any re-evaluation of the tests take place.

1.4 EXAMINATIONS: A two-hour examination is written at the end of the semester. The supplementary exam takes place about a week after the main exam. Please make sure if your name appears on the supplementary list approximately 3 days after the examination.

1.5 FINAL MARK: = 0.5 (EXAM MARK) + 0.5 (EVALUATION MARK)

(The Evaluation mark is described in paragraph 3.)

NB: Please read rule A.13 and A.14 in the General Calendar with regard to Formal Examinations, Pass requirements and Evaluation.

1.6 NOTICE-BOARD

Consult the notice board frequently for any other details pertaining to the course. These notice boards are situated on the third level of the New Science Building. (Opposite the stairway on the 3rd level at the rear entrance where the Computer Science laboratories are in the New Sciences building.) Also access KEWL weekly for notices and correspondence.

1.7 STAFF: South Campus (New Sciences) Building	**Office no**	**Telephone number**
Prof. D. Kotze	3.18	959 3203
Prof. R. Blignaut (Chairperson)	3.21	959 3034
Dr. G. Tati	3.24	959 3035
Prof. C. Koen	3.22	959 3258
Prof. R. Shell	3.23	959 3898
Dr. H. Doctor	3.28	959 3023
Mr. A. Latief	3.25	959 3031
Miss N. Stiegler	3.26	959 3038
Miss. N. Makapela Chief Officer)	3.19	959 3199
Miss. R. Lombard (Senior Officer)	3.30	959 3036
Mr L. Corker (Chief Officer)	3.27	959 3032
Mr. L. Selbourne (Secretary)	3.21	959 3039
Ms L. Matizirofa	3. 17	959 3370

Photos of staff members and assistants are displayed on the notice board in the department and the ADM lab. Please consult with us should you require assistance.

1.8 CALCULATORS: You will benefit by using a scientific calculator for this course.

An example of a good model is the Sharp EL-506 model or the HP 28S.

2. COURSE MATERIAL

2.1 COURSE READER-NOTES:

Can be purchased at the front office of the Statistics department at a printing cost of R100.

2.2 RECOMMENDED TEXT BOOK

1. Applied Business Statistics: Methods and Application by Trevor Wegner, Publisher JUTA.

2. C-Kit Undergraduate Statistics for Business by Maskwe, Miller and Longman, Publisher

   Pearson

3. CONTINUOUS EVALUATION

CONTINUOUS EVALUATION MARK = 0.6 (average of the 3 best tests) + 0.4 (Tutorials).

You have to consult the notice board for semester marks before the examination

commences.

NB! Please check deadlines for mark/test queries, as no queries will be accepted after the due date.

4. Hot Seat

The department has employed assistants to answer all your questions on a daily basis. These assistants can be found at a desk next to the STA 111/131notice board, level three, of the New Sciences building. Please consult with them whenever you have a problem. The Hot Seat operates from Monday to Friday from 09:00 to 16:00.

5. COMPULSORY TUTORIALS

5.1 COMPULSORY Web-BASED TUTORIALS are run in the department. Follow the STA 111/131 logon procedure below in 5.3. Make use of the STA 111/131 time slots as you stand a chance of losing the space to other courses that are desperately in need of the lab.

5.2 ADM LABORATORY AVAILABILITY TIME SLOTS FOR STA 111/131

Consult both the STA 111/131 and ADM lab notice boards for available time slots and any changes. Normal open hours for the ADM lab will be:

Tuesday from 09h00 to 17h00 , Wednesday and Thursday from 09h00 to 13h00, Friday from 09h00 to 17h00.

Excluding: Wednesday 14h00 to 17h00 and Thursdays from 13h00 to 17h00.

Please check the notice board and KEWL for STA 111/131 time slots.

5.3 STA 111/131 Tutorial Guide

PLS follow the KEWL registration procedure to access the ONLINE tutorials.

6. SELFTEACH MODULES

A number of self teach modules have been developed to assist you to grasp new concepts. These modules are optional and do not form part of the compulsory work for evaluation purposes. They can be accessed from the Quick links on the KEWL page.

7. CHAT ROOM AND DISCUSSION FORUM

In KEWL you have access to the tools above. Some topics may be discussed in these forums and can be accessed through the buttons at the bottom of the KEWL pages. You are encouraged to participate in these forums. Ensure that you are able to access these using your student email account via KEWL.

8. COURSE OUTLINE, TEST DATES, TUTORIAL DUE DATES

8.1 Course Outline and Test Dates

05 - 09 Feb - Basic Concepts in Statistics (Ch 1)

12 -16 Feb - Graphical Presentation of Data (Ch 2)

19 - 23 Feb - Measures of Location and Dispersion (Grouped & Ungrouped Data (Ch 3)

26 Feb - 02 Mar- Measures of Location and Dispersion (Grouped & Ungrouped Data (Ch 3)

02 March Test1 (09h00 to 16h00 every hour on the hour)

03 March Tutorial due date

Tutorials: Frequency distributions, Ungrouped data and Grouped data

05 – 09 March - Probability (Ch 4)

12 – 17 March - Distributions of Random Variables (Ch 5)

19 – 23 March - Sampling and Sampling Distributions (Ch 6)

12 – 17 March Queries Test1 and Tut1 Queries

Thursday 22 March – Due date Tut 2: Probability section 1 to Probability section 4

Friday 23 March – Test2

02 – 06 April - Interval Estimation (Ch 7)

09 – 13 April - Hypothesis Testing (Ch 8)

16 - 20 April - Hypothesis Testing (Ch 8)

23 – 27 April - Linear Regression and Correlation (Ch 9)

Wednesday 11 April : due date tut 3 distribution, Normal distribution, Confidence Interval 1, Confidence Interval2

Friday 13 April : test3

Week 23- 27 April : Queries Tut 3 and Test3

30 April- 04 May - Index Numbers (Ch 12)

08 – 12 May - Time Series (Ch 13)

Friday 11 May : Test4

Saturday 12 May : Tutorial due date

Tutorials: Hypothesis testing, Linear regression, Index numbers and Time series

Friday 18 May : All sick tests 1-4

Week 21 – 25 May : Last week for all mark queries

NO STUDENT WILL BE ALLOWED TO WRITE TESTS OR EXAM WITHOUT A STUDENT CARD

********23 May Semester Mark query deadline**********

9. Module descriptor

Module Name	Introductory Statistics
Home Department	Statistics
Module Codes	STA 111 & STA131
Credit Value	15
Duration	Semester
Module Type	Faculty
Level	5
Main Outcomes	To be able to recognise the importance of statistics in both private and public sectors; summarize the data into few summary measures (e.g. mean and standard deviation); do simple statistical analysis; use a computer to analyse the data
Pre-requisites	Matric mathematics or equivalent
Module descriptor (Continued)	
Co-requisites	None
Prohibited combination	STA 111 & STA131
Breakdown of learning	Contact with lecturer Classes: 3 classes = 3 hrs per week

	Tutorials : 3 hours per week Self-study: 4.5 hours per week Tests: 30 mins on a monthly basis Exams: 2 hours end semester TOTAL: 150

11. The Science faculty has adopted standardised penalties for late submissions and the Statistics department adheres to these:

Standardized penalties for the Science Faculty

It is important that these measures be communicated to the students at the beginning of each and every term. They must be adhered to by all Departments so as to have uniformity of treatment for all the students in the Faculty.

Late submission of assignments 15% off per 24hrs

Plagiarism: 100% off for undergraduates, 100% off for postgraduates with submission of disciplinary action against the student if intent can be proven. NB the lecturer must be able to demonstrate the plagiarism and adhere such proof to the script for recording purposes. This ruling will apply to assignments and tests alike.

"Sick tests ": Each programme will set One Day Only per term on which all sick tests and special occasion tests will be written. A doctor's certificate stating that the student was unfit to write the test/exam on the set date will have to be supplied to the department

Special Occasions tests: As above. The student needs to supply documentary proof of the special circumstances that prevented the writing of and/or preparation for the test.

Special Exams: These are in addition to the supplementary exams and can only be set by the department in the exam period at the discretion of the Chairperson of the department. Outside the exams period the Student Affairs Committee needs to make a recommendation to the Senate Exams Committee

Success through hard work

APPENDIX B: DEMOGRAPHIC AND GRADE 12 BACKGROUND TABLES

B1: AREA OF RESIDENCE

Table 1

Area of Residence

Area of residence	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Unknown	129	5.11	129	5.11
Western Cape	1888	74.74	2017	79.85
Eastern Cape	214	8.47	2231	88.32
Northern Cape	40	1.58	2271	89.90
Free State	15	0.59	2286	90.50
Gauteng	42	1.66	2328	92.16
Mpumalanga	15	0.59	2343	92.76
Limpopo Province	46	1.82	2389	94.58
North West Province	15	0.59	2404	95.17
Kwazulu Natal	33	1.31	2437	96.48
Namibia	20	0.79	2457	97.27
Zimbabwe	21	0.83	2478	98.10
Angola	4	0.16	2482	98.26
Botswana	39	1.54	2521	99.80
Lesotho	2	0.08	2523	99.88
Swaziland	3	0.12	2526	100.00

Table 2

Table of Period by Area of residence									
Period	Area of Residence								
Frequency Percent Row Pct	Unknown	Western Cape	Eastern Cape	Northern Cape	Free State	Gauteng	Mpumalanga	Limpopo Province	North West Province
2003sem2	38 1.56 3.97	712 29.26 74.40	83 3.41 8.67	15 0.62 1.57	7 0.29 0.73	19 0.78 1.99	8 0.33 0.84	22 0.90 2.30	5 0.21 0.52
2004sem1	8 0.33 3.54	165 6.78 73.01	25 1.03 11.06	4 0.16 1.77	0 0.00 0.00	4 0.16 1.77	2 0.08 0.88	3 0.12 1.33	2 0.08 0.88
2004sem2	35 1.44 6.08	447 18.37 77.60	41 1.69 7.12	8 0.33 1.39	3 0.12 0.52	5 0.21 0.87	3 0.12 0.52	6 0.25 1.04	4 0.16 0.69
2005sem1	12 0.49 5.85	158 6.49 77.07	10 0.41 4.88	2 0.08 0.98	2 0.08 0.98	3 0.12 1.46	0 0.00 0.00	6 0.25 2.93	2 0.08 0.98
2005sem2	29 1.19 6.18	348 14.30 74.20	40 1.64 8.53	10 0.41 2.13	3 0.12 0.64	5 0.21 1.07	2 0.08 0.43	8 0.33 1.71	1 0.04 0.21
Total	122 5.01	1830 75.22	199 8.18	39 1.60	15 0.62	36 1.48	15 0.62	45 1.85	14 0.58
Frequency Missing = 938									

Table 3

Table of Period by area of residence								
Period	Area of residence							
Frequency Percent Row Pct	Kwazulu Natal	Namibia	Zimbabwe	Angola	Botswana	Lesotho	Swaziland	Total
2003sem2	14 0.58 1.46	11 0.45 1.15	7 0.29 0.73	1 0.04 0.10	11 0.45 1.15	2 0.08 0.21	2 0.08 0.21	957 39.33
2004sem1	5 0.21 2.21	1 0.04 0.44	0 0.00 0.00	0 0.00 0.00	7 0.29 3.10	0 0.00 0.00	0 0.00 0.00	226 9.29
2004sem2	5 0.21 0.87	3 0.12 0.52	3 0.12 0.52	1 0.04 0.17	11 0.45 1.91	0 0.00 0.00	1 0.04 0.17	576 23.67
2005sem1	4 0.16 1.95	0 0.00 0.00	3 0.12 1.46	0 0.00 0.00	3 0.12 1.46	0 0.00 0.00	0 0.00 0.00	205 8.43
2005sem2	5 0.21 1.07	4 0.16 0.85	6 0.25 1.28	2 0.08 0.43	6 0.25 1.28	0 0.00 0.00	0 0.00 0.00	469 19.28
Total	33 1.36	19 0.78	19 0.78	4 0.16	38 1.56	2 0.08	3 0.12	2433 100.00
Frequency Missing = 938								

Living Area

Urban_Rural	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Rural	377	15.12	377	15.12
Urban	2116	84.88	2493	100.00

Table 5

Period by Living Area

Table of Period by Urban Rural			
Period	Urban Rural		
Frequency Percent Row Pct	Rural	Urban	Total
2003sem2	221 9.21 23.49	720 30.00 76.51	941 39.21
2004sem1	43 1.79 19.55	177 7.38 80.45	220 9.17
2004sem2	108 4.50 19.25	453 18.88 80.75	561 23.38
2005sem1	0 0.00 0.00	206 8.58 100.00	206 8.58
2005sem2	0 0.00 0.00	472 19.67 100.00	472 19.67
Total	372 15.50	2028 84.50	2400 100.00
Frequency Missing = 971			

B2: ETHNIC GROUPS

Table 6

Ethnic Background

Race	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Unknown	41	1.62	41	1.62
White	29	1.14	70	2.76
Coloured	1416	55.79	1486	58.55
Indian	230	9.06	1716	67.61
Asian	60	2.36	1776	69.98
African	618	24.35	2394	94.33
Other	144	5.67	2538	100.00

Table 7

Table of Period by Race								
Period	Race							
Frequency Percent Row Pct	Unknown	White	Coloured	Indian	Asian	African	Other	Total
2003sem2	17 0.70 1.77	9 0.37 0.94	517 21.15 53.97	94 3.84 9.81	24 0.98 2.51	286 11.70 29.85	11 0.45 1.15	958 39.18
2004sem1	4 0.16 1.77	2 0.08 0.88	124 5.07 54.87	25 1.02 11.06	5 0.20 2.21	62 2.54 27.43	4 0.16 1.77	226 9.24
2004sem2	8 0.33 1.37	6 0.25 1.03	348 14.23 59.49	46 1.88 7.86	12 0.49 2.05	150 6.13 25.64	15 0.61 2.56	585 23.93
2005sem1	4 0.16 1.94	2 0.08 0.97	122 4.99 59.22	21 0.86 10.19	4 0.16 1.94	26 1.06 12.62	27 1.10 13.11	206 8.43
2005sem2	8 0.33 1.70	9 0.37 1.91	265 10.84 56.38	35 1.43 7.45	12 0.49 2.55	68 2.78 14.47	73 2.99 15.53	470 19.22
Total	41 1.68	28 1.15	1376 56.28	221 9.04	57 2.33	592 24.21	130 5.32	2445 100.00
Frequency Missing = 926								

B3: HOME LANGUAGE

Table 8

Home language

Home language	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Afrikaans	336	13.23	336	13.23
English and Afrikaans	316	12.44	652	25.67
Ndebele	5	0.20	657	25.87
English	1138	44.80	1795	70.67
Tsonga	22	0.87	1817	71.54
North Sotho	19	0.75	1836	72.28
Other	99	3.90	1935	76.18
South Sotho	23	0.91	1958	77.09
Tswana	74	2.91	2032	80.00
Venda	13	0.51	2045	80.51
Swati	12	0.47	2057	80.98
Xhosa	448	17.64	2505	98.62
Zulu	35	1.38	2540	100.00

Table 9

Table of Period by Home language									
Period	Home language								
Frequency Percent Row Pct	Afrikaans	English and Afrikaans	Ndebele	English	Tsonga	North Sotho	Other	South Sotho	Tswana
2003sem2	117 4.78 12.21	122 4.99 12.73	2 0.08 0.21	419 17.12 43.74	13 0.53 1.36	9 0.37 0.94	33 1.35 3.44	10 0.41 1.04	27 1.10 2.82
2004sem1	38 1.55 16.81	24 0.98 10.62	1 0.04 0.44	96 3.92 42.48	0 0.00 0.00	1 0.04 0.44	3 0.12 1.33	2 0.08 0.88	7 0.29 3.10
2004sem2	88 3.60 15.04	74 3.02 12.65	0 0.00 0.00	265 10.83 45.30	1 0.04 0.17	2 0.08 0.34	20 0.82 3.42	4 0.16 0.68	18 0.74 3.08
2005sem1	25 1.02 12.14	25 1.02 12.14	0 0.00 0.00	105 4.29 50.97	3 0.12 1.46	4 0.16 1.94	11 0.45 5.34	0 0.00 0.00	6 0.25 2.91
2005sem2	58 2.37 12.29	57 2.33 12.08	1 0.04 0.21	222 9.07 47.03	4 0.16 0.85	2 0.08 0.42	26 1.06 5.51	5 0.20 1.06	12 0.49 2.54
Total	326 13.32	302 12.34	4 0.16	1107 45.24	21 0.86	18 0.74	93 3.80	21 0.86	70 2.86
Frequency Missing = 924									

Table 10

Table of Period by Home language					
Period	Home language				
Frequency Percent Row Pct	Venda	Swati	Xhosa	Zulu	Total
2003sem2	6 0.25 0.63	7 0.29 0.73	179 7.32 18.68	14 0.57 1.46	958 39.15
2004sem1	2 0.08 0.88	1 0.04 0.44	46 1.88 20.35	5 0.20 2.21	226 9.24
2004sem2	3 0.12 0.51	2 0.08 0.34	101 4.13 17.26	7 0.29 1.20	585 23.91
2005sem1	0 0.00 0.00	1 0.04 0.49	23 0.94 11.17	3 0.12 1.46	206 8.42
2005sem2	1 0.04 0.21	1 0.04 0.21	81 3.31 17.16	2 0.08 0.42	472 19.29
Total	12 0.49	12 0.49	430 17.57	31 1.27	2447 100.00
Frequency Missing = 924					

B4: ACADEMIC LANGUAGE

Table 11

Academic language

Academic Language	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Afrikaans	155	6.12	155	6.12
Both	351	13.85	506	19.97
English	2028	80.03	2534	100.00

Frequency Missing = 837

Table 12

Period by Academic Language

Table of Period by Academic language				
Period	Academic language			
Frequency Percent Row Pct	Afrikaans	Both	English	Total
2003sem2	61 2.50 6.38	75 3.07 7.85	820 33.58 85.77	956 39.15
2004sem1	16 0.66 7.11	32 1.31 14.22	177 7.25 78.67	225 9.21
2004sem2	35 1.43 5.98	95 3.89 16.24	455 18.63 77.78	585 23.96
2005sem1	14 0.57 6.83	39 1.60 19.02	152 6.22 74.15	205 8.39
2005sem2	25 1.02 5.31	96 3.93 20.38	350 14.33 74.31	471 19.29
Total	151 6.18	337 13.80	1954 80.02	2442 100.00
Frequency Missing = 929				

B5: GENDER

Table 13

Gender

Gender	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Female	1380	54.46	1380	54.46
Male	1154	45.54	2534	100.00

Table 14

Period by Gender

Table of Period by Gender			
Period	Gender		
Frequency Percent Row Pct	Female	Male	Total
2003sem2	532 21.79 55.82	421 17.25 44.18	953 39.04
2004sem1	112 4.59 49.56	114 4.67 50.44	226 9.26
2004sem2	318 13.03 54.36	267 10.94 45.64	585 23.97
2005sem1	101 4.14 49.27	104 4.26 50.73	205 8.40
2005sem2	271 11.10 57.42	201 8.23 42.58	472 19.34
Total	1334 54.65	1107 45.35	2441 100.00
Frequency Missing = 930			

Table 15

Grouped Age

Grouped Age	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Directly to University	829	47.26	829	47.26
Delay entrance	770	43.90	1599	91.16
Late entrance	155	8.84	1754	100.00

Table 16

Period by Grouped AgeTable of Period by GroupedAge				
Period	GroupedAge			
Frequency Percent Row Pct	Directly to University	Delay of at most two years	Delay more than two years	Total
2003sem2	271 15.64 28.65	572 33.01 60.47	103 5.94 10.89	946 54.59
2004sem1	161 9.29 73.18	49 2.83 22.27	10 0.58 4.55	220 12.69
2004sem2	387 22.33 68.50	140 8.08 24.78	38 2.19 6.73	565 32.60
2005sem1	0 0.00 0.00	1 0.06 100.00	0 0.00 0.00	1 0.06
2005sem2	1 0.06 100.00	0 0.00 0.00	0 0.00 0.00	1 0.06
Total	820 47.32	762 43.97	151 8.71	1733 100.00
Frequency Missing = 1638				

Table 17

Nationality

Nationality	Frequency	Percent	Cumulative Frequency	Cumulative Percent
South African	1632	93.52	1632	93.52
Other Country	113	6.48	1745	100.00

Table 18

Period by Nationality

Table of Period by nationality			
Period	nationality		
Frequency Percent Row Pct	South African	Other Country	Total
2003sem2	894 51.83 94.20	55 3.19 5.80	949 55.01
2004sem1	209 12.12 95.43	10 0.58 4.57	219 12.70
2004sem2	510 29.57 91.89	45 2.61 8.11	555 32.17
2005sem1	1 0.06 100.00	0 0.00 0.00	1 0.06
2005sem2	1 0.06 100.00	0 0.00 0.00	1 0.06
Total	1615 93.62	110 6.38	1725 100.00
Frequency Missing = 1646			

Table 19

Marital Status

Marital status	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Divorced	3	0.12	3	0.12
Married	73	2.89	76	3.01
Single	2447	96.95	2523	99.96
Widowed	1	0.04	2524	100.00

Table 20

Period by Marital Status

Table of Period by Marital status					
Period	Marital status				
Frequency Percent Row Pct	Divorced	Married	Single	Widowed	Total
2003sem2	2 0.08 0.21	35 1.44 3.68	913 37.56 96.11	0 0.00 0.00	950 39.08
2004sem1	0 0.00 0.00	4 0.16 1.78	220 9.05 97.78	1 0.04 0.44	225 9.26
2004sem2	1 0.04 0.17	16 0.66 2.75	564 23.20 97.07	0 0.00 0.00	581 23.90
2005sem1	0 0.00 0.00	1 0.04 0.49	203 8.35 99.51	0 0.00 0.00	204 8.39
2005sem2	0 0.00 0.00	12 0.49 2.55	459 18.88 97.45	0 0.00 0.00	471 19.37
Total	3 0.12	68 2.80	2359 97.04	1 0.04	2431 100.00
Frequency Missing = 940					

Table 21

Church

CHURCH	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Anglican	311	12.41	311	12.41
New Apostolic	102	4.07	413	16.47
Old Apostolic	47	1.87	460	18.35
Baptist	65	2.59	525	20.94
Moravian	37	1.48	562	22.42
Congregational	43	1.72	605	24.13
Lutheran	53	2.11	658	26.25
Calvin Protestant	19	0.76	677	27.00
Full Gospel	96	3.83	773	30.83
African Methodist Episcopal	33	1.32	806	32.15
Methodist	183	7.30	989	39.45
United Reformed	143	5.70	1132	45.15
Apostolic Faith Mission	54	2.15	1186	47.31
Presbyterian	63	2.51	1249	49.82
Roman Catholic	205	8.18	1454	58.00
Seventh Day Adventist	52	2.07	1506	60.07
Jehovah Witness	31	1.24	1537	61.31
Islamic	605	24.13	2142	85.44
Hindu	29	1.16	2171	86.60
Other	335	13.36	2506	99.96
Jewish	1	0.04	2507	100.00

Table 22

Period by Type of Church

Table of Period by CHURCH								
Period	CHURCH							
Frequency Percent Row Pct	Anglican	New Apostolic	Old Apostolic	Baptist	Moravian	Congregational	Lutheran	Calvin Protestant
2003sem2	106 4.39 11.10	37 1.53 3.87	23 0.95 2.41	26 1.08 2.72	14 0.58 1.47	8 0.33 0.84	23 0.95 2.41	6 0.25 0.63
2004sem1	31 1.28 13.90	5 0.21 2.24	5 0.21 2.24	4 0.17 1.79	4 0.17 1.79	7 0.29 3.14	3 0.12 1.35	2 0.08 0.90
2004sem2	81 3.35 14.19	28 1.16 4.90	14 0.58 2.45	16 0.66 2.80	7 0.29 1.23	10 0.41 1.75	11 0.46 1.93	6 0.25 1.05
2005sem1	21 0.87 10.50	9 0.37 4.50	1 0.04 0.50	7 0.29 3.50	5 0.21 2.50	7 0.29 3.50	7 0.29 3.50	1 0.04 0.50
2005sem2	61 2.52 13.06	20 0.83 4.28	4 0.17 0.86	10 0.41 2.14	7 0.29 1.50	9 0.37 1.93	6 0.25 1.28	2 0.08 0.43
Total	300 12.42	99 4.10	47 1.95	63 2.61	37 1.53	41 1.70	50 2.07	17 0.70
Frequency Missing = 955								

Table 23

Continuation of Table 22

Table of Period by CHURCH								
Period	CHURCH							
Frequency Percent Row Pct	Full Gospel	African Methodist Episcopal	Methodist	United Reformed	Apostolic Faith Mission	Presbyterian	Roman Catholic	Seventh Day Adventist
2003sem2	37 1.53 3.87	13 0.54 1.36	79 3.27 8.27	49 2.03 5.13	21 0.87 2.20	19 0.79 1.99	82 3.39 8.59	21 0.87 2.20
2004sem1	6 0.25 2.69	3 0.12 1.35	15 0.62 6.73	17 0.70 7.62	4 0.17 1.79	11 0.46 4.93	16 0.66 7.17	6 0.25 2.69
2004sem2	23 0.95 4.03	6 0.25 1.05	36 1.49 6.30	40 1.66 7.01	14 0.58 2.45	12 0.50 2.10	44 1.82 7.71	13 0.54 2.28
2005sem1	12 0.50 6.00	3 0.12 1.50	12 0.50 6.00	12 0.50 6.00	2 0.08 1.00	5 0.21 2.50	10 0.41 5.00	2 0.08 1.00
2005sem2	13 0.54 2.78	7 0.29 1.50	33 1.37 7.07	22 0.91 4.71	10 0.41 2.14	12 0.50 2.57	45 1.86 9.64	8 0.33 1.71
Total	91 3.77	32 1.32	175 7.24	140 5.79	51 2.11	59 2.44	197 8.15	50 2.07
Frequency Missing = 955								

Table 24

Continuation of Tables 22 and 23

Table of Period by CHURCH						
Period	CHURCH					
Frequency Percent Row Pct	Jehovah Witness	Islamic	Hindu	Other	Jewish	Total
2003sem2	14 0.58 1.47	236 9.77 24.71	13 0.54 1.36	128 5.30 13.40	0 0.00 0.00	955 39.53
2004sem1	1 0.04 0.45	52 2.15 23.32	1 0.04 0.45	30 1.24 13.45	0 0.00 0.00	223 9.23
2004sem2	7 0.29 1.23	137 5.67 23.99	5 0.21 0.88	60 2.48 10.51	1 0.04 0.18	571 23.63
2005sem1	0 0.00 0.00	50 2.07 25.00	5 0.21 2.50	29 1.20 14.50	0 0.00 0.00	200 8.28
2005sem2	7 0.29 1.50	115 4.76 24.63	3 0.12 0.64	73 3.02 15.63	0 0.00 0.00	467 19.33
Total	29 1.20	590 24.42	27 1.12	320 13.25	1 0.04	2416 100.00
Frequency Missing = 955						

Table 25

Examination Board

Examination board	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Eastern Cape Education Department	201	7.97	201	7.97
Foreign Examination	128	5.07	329	13.04
Gauteng Education Department	71	2.81	400	15.85
Joint Matriculation Board	13	0.52	413	16.37
Kwazulu Natal Education Department	48	1.90	461	18.27
Mpumalanga Education Department	14	0.55	475	18.83
Northern Cape Education Department	40	1.59	515	20.41
Northern Province Education Department	44	1.74	559	22.16
Northwest Education Department	11	0.44	570	22.59
Free State Education Department	19	0.75	589	23.35
Western Cape Education Department	1934	76.65	2523	100.00

Table 26

Period by Examination Board

Table of Period by examination board						
Period	Examination board					
Frequency Percent Row Pct	Eastern Cape Education Department	Foreign Examination	Gauteng Education Department	Joint Matriculation Board	Kwazulu Natal Education Department	Mpumalanga Education Department
2003sem2	84 3.46 8.78	42 1.73 4.39	32 1.32 3.34	6 0.25 0.63	23 0.95 2.40	9 0.37 0.94
2004sem1	19 0.78 8.41	3 0.12 1.33	8 0.33 3.54	3 0.12 1.33	6 0.25 2.65	2 0.08 0.88
2004sem2	45 1.85 7.72	28 1.15 4.80	9 0.37 1.54	3 0.12 0.51	7 0.29 1.20	1 0.04 0.17
2005sem1	10 0.41 4.98	12 0.49 5.97	2 0.08 1.00	0 0.00 0.00	6 0.25 2.99	1 0.04 0.50
2005sem2	31 1.28 6.72	33 1.36 7.16	11 0.45 2.39	0 0.00 0.00	6 0.25 1.30	1 0.04 0.22
Total	189 7.78	118 4.86	62 2.55	12 0.49	48 1.98	14 0.58
Frequency Missing = 943						

Table 27

Continuation of Table 26

Table of Period by examination board						
Period	Examination board					
Frequency Percent Row Pct	Northern Cape Education Department	Northern Province Education Department	Northwest Education Department	Free State Education Department	Western Cape Education Department	Total
2003sem2	16 0.66 1.67	22 0.91 2.30	7 0.29 0.73	9 0.37 0.94	707 29.12 73.88	957 39.42
2004sem1	4 0.16 1.77	4 0.16 1.77	0 0.00 0.00	0 0.00 0.00	177 7.29 78.32	226 9.31
2004sem2	7 0.29 1.20	9 0.37 1.54	2 0.08 0.34	2 0.08 0.34	470 19.36 80.62	583 24.01
2005sem1	2 0.08 1.00	4 0.16 1.99	0 0.00 0.00	4 0.16 1.99	160 6.59 79.60	201 8.28
2005sem2	10 0.41 2.17	5 0.21 1.08	2 0.08 0.43	4 0.16 0.87	358 14.74 77.66	461 18.99
Total	39 1.61	44 1.81	11 0.45	19 0.78	1872 77.10	2428 100.00
Frequency Missing = 943						

Table 28

Grade 11 Symbol

Grade 11 SBL	Frequency	Percent	Cumulative Frequency	Cumulative Percent
A	40	2.90	40	2.90
B	211	15.30	251	18.20
C	497	36.04	748	54.24
D	490	35.53	1238	89.78
E	134	9.72	1372	99.49
F	6	0.44	1378	99.93
H	1	0.07	1379	100.00

Table 29

Period by Grade 11 Symbol

Table of Period by Grade 11Symbol								
Period	Grade 11 Symbol							
Frequency Percent Row Pct	A	B	C	D	E	F	H	Total
2003sem2	15 1.12 2.94	84 6.27 16.44	186 13.88 36.40	175 13.06 34.25	48 3.58 9.39	3 0.22 0.59	0 0.00 0.00	511 38.13
2004sem1	8 0.60 5.63	25 1.87 17.61	72 5.37 50.70	31 2.31 21.83	5 0.37 3.52	1 0.07 0.70	0 0.00 0.00	142 10.60
2004sem2	3 0.22 0.93	39 2.91 12.07	105 7.84 32.51	129 9.63 39.94	46 3.43 14.24	1 0.07 0.31	0 0.00 0.00	323 24.10
2005sem1	6 0.45 4.96	26 1.94 21.49	43 3.21 35.54	37 2.76 30.58	9 0.67 7.44	0 0.00 0.00	0 0.00 0.00	121 9.03
2005sem2	8 0.60 3.29	35 2.61 14.40	81 6.04 33.33	98 7.31 40.33	20 1.49 8.23	0 0.00 0.00	1 0.07 0.41	243 18.13
Total	40 2.99	209 15.60	487 36.34	470 35.07	128 9.55	5 0.37	1 0.07	1340 100.00
Frequency Missing = 2031								

Table 30

Grade 12 Symbol

Grade 12 symbol	Frequency	Percent	Cumulative Frequency	Cumulative Percent
A	67	2.73	67	2.73
B	381	15.53	448	18.26
C	1046	42.62	1494	60.88
D	749	30.52	2243	91.40
E	198	8.07	2441	99.47
EE	2	0.08	2443	99.55
F	11	0.45	2454	100.00

Table 31

Period by Grade 12 Symbol

Table of Period by Grade 12 symbol								
Period	Grade 12 symbol							
Frequency Percent Row Pct	A	B	C	D	E	EE	F	Total
2003sem2	27 1.14 2.98	116 4.92 12.79	366 15.51 40.35	292 12.37 32.19	100 4.24 11.03	2 0.08 0.22	4 0.17 0.44	907 38.43
2004sem1	10 0.42 4.46	74 3.14 33.04	103 4.36 45.98	34 1.44 15.18	3 0.13 1.34	0 0.00 0.00	0 0.00 0.00	224 9.49
2004sem2	5 0.21 0.86	50 2.12 8.62	269 11.40 46.38	216 9.15 37.24	38 1.61 6.55	0 0.00 0.00	2 0.08 0.34	580 24.58
2005sem1	17 0.72 8.59	58 2.46 29.29	84 3.56 42.42	33 1.40 16.67	6 0.25 3.03	0 0.00 0.00	0 0.00 0.00	198 8.39
2005sem2	8 0.34 1.77	75 3.18 16.63	197 8.35 43.68	129 5.47 28.60	38 1.61 8.43	0 0.00 0.00	4 0.17 0.89	451 19.11
Total	67 2.84	373 15.81	1019 43.18	704 29.83	185 7.84	2 0.08	10 0.42	2360 100.00
Frequency Missing = 1011								

Table 32

Recognition of Prior Learning

RPL	Frequency	Percent	Cumulative Frequency	Cumulative Percent
No	1386	80.30	1386	80.30
Yes	340	19.70	1726	100.00

Table 33

Period by Recognition of Prior Education

Table of Period by Recognition of prior learning			
Period	RPL		
Frequency Percent Row Pct	No	Yes	Total
2003sem2	757 44.40 79.10	200 11.73 20.90	957 56.13
2004sem1	190 11.14 88.37	25 1.47 11.63	215 12.61
2004sem2	426 24.99 80.23	105 6.16 19.77	531 31.14
2005sem1	1 0.06 100.00	0 0.00 0.00	1 0.06
2005sem2	1 0.06 100.00	0 0.00 0.00	1 0.06
Total	1375 80.65	330 19.35	1705 100.00
Frequency Missing = 1666			

Table 34

Acceptance Status

Acceptance status	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Age Exemption	114	4.59	114	4.59
Conditional Exemption	249	10.02	363	14.61
Failed	6	0.24	369	14.86
Full Exemption	1906	76.73	2275	91.59
Exemption on Foreign Qualification	67	2.70	2342	94.28
Provisional Age Exemption	2	0.08	2344	94.36
Recognition of Prior Learning	8	0.32	2352	94.69
Senate Discretion	71	2.86	2423	97.54
School Leaving Certificate	60	2.42	2483	99.96
Status	7	0.28	2484	100.00

Table 35

Period by Acceptance Status

Table of Period by acceptance status						
Period	Acceptance status					
Frequency Percent Row Pct	Age Exemption	Conditional Exemption	Failed	Full Exemption	Exemption on Foreign Qualification	Provisional Age Exemption
2003sem2	56 2.34 6.02	114 4.77 12.26	4 0.17 0.43	709 29.67 76.24	10 0.42 1.08	1 0.04 0.11
2004sem1	3 0.13 1.33	16 0.67 7.11	0 0.00 0.00	203 8.49 90.22	3 0.13 1.33	0 0.00 0.00
2004sem2	28 1.17 4.82	66 2.76 11.36	0 0.00 0.00	456 19.08 78.49	22 0.92 3.79	0 0.00 0.00
2005sem1	3 0.13 1.51	7 0.29 3.52	0 0.00 0.00	171 7.15 85.93	7 0.29 3.52	1 0.04 0.50
2005sem2	20 0.84 4.40	37 1.55 8.13	2 0.08 0.44	308 12.89 67.69	20 0.84 4.40	0 0.00 0.00
Total	110 4.60	240 10.04	6 0.25	1847 77.28	62 2.59	2 0.08
Frequency Missing = 981						

Table 36

Table of Period by acceptance status					
Period	Acceptance status				
Frequency Percent Row Pct	Recognition of Prior Learning	Senate Discretion	School Leaving Certificate	Status	Total
2003sem2	3 0.13 0.32	24 1.00 2.58	9 0.38 0.97	0 0.00 0.00	930 38.91
2004sem1	0 0.00 0.00	0 0.00 0.00	0 0.00 0.00	0 0.00 0.00	225 9.41
2004sem2	4 0.17 0.69	3 0.13 0.52	1 0.04 0.17	1 0.04 0.17	581 24.31
2005sem1	0 0.00 0.00	7 0.29 3.52	3 0.13 1.51	0 0.00 0.00	199 8.33
2005sem2	1 0.04 0.22	30 1.26 6.59	37 1.55 8.13	0 0.00 0.00	455 19.04
Total	8 0.33	64 2.68	50 2.09	1 0.04	2390 100.00
Frequency Missing = 981					

Table 37

Type of Registration

FT_PT	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Full Time	2407	96.13	2407	96.13
Part Time	97	3.87	2504	100.00

Table 38

Period by Type of Registration

Table of Period by FT_PT			
Period	FT_PT		
Frequency Percent Row Pct	Full Time	Part Time	Total
2003sem2	879 36.49 92.92	67 2.78 7.08	946 39.27
2004sem1	219 9.09 99.55	1 0.04 0.45	220 9.13
2004sem2	550 22.83 94.99	29 1.20 5.01	579 24.03
2005sem1	201 8.34 100.00	0 0.00 0.00	201 8.34
2005sem2	463 19.22 100.00	0 0.00 0.00	463 19.22
Total	2312 95.97	97 4.03	2409 100.00
Frequency Missing = 962			

B11: STATUS OF PARENTS

Table 39

Parental Level of Education

Parent education	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Unknown	897	50.34	897	50.34
Father no formal Education	39	2.19	936	52.53
Father primary Education	7	0.39	943	52.92
Father standard 6 to 8	62	3.48	1005	56.40
Father standard 9 to 10	172	9.65	1177	66.05
Father post secondary education	257	14.42	1434	80.47
Mother no formal Education	23	1.29	1457	81.76
Mother primary Education	6	0.34	1463	82.10
Mother standard 6 to 8	30	1.68	1493	83.78
Mother standard 9 to 10	84	4.71	1577	88.50
Mother post secondary education	178	9.99	1755	98.48
Guardian no formal Education	1	0.06	1756	98.54
Guardian standard 6 to 8	2	0.11	1758	98.65
Guardian standard 9 to 10	13	0.73	1771	99.38
Guardian post secondary education	11	0.62	1782	100.00

Table 40

Period by Parental Education

Table of Period by Parent education								
Period	Parent education							
Frequency Percent Row Pct	Unknown	Father no formal Education	Father primary Education	Father standard 6 to 8	Father standard 9 to 10	Father post secondary education	Mother no formal Education	Mother primary Education
2003sem2	479 27.20 50.05	28 1.59 2.93	2 0.11 0.21	36 2.04 3.76	89 5.05 9.30	131 7.44 13.69	17 0.97 1.78	5 0.28 0.52
2004sem1	113 6.42 50.00	1 0.06 0.44	0 0.00 0.00	6 0.34 2.65	30 1.70 13.27	34 1.93 15.04	1 0.06 0.44	0 0.00 0.00
2004sem2	288 16.35 50.00	10 0.57 1.74	5 0.28 0.87	20 1.14 3.47	52 2.95 9.03	90 5.11 15.63	5 0.28 0.87	1 0.06 0.17
2005sem1	1 0.06 100.00	0 0.00 0.00	0 0.00 0.00	0 0.00 0.00	0 0.00 0.00	0 0.00 0.00	0 0.00 0.00	0 0.00 0.00
2005sem2	1 0.06 100.00	0 0.00 0.00	0 0.00 0.00	0 0.00 0.00	0 0.00 0.00	0 0.00 0.00	0 0.00 0.00	0 0.00 0.00
Total	882 50.09	39 2.21	7 0.40	62 3.52	171 9.71	255 14.48	23 1.31	6 0.34
Frequency Missing = 1610								

Table 41

Continuation of Table 40

Table of Period by Parent education								
Period	Parent education							
Frequency Percent Row Pct	Mother standard 6 to 8	Mother standard 9 to 10	Mother post secondary education	Guardian no formal Education	Guardian standard 6 to 8	Guardian standard 9 to 10	Guardian post secondary education	Total
2003sem2	21 1.19 2.19	46 2.61 4.81	91 5.17 9.51	1 0.06 0.10	0 0.00 0.00	4 0.23 0.42	7 0.40 0.73	957 54.34
2004sem1	2 0.11 0.88	10 0.57 4.42	22 1.25 9.73	0 0.00 0.00	2 0.11 0.88	4 0.23 1.77	1 0.06 0.44	226 12.83
2004sem2	7 0.40 1.22	27 1.53 4.69	63 3.58 10.94	0 0.00 0.00	0 0.00 0.00	5 0.28 0.87	3 0.17 0.52	576 32.71
2005sem1	0 0.00 0.00	0 0.00 0.00	0 0.00 0.00	0 0.00 0.00	0 0.00 0.00	0 0.00 0.00	0 0.00 0.00	1 0.06
2005sem2	0 0.00 0.00	0 0.00 0.00	0 0.00 0.00	0 0.00 0.00	0 0.00 0.00	0 0.00 0.00	0 0.00 0.00	1 0.06
Total	30 1.70	83 4.71	176 9.99	1 0.06	2 0.11	13 0.74	11 0.62	1761 100.00
Frequency Missing = 1610								

Table 42

Employment of Father

Father work	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Unknown	890	40.68	890	40.68
Agricultural environment	267	12.20	1157	52.88
Administrative	146	6.67	1303	59.55
Building Industry	167	7.63	1470	67.18
Defence Industry	164	7.50	1634	74.68
Management	414	18.92	2048	93.60
Own Business	3	0.14	2051	93.74
Professional	108	4.94	2159	98.67
Service Job	22	1.01	2181	99.68
Transport	7	0.32	2188	100.00

Table 43

Period by Father's Employment

Table of Period by father work						
Period	Father work					
Frequency Percent Row Pct	Unknown	Agricultural environment	Administrative	Building Industry	Defence Industry	Management
2003sem2	458 21.46 47.86	93 4.36 9.72	44 2.06 4.60	39 1.83 4.08	85 3.98 8.88	182 8.53 19.02
2004sem1	111 5.20 49.12	20 0.94 8.85	9 0.42 3.98	17 0.80 7.52	20 0.94 8.85	40 1.87 17.70
2004sem2	282 13.21 48.96	59 2.76 10.24	32 1.50 5.56	34 1.59 5.90	37 1.73 6.42	117 5.48 20.31
2005sem1	11 0.52 8.33	39 1.83 29.55	20 0.94 15.15	20 0.94 15.15	3 0.14 2.27	21 0.98 15.91
2005sem2	16 0.75 6.58	51 2.39 20.99	37 1.73 15.23	42 1.97 17.28	15 0.70 6.17	46 2.16 18.93
Total	878 41.14	262 12.28	142 6.65	152 7.12	160 7.50	406 19.03
Frequency Missing = 1237						

Table 44

Continuation of Table 43

Table of Period by Father work					
Period	Father work				
Frequency Percent Row Pct	Own Business	Professional	Service Job	Transport	Total
2003sem2	3 0.14 0.31	47 2.20 4.91	6 0.28 0.63	0 0.00 0.00	957 44.85
2004sem1	0 0.00 0.00	9 0.42 3.98	0 0.00 0.00	0 0.00 0.00	226 10.59
2004sem2	0 0.00 0.00	12 0.56 2.08	1 0.05 0.17	2 0.09 0.35	576 26.99
2005sem1	0 0.00 0.00	12 0.56 9.09	5 0.23 3.79	1 0.05 0.76	132 6.19
2005sem2	0 0.00 0.00	24 1.12 9.88	8 0.37 3.29	4 0.19 1.65	243 11.39
Total	3 0.14	104 4.87	20 0.94	7 0.33	2134 100.00
Frequency Missing = 1237					

Table 45

Employment of Mother

Mother work	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Unknown	904	47.75	904	47.75
Agricultural environment	282	14.90	1186	62.65
Administrative	44	2.32	1230	64.98
Building Industry	188	9.93	1418	74.91
Defence Industry	69	3.65	1487	78.55
Management	393	20.76	1880	99.31
Own Business	1	0.05	1881	99.37
Professional	8	0.42	1889	99.79
Service Job	4	0.21	1893	100.00

Table 46

Period by Mother's Employment

Table of Period by mother work									
Period	Mother work								
Frequency Percent Row Pct	Unknown	Agricultural environment	Administrative	Building Industry	Defence Industry	Management	Own Business	Professional	Service Job
2003sem2	489 26.18 51.10	123 6.58 12.85	23 1.23 2.40	94 5.03 9.82	29 1.55 3.03	193 10.33 20.17	1 0.05 0.10	5 0.27 0.52	0 0.00 0.00
2004sem1	107 5.73 47.35	32 1.71 14.16	1 0.05 0.44	24 1.28 10.62	9 0.48 3.98	53 2.84 23.45	0 0.00 0.00	0 0.00 0.00	0 0.00 0.00
2004sem2	289 15.47 50.17	84 4.50 14.58	9 0.48 1.56	46 2.46 7.99	26 1.39 4.51	119 6.37 20.66	0 0.00 0.00	0 0.00 0.00	3 0.16 0.52
2005sem1	4 0.21 10.81	14 0.75 37.84	6 0.32 16.22	7 0.37 18.92	0 0.00 0.00	4 0.21 10.81	0 0.00 0.00	1 0.05 2.70	1 0.05 2.70
2005sem2	6 0.32 8.33	26 1.39 36.11	4 0.21 5.56	13 0.70 18.06	3 0.16 4.17	18 0.96 25.00	0 0.00 0.00	2 0.11 2.78	0 0.00 0.00
Total	895 47.91	279 14.94	43 2.30	184 9.85	67 3.59	387 20.72	1 0.05	8 0.43	4 0.21
Frequency Missing = 1503									

Table 47

Continuation of Table 46

Table of Period by Mother work	
Period	
Frequency Percent Row Pct	Total
2003sem2	957 51.23
2004sem1	226 12.10
2004sem2	576 30.84
2005sem1	37 1.98
2005sem2	72 3.85
Total	1868 100.00
Frequency Missing = 1503	

Table 48

Monthly Income

Monthly income	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Unknown	363	18.29	363	18.29
Less than R2 000.00	221	11.13	584	29.42
Between R2 001.00 and R6 000.00	706	35.57	1290	64.99
Between R6 000.00 and R10 000.00	426	21.46	1716	86.45
More than R10 000.00	269	13.55	1985	100.00

Table 49

Period by Monthly Income

Table of Period by monthly income						
Period	Monthly income					Total
Frequency Percent Row Pct	Unknown	Less than R2 000.00	Between R2 001.00 and R6 000.00	Between R6 000.00 and R10 000.00	More than R10 000.00	
2003sem2	63 3.27 7.88	110 5.70 13.77	346 17.94 43.30	188 9.75 23.53	92 4.77 11.51	799 41.42
2004sem1	24 1.24 12.24	27 1.40 13.78	73 3.78 37.24	50 2.59 25.51	22 1.14 11.22	196 10.16
2004sem2	64 3.32 12.67	60 3.11 11.88	181 9.38 35.84	121 6.27 23.96	79 4.10 15.64	505 26.18
2005sem1	60 3.11 40.00	8 0.41 5.33	28 1.45 18.67	27 1.40 18.00	27 1.40 18.00	150 7.78
2005sem2	131 6.79 46.95	14 0.73 5.02	60 3.11 21.51	31 1.61 11.11	43 2.23 15.41	279 14.46
Total	342 17.73	219 11.35	688 35.67	417 21.62	263 13.63	1929 100.00
Frequency Missing = 1442						

Table 50

Annual Income

Annual income	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Unknown	503	25.34	503	25.34
Less than R20 000.00	239	12.04	742	37.38
Between R20 000.00 and R60 000.00	524	26.40	1266	63.78
Between R60 000.00 and R100 000.00	424	21.36	1690	85.14
Above R120 000.00	295	14.86	1985	100.00

Table 51

Period by Annual IncomeTable of Period by annual income						
Period	Annual income					
Frequency Percent Row Pct	Unknown	Less than R20 000.00	Between R20 000.00 and R60 000.00	Between R60 000.00 and R100 000.00	Above R120 000.00	Total
2003sem2	195 10.11 24.41	106 5.50 13.27	209 10.83 26.16	183 9.49 22.90	106 5.50 13.27	799 41.42
2004sem1	49 2.54 25.00	28 1.45 14.29	46 2.38 23.47	50 2.59 25.51	23 1.19 11.73	196 10.16
2004sem2	114 5.91 22.57	59 3.06 11.68	133 6.89 26.34	100 5.18 19.80	99 5.13 19.60	505 26.18
2005sem1	47 2.44 31.33	11 0.57 7.33	39 2.02 26.00	36 1.87 24.00	17 0.88 11.33	150 7.78
2005sem2	82 4.25 29.39	31 1.61 11.11	79 4.10 28.32	43 2.23 15.41	44 2.28 15.77	279 14.46
Total	487 25.25	235 12.18	506 26.23	412 21.36	289 14.98	1929 100.00
Frequency Missing = 1442						

APPENDIX C: EVALUATION INSTRUMEMTS

C1: END OF COURSE EVALUATION

UNIVERSITY of the
WESTERN CAPE

DEPARTMENT OF STATISTICS

END OF COURSE EVALUATION

INTRODUCTORY STATISTICS PROGRAMME

Thank you for your participation in this course. Your feedback will help to improve the quality of our teaching, and the organization and design of this course.

Please check the appropriate choice(s) thoughtfully and with honesty. For questions involving a scale of responses, please read each statement and then check the response, which best shows, what you think.

NOTE: Complete anonymity is assured, you do not need to identify yourself.

Internet tutorials and Web-based self-help

1. How would you rank the availability of computers in the ADM lab?
   a) Poor b) Average c) Good d) Very good e) Excellent

2. The unavailability of computers in the ADM lab is due to:
   a) To few computers
   b) Time-table clashes
   c) Lab closes too early
   d) You choosing to use other lab
   e) You completing your tutorials in the last few days before due date

3. I found the tutors to be helpful:

a) Strongly disagree
b) Disagree
c) Neutral
d) Agree
e) Strongly agree

4. Tutor's knowledge level:

a) Poor b) Average c) Good d) Very good e) Excellent

5. The tutorials and self-help material on KEWL was helpful in improving your understanding of the subject:
   a) Strongly disagree
   b) Disagree
   c) Neutral
   d) Agree
   e) Strongly agree

6. The Discussion Forum, on KEWL, provides a medium where I can engage in discussing academic matters with the lecturers and fellow students:
   a) Strongly disagree
   b) Disagree
   c) Neutral
   d) Agree
   e) Strongly agree

7. I enjoy using the Chat Room to meet friends:
   a) Strongly disagree
   b) Disagree
   c) Neutral
   d) Agree
   e) Strongly agree

8. The questions in the tutorials are reflective of what is taught in the notes:
   a) Strongly disagree
   b) Disagree
   c) Neutral
   d) Agree
   e) Strongly agree

Please comment on the value of Internet tutorials and Web-based self-help for this course.

9. The degree of difficulty of the questions asked in the test was fair:
    a) Strongly disagree
    b) Disagree
    c) Neutral
    d) Agree
    e) Strongly agree

10. The questions asked in the test reflected the coursework:
    a) Strongly disagree
    b) Disagree
    c) Neutral
    d) Agree
    e) Strongly agree

11. the randomness of the questions selected for the test reduced cheating:
    a) Strongly disagree
    b) Disagree
    c) Neutral
    d) Agree
    e) Strongly agree

12. You prefer writing the test on paper:
    a) Strongly disagree
    b) Disagree
    c) Neutral
    d) Agree
    e) Strongly agree

13. If you could use the 'Practice Test' function on the TestWriter program to practice writing the test you would then prefer the TestWriter program over a paper test:
    a) Strongly disagree
    b) Disagree
    c) Neutral
    d) Agree
    e) Strongly agree

14. Despite the beta version (testing version) of the TestWriter program there are enough good reasons to continue using and improving the program:
    a) Strongly disagree
    b) Disagree
    c) Neutral
    d) Agree
    e) Strongly agree

Please comment on the use of the TestWriter program for writing test:

Lecturer

15. Lecturer's knowledge level:
    a) Poor b) Average c) Good d) Very good e) Excellent

16. Lecturer's teaching style:
    a) Poor b) Average c) Good d) Very good e) Excellent

17. Lecturer's responses to questions were clear and complete:
    a) Strongly disagree
    b) Disagree
    c) Neutral
    d) Agree
    e) Strongly agree

18. Lecturer was considerate and courteous:
    a) Strongly disagree
    b) Disagree
    c) Neutral
    d) Agree
    e) Strongly agree

19. I would take another course with this lecturer:
    a) Strongly disagree
    b) Disagree
    c) Neutral
    d) Agree
    e) Strongly agree

Please comment on the value of the lecturer in your understanding of the course.

Coursenotes and Coursework

20. The notebook was clear and helpful in understanding the coursework:
    a) Strongly disagree
    b) Disagree
    c) Neutral
    d) Agree
    e) Strongly agree

21. The notebook needs more worked out examples:
    a) Strongly disagree
    b) Disagree
    c) Neutral

d) Agree
e) Strongly agree

22. The quality of the notebook is acceptable for this course:
    a) Strongly disagree
    b) Disagree
    c) Neutral
    d) Agree
    e) Strongly agree

23. Grading was fair and consistent:
    a) Strongly disagree
    b) Disagree
    c) Neutral
    d) Agree
    e) Strongly agree

24. Feedback about the quality of my work was useful, timely, relevant:
    a) Strongly disagree
    b) Disagree
    c) Neutral
    d) Agree
    e) Strongly agree

25. The course content was at about the right level of difficulty:
    a) Strongly disagree
    b) Disagree
    c) Neutral
    d) Agree
    e) Strongly agree

26. Was the course more teacher-centered or student-centered?
    a) Strongly teacher-centered
    b) Teacher-centered
    c) Both
    d) Student-centered
    e) Strongly Student-centered

27. On average, the amount of time required for this course was more than that required for my other courses:
    a) Strongly disagree
    b) Disagree
    c) Neutral
    d) Agree
    e) Strongly agree

28. Clarity of course objectives and expectations:
    a) Poor b) Average c) Good d) Very good e) Excellent

29. Overall Course Rating:
    a) Poor b) Average c) Good d) Very good e) Excellent

What's wrong with this course and how would you fix it?

UNIVERSITY of the
WESTERN CAPE

Table 1						
Table of PERIOD by Q1						
PERIOD	Q1(How would you rank the availability of computers in the ADM lab?)					
Frequency Row Pct	Poor	Average	Good	Very good	Excellent	Total
2003sem2	468 45.88	326 31.96	150 14.71	51 5.00	25 2.45	1020
2004sem1	119 40.48	84 28.57	37 12.59	52 17.69	2 0.68	294
2004sem2	166 35.10	189 39.96	79 16.70	25 5.29	14 2.96	473
2005sem1	9 9.38	24 25.00	33 34.38	20 20.83	10 10.42	96
2005sem2	161 32.59	189 38.26	110 22.27	29 5.87	5 1.01	494
Total	923	812	409	177	56	2377
Frequency Missing = 9						

Table 2			
Statistic	DF	Value	Prob
Chi-Square	16	198.0289	<.0001
Likelihood Ratio Chi-Square	16	175.8692	<.0001
Mantel-Haenszel Chi-Square	1	25.3280	<.0001
Phi Coefficient		0.2886	
Contingency Coefficient		0.2773	
Cramer's V		0.1443	

Table 3						
Table of PERIOD by Q2						
PERIOD	Q2(The unavailability of computers in the ADM lab is due to)					
Frequency Row Pct	To few computers	TimeTable clashes	Lab closes too early	You choosing to use other lab	You completing your tutorials in the last few days before due date	Total
2003sem2	640 63.49	122 12.10	62 6.15	23 2.28	161 15.97	1008
2004sem1	44 14.97	98 33.33	109 37.07	28 9.52	15 5.10	294
2004sem2	246 52.79	68 14.59	56 12.02	11 2.36	85 18.24	466
2005sem1	13 13.83	22 23.40	38 40.43	7 7.45	14 14.89	94
2005sem2	210 42.86	81 16.53	115 23.47	21 4.29	63 12.86	490
Total	1153	391	380	90	338	2352
Frequency Missing = 34						

Table 4			
Statistic	DF	Value	Prob
Chi-Square	16	466.9132	<.0001
Likelihood Ratio Chi-Square	16	474.0081	<.0001
Mantel-Haenszel Chi-Square	1	21.6357	<.0001
Phi Coefficient		0.4456	
Contingency Coefficient		0.4070	
Cramer's V		0.2228	

Table 5						
Table of PERIOD by Q3						
PERIOD	Q3(I found the tutors to be helpful)					
Frequency Row Pct	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Total
2003sem2	124 12.17	174 17.08	349 34.25	272 26.69	100 9.81	1019
2004sem1	104 35.49	53 18.09	85 29.01	46 15.70	5 1.71	293
2004sem2	79 16.70	109 23.04	166 35.10	91 19.24	28 5.92	473
2005sem1	13 13.54	12 12.50	29 30.21	25 26.04	17 17.71	96
2005sem2	59 12.04	54 11.02	180 36.73	143 29.18	54 11.02	490
Total	379	402	809	577	204	2371
Frequency Missing = 15						

Table 6			
Statistic	DF	Value	Prob
Chi-Square	16	165.6737	<.0001
Likelihood Ratio Chi-Square	16	156.7662	<.0001
Mantel-Haenszel Chi-Square	1	4.5684	0.0326
Phi Coefficient		0.2643	
Contingency Coefficient		0.2556	
Cramer's V		0.1322	

Table 7						
Table of PERIOD by Q4						
PERIOD	Q4(Tutor knowledge level)					
Frequency Row Pct	Poor	Average	Good	Very good	Excellent	Total
2003sem2	85 8.35	385 37.82	355 34.87	159 15.62	34 3.34	1018
2004sem1	8 2.72	269 91.50	12 4.08	3 1.02	2 0.68	294
2004sem2	56 11.91	183 38.94	146 31.06	71 15.11	14 2.98	470
2005sem1	5 5.26	27 28.42	32 33.68	24 25.26	7 7.37	95
2005sem2	27 5.54	135 27.72	187 38.40	111 22.79	27 5.54	487
Total	181	999	732	368	84	2364
Frequency Missing = 22						

Table 8			
Statistic	DF	Value	Prob
Chi-Square	16	389.3548	<.0001
Likelihood Ratio Chi-Square	16	420.7867	<.0001
Mantel-Haenszel Chi-Square	1	38.4661	<.0001
Phi Coefficient		0.4058	
Contingency Coefficient		0.3760	
Cramer's V		0.2029	

Table 9						
Table of PERIOD by Q5						
PERIOD	Q5(The tutorials and selfhelp material on KEWL was helpful in improving your understanding of the subject)					
Frequency Row Pct	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Total
2003sem2	44 4.34	81 7.99	332 32.74	401 39.55	156 15.38	1014
2004sem1	39 13.27	20 6.80	219 74.49	14 4.76	2 0.68	294
2004sem2	29 6.20	53 11.32	134 28.63	174 37.18	78 16.67	468
2005sem1	5 5.26	14 14.74	30 31.58	33 34.74	13 13.68	95
2005sem2	37 7.60	47 9.65	181 37.17	164 33.68	58 11.91	487
Total	154	215	896	786	307	2358
Frequency Missing = 28						

Table 10			
Statistic	DF	Value	Prob
Chi-Square	16	290.3576	<.0001
Likelihood Ratio Chi-Square	16	331.3125	<.0001
Mantel-Haenszel Chi-Square	1	5.8350	0.0157
Phi Coefficient		0.3509	

Table 10			
Statistic	DF	Value	Prob
Contingency Coefficient		0.3311	
Cramer's V		0.1755	

Table 11						
Table of PERIOD by Q8						
PERIOD	Q8(The questions in the tutorials are reflective of what is taught in the notes)					
Frequency Row Pct	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Total
2003sem2	50 4.99	117 11.67	211 21.04	420 41.87	205 20.44	1003
2004sem1	8 2.76	16 5.52	52 17.93	34 11.72	180 62.07	290
2004sem2	38 8.09	61 12.98	98 20.85	123 26.17	150 31.91	470
2005sem1	3 3.23	4 4.30	24 25.81	11 11.83	51 54.84	93
2005sem2	22 4.55	25 5.18	93 19.25	63 13.04	280 57.97	483
Total	121	223	478	651	866	2339
Frequency Missing = 47						

Table 12			
Statistic	DF	Value	Prob
Chi-Square	16	379.9044	<.0001
Likelihood Ratio Chi-Square	16	388.7113	<.0001
Mantel-Haenszel Chi-Square	1	51.5257	<.0001

Table 12			
Statistic	DF	Value	Prob
Phi Coefficient		0.4030	
Contingency Coefficient		0.3738	
Cramer's V		0.2015	

C3: EVALUATION OF TESTS-WRITER

Table 13						
Table of PERIOD by q9						
PERIOD	q9(The degree of difficulty of the questions asked in the test was fair)					
Frequency Row Pct	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Total
2003sem2	0 .	0 .	0 .	0 .	0 .	0
2004sem1	0 .	0 .	0 .	0 .	0 .	0
2004sem2	6 5.94	5 4.95	63 62.38	25 24.75	2 1.98	101
2005sem1	5 5.26	14 14.74	30 31.58	33 34.74	13 13.68	95
2005sem2	48 10.08	66 13.87	257 53.99	86 18.07	19 3.99	476
Total	59	85	350	144	34	672
Frequency Missing = 1714						

Table 14

Statistic	DF	Value	Prob
Chi-Square	8	46.6755	<.0001
Likelihood Ratio Chi-Square	8	44.5625	<.0001
Mantel-Haenszel Chi-Square	1	9.1934	0.0024
Phi Coefficient		0.2635	
Contingency Coefficient		0.2548	
Cramer's V		0.1864	

Table 15

Table of PERIOD by q10

PERIOD	q10(The questions asked in the test reflected the coursework)					
Frequency Row Pct	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Total
2003sem2	0 .	0 .	0 .	0 .	0 .	0
2004sem1	0 .	0 .	0 .	0 .	0 .	0
2004sem2	2 1.89	4 3.77	14 13.21	10 9.43	76 71.70	106
2005sem1	7 7.37	12 12.63	9 9.47	52 54.74	15 15.79	95
2005sem2	21 4.30	29 5.94	97 19.88	97 19.88	244 50.00	488
Total	30	45	120	159	335	689

Frequency Missing = 1697

Table 16			
Statistic	DF	Value	Prob
Chi-Square	8	101.4297	<.0001
Likelihood Ratio Chi-Square	8	98.3406	<.0001
Mantel-Haenszel Chi-Square	1	3.4166	0.0645
Phi Coefficient		0.3837	
Contingency Coefficient		0.3582	
Cramer's V		0.2713	

Table 17						
Table of PERIOD by Q11						
PERIOD	Q11(The randomness of the questions selected for the test reduced cheating)					Total
Frequency Row Pct	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	
2003sem2	0 .	0 .	0 .	0 .	0 .	0
2004sem1	0 .	0 .	0 .	0 .	0 .	0
2004sem2	20 19.61	14 13.73	52 50.98	12 11.76	4 3.92	102
2005sem1	8 8.42	19 20.00	39 41.05	28 29.47	1 1.05	95
2005sem2	92 19.41	92 19.41	183 38.61	84 17.72	23 4.85	474
Total	120	125	274	124	28	671
Frequency Missing = 1715						

Table 18			
Statistic	DF	Value	Prob
Chi-Square	8	21.8643	0.0052
Likelihood Ratio Chi-Square	8	23.3101	0.0030
Mantel-Haenszel Chi-Square	1	0.2043	0.6513
Phi Coefficient		0.1805	
Contingency Coefficient		0.1776	
Cramer's V		0.1276	

Table 19						
Table of PERIOD by q12						
PERIOD	q12(You prefer writing the test on paper)					Total
Frequency Row Pct	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	
2003sem2	0 .	0 .	0 .	0 .	0 .	0
2004sem1	0 .	0 .	0 .	0 .	0 .	0
2004sem2	4 3.81	9 8.57	20 19.05	46 43.81	26 24.76	105
2005sem1	5 5.43	7 7.61	17 18.48	58 63.04	5 5.43	92
2005sem2	43 8.87	63 12.99	120 24.74	205 42.27	54 11.13	485
Total	52	79	157	309	85	682
Frequency Missing = 1704						

Table 20			
Statistic	DF	Value	Prob
Chi-Square	8	33.1427	<.0001
Likelihood Ratio Chi-Square	8	31.3948	0.0001
Mantel-Haenszel Chi-Square	1	14.9636	0.0001
Phi Coefficient		0.2204	
Contingency Coefficient		0.2153	
Cramer's V		0.1559	

Table 21						
Table of PERIOD by q13						
PERIOD	q13(If you could use the Practice Test function on the TestWriter program to practice writing the test you would then prefer the TestWriter program over a paper test)					
Frequency Row Pct	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Total
2003sem2	0 .	0 .	0 .	0 .	0 .	0
2004sem1	0 .	0 .	0 .	0 .	0 .	0
2004sem2	2 1.89	11 10.38	26 24.53	39 36.79	28 26.42	106
2005sem1	6 6.25	3 3.13	19 19.79	33 34.38	35 36.46	96
2005sem2	34 6.94	62 12.65	146 29.80	151 30.82	97 19.80	490
Total	42	76	191	223	160	692
Frequency Missing = 1694						

Table 22			
Statistic	DF	Value	Prob
Chi-Square	8	25.0389	0.0015
Likelihood Ratio Chi-Square	8	27.4240	0.0006
Mantel-Haenszel Chi-Square	1	12.1200	0.0005
Phi Coefficient		0.1902	
Contingency Coefficient		0.1869	
Cramer's V		0.1345	

Table 23						
Table of PERIOD by q14						
PERIOD	q14(Despite the beta version(testing version) of the testWriter program there are enough good reasons to continue using and improving the program)					
Frequency Row Pct	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Total
2003sem2	0 .	0 .	0 .	0 .	0 .	0
2004sem1	0 .	0 .	0 .	0 .	0 .	0
2004sem2	9 8.49	28 26.42	43 40.57	19 17.92	7 6.60	106
2005sem1	37 38.95	16 16.84	16 16.84	18 18.95	8 8.42	95
2005sem2	123 25.15	142 29.04	123 25.15	60 12.27	41 8.38	489
Total	169	186	182	97	56	690
Frequency Missing = 1696						

C4: EVALUATION OF THE LECTURER

Table 24						
Table of PERIOD by q15						
PERIOD	Q15(Lecturer knowledge level)					Total
Frequency Row Pct	Poor	Average	Good	Very good	Excellent	
2003sem2	87 8.67	109 10.87	373 37.19	338 33.70	96 9.57	1003
2004sem1	20 6.92	37 12.80	32 11.07	144 49.83	56 19.38	289
2004sem2	30 6.45	42 9.03	42 9.03	191 41.08	160 34.41	465
2005sem1	2 2.11	8 8.42	25 26.32	35 36.84	25 26.32	95
2005sem2	53 10.77	81 16.46	210 42.68	111 22.56	37 7.52	492
Total	192	277	682	819	374	2344
Frequency Missing = 42						

Table 25

Statistic	DF	Value	Prob
Chi-Square	16	376.2552	<.0001
Likelihood Ratio Chi-Square	16	389.8602	<.0001
Mantel-Haenszel Chi-Square	1	2.4378	0.1184
Phi Coefficient		0.4006	
Contingency Coefficient		0.3719	
Cramer's V		0.2003	

Table 26

Table of PERIOD by q16

PERIOD	q16(Lecturer teaching style)					
Frequency Row Pct	Poor	Average	Good	Very good	Excellent	Total
2003sem2	174 17.76	157 16.02	299 30.51	266 27.14	84 8.57	980
2004sem1	21 7.27	40 13.84	115 39.79	108 37.37	5 1.73	289
2004sem2	78 16.99	93 20.26	177 38.56	95 20.70	16 3.49	459
2005sem1	2 2.11	3 3.16	36 37.89	37 38.95	17 17.89	95
2005sem2	44 9.00	55 11.25	168 34.36	183 37.42	39 7.98	489
Total	319	348	795	689	161	2312

Frequency Missing = 74

Table 27

Statistic	DF	Value	Prob
Chi-Square	16	146.0814	<.0001
Likelihood Ratio Chi-Square	16	158.8610	<.0001
Mantel-Haenszel Chi-Square	1	24.2031	<.0001
Phi Coefficient		0.2514	
Contingency Coefficient		0.2438	
Cramer's V		0.1257	

Table 28

Table of PERIOD by Q17

PERIOD	Q17(lecturer responses to questions were clear and complete)					
Frequency Row Pct	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Total
2003sem2	201 20.14	213 21.34	269 26.95	238 23.85	77 7.72	998
2004sem1	194 66.44	42 14.38	13 4.45	32 10.96	11 3.77	292
2004sem2	12 11.32	13 12.26	37 34.91	34 32.08	10 9.43	106
2005sem1	6 6.52	16 17.39	21 22.83	35 38.04	14 15.22	92
2005sem2	121 25.37	82 17.19	146 30.61	88 18.45	40 8.39	477
Total	534	366	486	427	152	1965

Frequency Missing = 421

Table 29

Statistic	DF	Value	Prob
Chi-Square	16	329.8580	<.0001
Likelihood Ratio Chi-Square	16	318.1895	<.0001
Mantel-Haenszel Chi-Square	1	1.1015	0.2939
Phi Coefficient		0.4097	
Contingency Coefficient		0.3791	
Cramer's V		0.2049	

Table 30

Table of PERIOD by Q18

PERIOD	Q18(Lecturer was considerate and courteous)					
Frequency Row Pct	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Total
2003sem2	101 10.01	113 11.20	248 24.58	304 30.13	243 24.08	1009
2004sem1	20 6.85	34 11.64	63 21.58	174 59.59	1 0.34	292
2004sem2	90 19.11	109 23.14	134 28.45	103 21.87	35 7.43	471
2005sem1	17 17.71	18 18.75	30 31.25	21 21.88	10 10.42	96
2005sem2	82 16.73	108 22.04	129 26.33	147 30.00	24 4.90	490
Total	310	382	604	749	313	2358

Frequency Missing = 28

Table 31

Statistic	DF	Value	Prob
Chi-Square	16	338.6733	<.0001
Likelihood Ratio Chi-Square	16	350.8386	<.0001
Mantel-Haenszel Chi-Square	1	120.3308	<.0001
Phi Coefficient		0.3790	
Contingency Coefficient		0.3544	
Cramer's V		0.1895	

Table 32

Table of PERIOD by Q19

PERIOD	Q19(I would take another course with this lecturer)					
Frequency Row Pct	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Total
2003sem2	79 7.89	162 16.18	305 30.47	297 29.67	158 15.78	1001
2004sem1	72 24.49	104 35.37	80 27.21	29 9.86	9 3.06	294
2004sem2	36 7.66	79 16.81	145 30.85	124 26.38	86 18.30	470
2005sem1	7 7.29	6 6.25	41 42.71	33 34.38	9 9.38	96
2005sem2	32 6.48	46 9.31	106 21.46	135 27.33	175 35.43	494
Total	226	397	677	618	437	2355

Frequency Missing = 31

Table 33

Statistic	DF	Value	Prob
Chi-Square	16	338.6553	<.0001
Likelihood Ratio Chi-Square	16	324.7131	<.0001
Mantel-Haenszel Chi-Square	1	61.9999	<.0001
Phi Coefficient		0.3792	
Contingency Coefficient		0.3546	
Cramer's V		0.1896	

C5: EVALUATION OF COURSENOTES AND COURSE IN GENERAL

Table 34						
Table of PERIOD by Q20						
PERIOD	Q20(The notebook was clear and helpful in understanding the coursework)					
Frequency Row Pct	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Total
2003sem2	107 10.62	171 16.96	389 38.59	247 24.50	94 9.33	1008
2004sem1	110 37.54	81 27.65	38 12.97	59 20.14	5 1.71	293
2004sem2	30 6.42	70 14.99	158 33.83	159 34.05	50 10.71	467
2005sem1	2 2.11	16 16.84	29 30.53	41 43.16	7 7.37	95
2005sem2	52 10.63	89 18.20	170 34.76	141 28.83	37 7.57	489
Total	301	427	784	647	193	2352
Frequency Missing = 34						

Table 35			
Statistic	DF	Value	Prob
Chi-Square	16	278.0348	<.0001
Likelihood Ratio Chi-Square	16	252.6808	<.0001
Mantel-Haenszel Chi-Square	1	6.1128	0.0134
Phi Coefficient		0.3438	
Contingency Coefficient		0.3251	
Cramer's V		0.1719	

Table 36						
Table of PERIOD by Q21						
PERIOD	Q21(The notebook needs more worked out examples)					
Frequency Row Pct	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Total
2003sem2	63 6.29	105 10.48	211 21.06	339 33.83	284 28.34	1002
2004sem1	58 20.00	40 13.79	55 18.97	132 45.52	5 1.72	290
2004sem2	75 16.20	82 17.71	114 24.62	146 31.53	46 9.94	463
2005sem1	14 14.74	14 14.74	26 27.37	32 33.68	9 9.47	95
2005sem2	36 7.36	76 15.54	220 44.99	131 26.79	26 5.32	489
Total	246	317	626	780	370	2339
Frequency Missing = 47						

Table 37			
Statistic	DF	Value	Prob
Chi-Square	16	359.1370	<.0001
Likelihood Ratio Chi-Square	16	363.5568	<.0001
Mantel-Haenszel Chi-Square	1	96.6848	<.0001
Phi Coefficient		0.3918	
Contingency Coefficient		0.3648	
Cramer's V		0.1959	

Table 38						
Table of PERIOD by Q22						
PERIOD	Q22(The quality of the notebook is acceptable for this course)					
Frequency Row Pct	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Total
2003sem2	53 5.25	115 11.39	364 36.04	409 40.50	69 6.83	1010
2004sem1	44 14.97	60 20.41	131 44.56	54 18.37	5 1.70	294
2004sem2	63 13.46	88 18.80	142 30.34	136 29.06	39 8.33	468
2005sem1	11 11.83	20 21.51	31 33.33	22 23.66	9 9.68	93
2005sem2	40 8.16	80 16.33	216 44.08	114 23.27	40 8.16	490
Total	211	363	884	735	162	2355
Frequency Missing = 31						

Table 39			
Statistic	DF	Value	Prob
Chi-Square	16	148.3609	<.0001
Likelihood Ratio Chi-Square	16	153.8864	<.0001
Mantel-Haenszel Chi-Square	1	20.5270	<.0001
Phi Coefficient		0.2510	
Contingency Coefficient		0.2434	
Cramer's V		0.1255	

Table 40						
Table of PERIOD by Q23						
PERIOD	Q23(Grading was fair and consistent)					
Frequency Row Pct	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Total
2003sem2	33 3.28	97 9.64	417 41.45	374 37.18	85 8.45	1006
2004sem1	108 36.86	63 21.50	76 25.94	39 13.31	7 2.39	293
2004sem2	26 5.54	27 5.76	89 18.98	163 34.75	164 34.97	469
2005sem1	4 4.26	6 6.38	15 15.96	26 27.66	43 45.74	94
2005sem2	65 13.35	93 19.10	184 37.78	116 23.82	29 5.95	487
Total	236	286	781	718	328	2349
Frequency Missing = 37						

Table 41			
Statistic	DF	Value	Prob
Chi-Square	16	744.2153	<.0001
Likelihood Ratio Chi-Square	16	643.3561	<.0001
Mantel-Haenszel Chi-Square	1	5.9453	0.0148
Phi Coefficient		0.5629	
Contingency Coefficient		0.4905	
Cramer's V		0.2814	

Table 42						
Table of PERIOD by Q24						
PERIOD	Q24(Feedback about the quality of my work was useful timely relevant)					
Frequency Row Pct	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Total
2003sem2	53 5.28	138 13.76	341 34.00	381 37.99	90 8.97	1003
2004sem1	141 48.12	59 20.14	19 6.48	73 24.91	1 0.34	293
2004sem2	45 9.64	79 16.92	171 36.62	136 29.12	36 7.71	467
2005sem1	4 4.17	15 15.63	40 41.67	31 32.29	6 6.25	96
2005sem2	63 12.86	129 26.33	196 40.00	81 16.53	21 4.29	490
Total	306	420	767	702	154	2349
Frequency Missing = 37						

Table 43			
Statistic	DF	Value	Prob
Chi-Square	16	523.2645	<.0001
Likelihood Ratio Chi-Square	16	469.9371	<.0001
Mantel-Haenszel Chi-Square	1	53.8312	<.0001
Phi Coefficient		0.4720	
Contingency Coefficient		0.4268	
Cramer's V		0.2360	

Table 44						
Table of PERIOD by Q25						
PERIOD	Q25(The course content was about the right level of difficulty)					
Frequency Row Pct	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Total
2003sem2	51 5.08	168 16.75	411 40.98	313 31.21	60 5.98	1003
2004sem1	114 38.78	92 31.29	41 13.95	40 13.61	7 2.38	294
2004sem2	31 6.64	66 14.13	183 39.19	157 33.62	30 6.42	467
2005sem1	2 2.11	7 7.37	44 46.32	39 41.05	3 3.16	95
2005sem2	49 9.96	77 15.65	151 30.69	146 29.67	69 14.02	492
Total	247	410	830	695	169	2351
Frequency Missing = 35						

Table 45			
Statistic	DF	Value	Prob
Chi-Square	16	441.2790	<.0001
Likelihood Ratio Chi-Square	16	369.1653	<.0001
Mantel-Haenszel Chi-Square	1	9.9522	0.0016
Phi Coefficient		0.4332	
Contingency Coefficient		0.3975	
Cramer's V		0.2166	

Table 46						
Table of PERIOD by Q26						
PERIOD	Q26(Was the course more teachercentered or studentcentered)					
Frequency Row Pct	Strongly teacher centered	Teacher centered	Both	Student centered	Strongly student centered	Total
2003sem2	70 7.03	203 20.38	384 38.55	249 25.00	90 9.04	996
2004sem1	151 51.36	54 18.37	54 18.37	32 10.88	3 1.02	294
2004sem2	36 7.71	70 14.99	189 40.47	134 28.69	38 8.14	467
2005sem1	6 6.32	9 9.47	46 48.42	26 27.37	8 8.42	95
2005sem2	53 10.79	135 27.49	187 38.09	93 18.94	23 4.68	491
Total	316	471	860	534	162	2343
Frequency Missing = 43						

Table 47			
Statistic	DF	Value	Prob
Chi-Square	16	477.7633	<.0001
Likelihood Ratio Chi-Square	16	374.4380	<.0001
Mantel-Haenszel Chi-Square	1	3.7864	0.0517
Phi Coefficient		0.4516	
Contingency Coefficient		0.4116	
Cramer's V		0.2258	

Table 48						
Table of PERIOD by Q27						
PERIOD	Q27(On average, the amount of time required for this course was more than that required for my other courses)					
Frequency Row Pct	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Total
2003sem2	82 8.22	303 30.36	333 33.37	190 19.04	90 9.02	998
2004sem1	88 30.03	52 17.75	122 41.64	29 9.90	2 0.68	293
2004sem2	36 7.64	84 17.83	171 36.31	158 33.55	22 4.67	471
2005sem1	9 9.68	13 13.98	37 39.78	32 34.41	2 2.15	93
2005sem2	54 10.93	150 30.36	185 37.45	88 17.81	17 3.44	494
Total	269	602	848	497	133	2349
Frequency Missing = 37						

Table 49			
Statistic	DF	Value	Prob
Chi-Square	16	249.1995	<.0001
Likelihood Ratio Chi-Square	16	230.2109	<.0001
Mantel-Haenszel Chi-Square	1	0.7995	0.3712
Phi Coefficient		0.3257	
Contingency Coefficient		0.3097	
Cramer's V		0.1629	

Table 50						
Table of PERIOD by Q28						
PERIOD	Q28(Clarity of course objectives and expectations)					
Frequency Row Pct	Poor	Average	Good	Very good	Excellent	Total
2003sem2	68 6.95	315 32.21	396 40.49	148 15.13	51 5.21	978
2004sem1	30 10.31	77 26.46	96 32.99	83 28.52	5 1.72	291
2004sem2	38 8.07	79 16.77	216 45.86	122 25.90	16 3.40	471
2005sem1	3 3.13	10 10.42	53 55.21	27 28.13	3 3.13	96
2005sem2	24 4.94	91 18.72	218 44.86	115 23.66	38 7.82	486
Total	163	572	979	495	113	2322
Frequency Missing = 64						

Table 51			
Statistic	DF	Value	Prob
Chi-Square	16	122.9355	<.0001
Likelihood Ratio Chi-Square	16	127.3280	<.0001
Mantel-Haenszel Chi-Square	1	43.3888	<.0001
Phi Coefficient		0.2301	
Contingency Coefficient		0.2242	
Cramer's V		0.1150	

Table 52						
Table of PERIOD by Q29						
PERIOD	Q29(Overall Course Rating)					
Frequency Row Pct	Poor	Average	Good	Very good	Excellent	Total
2003sem2	25 5.46	139 30.35	182 39.74	89 19.43	23 5.02	458
2004sem1	69 23.79	45 15.52	48 16.55	124 42.76	4 1.38	290
2004sem2	34 7.26	83 17.74	148 31.62	148 31.62	55 11.75	468
2005sem1	5 5.21	28 29.17	34 35.42	22 22.92	7 7.29	96
2005sem2	42 8.55	83 16.90	187 38.09	139 28.31	40 8.15	491
Total	175	378	599	522	129	1803
Frequency Missing = 583						

Table 53			
Statistic	DF	Value	Prob
Chi-Square	16	206.8688	<.0001
Likelihood Ratio Chi-Square	16	199.4354	<.0001
Mantel-Haenszel Chi-Square	1	14.3083	0.0002
Phi Coefficient		0.3387	
Contingency Coefficient		0.3208	
Cramer's V		0.1694	

C6: ONLINE QUESTIONNAIRES

C6_1: PRE-QUESTIONNAIRE

SOME BACKGROUND INFORMATION

Please select the most appropriate answer by clicking on the button of your choice.

1. Gender

Male	Female

2. Age Between

15-19	20-24	25-29	30-34	35+

3. Are you an S.A citizen

Yes	No

4. Ethnic Background

Black	Coloured	Indian	White	Other

5. Is English your home language?

Yes	No

6. Are you registered?

Full-time	Part-time

7. What degree are you pursuing?

BSc	BComm	Badmin	Non-degree	Other1

8. Are you a _____ student?

First year	Second year	Third year	Postgraduate

9. Are you staying

Friends/Relatives	With parents	Own Home

10. Are you:

Single	Married	Divorced	Widowed

11. Number of Children

None	One	Two	Three	More

12. Are you employed?

Permanent	Contract	Temporary	Not-employed	Workstudy

13. Who will pay for your tuition?

Bursary	Parents	Loan	Yourself	Employer

14. Do you own a cellular phone?

Yes	No

15. Do you have a telephone at home?

Yes	No

How important are each of the following reasons for your taking the course?

(Make on response for each of the applicable reason; otherwise leave blank.)

16. I mainly do statistics because:

Of professional or job related interest	Of general interest	It is a major requirement	It is required for my graduation

17. What symbol do you expect to get in this course?

A	B	C	D	O

18. How easy /difficult do you expect this course to be?

Easy	Not so easy	Not so difficult	Difficult

19. How many online courses have registered for previously?

None1	One1	2 to 4	5 or more

EXPECTATIONS AND FEELINGS ABOUT LEARNING MODES AND PROCESSES

Please select a response that corresponds to the following scale of each statement

SA=Strongly Agree; A=Agree; D=Disagree; SD=Strongly Disagree

20. I like to read:

SA	A	D	SD

21. I am apprehensive about working with students in groups.

SA	A	D	SD

22. My friends think that I am well organized.

SA	A	D	SD

23. I have difficulty expressing my ideas in writing.

SA	A	D	SD

24. I like to take part in class discussions

SA	A	D	SD

25. I planned some regular time on week to work on this course.

SA	A	D	SD

26. Learning is enjoyable experience.

SA	A	D	SD

27. I tend to put things off until the last minute.

SA	A	D	SD

28. I like working on my own.

SA	A	D	SD

29. I like working on the computer.

SA	A	D	SD

30. I like to do tutorials to enhance my learning.

SA	A	D	SD

31. I perceive on-line tutorials to be a problem.

SA	A	D	SD

32. This course is important for my future employment

SA	A	D	SD

YOUR PREVIOUS EXPERIENCE WITH COMPUTERS

The following categories describe your previous experience with computer systems.

Novice I seldom or never use

Occasionally used before

Frequently used (e.g. more than 10 times sometimes regularly)

Daily this use of computers is centrally to my PROFFESSIONAL work

33. Your previous experience with personal computers

Novice	Occasionally	Frequently	Daily

34. Your previous experience with Email

Novice	Occasionally	Frequently	Daily

35. Your previous experience with Word processors

Novice	Occasionally	Frequently	Daily

36. Your previous experience with Web browsers

Novice	Occasionally	Frequently	Daily

37. Your current feelings about using computers

Stimulating	Somewhat stimulating	Somewhat dull	Dull

38. Your current feelings about using computers

Fun	Somewhat fun	Somewhat dreary	Dreary

39. Your current feelings about using computers

Easy	Somewhat easy	Somewhat difficult	Difficult

40. Your current feelings about using computers

Personal	Somewhat personal	Somewhat impersonal	Impersonal

41.Your current feelings about using computers

Hindering	Somewhat hindering	Somewhat helpful	Helpful

42: Your current feelings about using computers

Threatening	Somewhat not threatening	Somewhat threatening	Not threatening

EQUIPMENT ACCESS

43. Do you currently have access to a personal computer and a Modem at your place of employment?

I am not currently Employed	Yes, I have convenient access from work	Yes, I have no access from work	Yes, I have limited access from work

44. Do you currently use a personal computer?

YES	NO

If you answered yes to the above question

45. Do you have a Modem?

YES	NO

46. Do you have a printer?

YES	NO

47. Do you have an e-mail address?

YES	NO

48. Any comments??

C6_2: PRE-QUESTIONNARE TABLES

Table 54			
Table of period by Q_1			
Period	Q_1(Gender)		
Frequency Row Pct	Male	Female	Total
2003sem2	397 43.77	510 56.23	907
2004sem1	143 54.37	120 45.63	263
2004sem2	97 48.50	103 51.50	200
2005sem1	256 47.50	283 52.50	539
2005sem2	190 44.29	239 55.71	429
Total	1083	1255	2338
Frequency Missing = 272			

Table 55						
Table of period by Q_2						
period	Q_2(Age)					
Frequency Row Pct	15 – 19	20 - 24	25 - 29	30 - 43	35 and over	Total
2003sem2	485 53.41	347 38.22	46 5.07	20 2.20	10 1.10	908
2004sem1	170 65.13	71 27.20	9 3.45	6 2.30	5 1.92	261
2004sem2	112 56.85	74 37.56	3 1.52	4 2.03	4 2.03	197
2005sem1	339 62.66	179 33.09	13 2.40	8 1.48	2 0.37	541
2005sem2	214 50.00	190 44.39	8 1.87	11 2.57	5 1.17	428
Total	1320	861	79	49	26	2335
Frequency Missing = 275						

Table 56			
Table of period by Q_3			
period	Q_3(Are you a South African citizen?)		
Frequency Row Pct	Yes	No	Total
2003sem2	851 94.14	53 5.86	904
2004sem1	244 93.49	17 6.51	261
2004sem2	184 92.46	15 7.54	199
2005sem1	497 92.04	43 7.96	540
2005sem2	392 91.80	35 8.20	427
Total	2168	163	2331
Frequency Missing = 279			

Table 57						
Table of period by Q_4						
period	Q_4(Ethnic background?)					
Frequency Row Pct	Black	Coloured	Indian	White	Other	Total
2003sem2	327 36.70	446 50.06	90 10.10	9 1.01	19 2.13	891
2004sem1	90 34.62	145 55.77	18 6.92	4 1.54	3 1.15	260
2004sem2	51 25.76	111 56.06	22 11.11	6 3.03	8 4.04	198
2005sem1	166 30.68	317 58.60	42 7.76	9 1.66	7 1.29	541
2005sem2	123 29.15	242 57.35	35 8.29	9 2.13	13 3.08	422
Total	757	1261	207	37	50	2312
Frequency Missing = 298						

Table 58			
Table of period by Q_5			
period	Q_5(Is English your home language??)		
Frequency Row Pct	Yes	No	Total
2003sem2	464 51.21	442 48.79	906
2004sem1	139 53.05	123 46.95	262
2004sem2	120 60.61	78 39.39	198
2005sem1	306 56.56	235 43.44	541
2005sem2	237 55.76	188 44.24	425
Total	1266	1066	2332
Frequency Missing = 278			

Table 59			
Table of period by Q_6			
Period	Q_6(Are you registered?)		
Frequency Row Pct	Fulltime	Parttime	Total
2003sem2	841 93.65	57 6.35	898
2004sem1	249 96.89	8 3.11	257
2004sem2	180 91.84	16 8.16	196
2005sem1	513 97.53	13 2.47	526
2005sem2	406 96.67	14 3.33	420
Total	2189	108	2297
Frequency Missing = 313			

Table 60						
Table of period by Q_7						
period	Q_7(What degree are you persuing?)					
Frequency Row Pct	BSc	BComm	BAdmin	Nondegree	Other	Total
2003sem2	114 12.69	607 67.59	98 10.91	2 0.22	77 8.57	898
2004sem1	41 16.02	203 79.30	6 2.34	0 0.00	6 2.34	256
2004sem2	24 12.24	132 67.35	27 13.78	1 0.51	12 6.12	196
2005sem1	74 14.02	348 65.91	64 12.12	0 0.00	42 7.95	528
2005sem2	75 17.86	259 61.67	69 16.43	0 0.00	17 4.05	420
Total	328	1549	264	3	154	2298
Frequency Missing = 312						

Table 61					
Table of period by Q_8					
period	Q_8(Are you a ....student?)				
Frequency Row Pct	First year	Second year	Final year	Post graduate	Total
2003sem2	742 82.63	134 14.92	15 1.67	7 0.78	898
2004sem1	218 85.16	29 11.33	7 2.73	2 0.78	256
2004sem2	170 86.73	22 11.22	2 1.02	2 1.02	196
2005sem1	441 83.52	77 14.58	10 1.89	0 0.00	528
2005sem2	321 76.61	77 18.38	21 5.01	0 0.00	419
Total	1892	339	55	11	2297
Frequency Missing = 313					

Table 62				
Table of period by Q_9				
period	Q_9(Are you staying?)			
Frequency Row Pct	Friends_relatives	With parents	Own home	Total
2003sem2	151 16.99	619 69.63	119 13.39	889
2004sem1	29 11.51	183 72.62	40 15.87	252
2004sem2	24 12.37	139 71.65	31 15.98	194
2005sem1	84 16.15	363 69.81	73 14.04	520
2005sem2	70 16.75	285 68.18	63 15.07	418
Total	358	1589	326	2273
Frequency Missing = 337				

Table 63				
Table of period by Q_10				
period	Q_10(Are you?)			
Frequency Row Pct	Single	Married	Divorced	Total
2003sem2	860 96.30	27 3.02	6 0.67	893
2004sem1	244 96.44	8 3.16	1 0.40	253
2004sem2	186 95.38	8 4.10	1 0.51	195
2005sem1	511 96.96	12 2.28	4 0.76	527
2005sem2	405 96.89	8 1.91	5 1.20	418
Total	2206	63	17	2286
Frequency Missing = 324				

Table 64					
Table of period by Q_11					
period	Q_11(Number of children)				
Frequency Row Pct	None	One	Two	Three	Total
2003sem2	726 85.21	35 4.11	36 4.23	55 6.46	852
2004sem1	218 87.55	7 2.81	12 4.82	12 4.82	249
2004sem2	161 88.46	6 3.30	7 3.85	8 4.40	182
2005sem1	445 88.82	21 4.19	13 2.59	22 4.39	501
2005sem2	362 89.38	20 4.94	12 2.96	11 2.72	405
Total	1912	89	80	108	2189
Frequency Missing = 421					

Table 65					
Table of period by Q_12					
period	Q_12(Are you employed?)				
Frequency Row Pct	Permanent	Contract	Temporary	Not employed	Total
2003sem2	48 5.67	20 2.36	108 12.77	670 79.20	846
2004sem1	10 4.13	5 2.07	21 8.68	206 85.12	242
2004sem2	12 6.74	3 1.69	25 14.04	138 77.53	178
2005sem1	22 4.44	9 1.81	58 11.69	407 82.06	496
2005sem2	17 4.38	15 3.87	60 15.46	296 76.29	388
Total	109	52	272	1717	2150
Frequency Missing = 460					

Table 66					
Table of period by Q_13					
period	Q_13(Who will pay for your tuition?)				
Frequency Row Pct	Bursary	Parents	Loan	Yourself	Total
2003sem2	134 15.24	491 55.86	187 21.27	67 7.62	879
2004sem1	74 28.79	134 52.14	30 11.67	19 7.39	257
2004sem2	32 17.30	114 61.62	26 14.05	13 7.03	185
2005sem1	81 15.55	314 60.27	100 19.19	26 4.99	521
2005sem2	65 15.93	238 58.33	83 20.34	22 5.39	408
Total	386	1291	426	147	2250
Frequency Missing = 360					

Table 67			
Table of period by Q_14			
period	Q_14(Do you own a cellular phone?)		
Frequency Row Pct	Yes	No	Total
2003sem2	725 81.19	168 18.81	893
2004sem1	215 83.33	43 16.67	258
2004sem2	169 89.42	20 10.58	189
2005sem1	463 88.53	60 11.47	523
2005sem2	375 91.24	36 8.76	411
Total	1947	327	2274
Frequency Missing = 336			

Table 68			
Table of period by Q_15			
period	Q_15(Do you have a telephone at home?)		
Frequency Row Pct	Yes	No	Total
2003sem2	704 78.75	190 21.25	894
2004sem1	181 70.70	75 29.30	256
2004sem2	141 74.60	48 25.40	189
2005sem1	405 77.29	119 22.71	524
2005sem2	301 73.41	109 26.59	410
Total	1732	541	2273
Frequency Missing = 337			

Table 69					
Table of period by Q_16					
period	Q_16(I mainly do statistics because:)				
Frequency Row Pct	Of professional job related interest	Of general interest	It is required for my major	It is required for my graduation	Total
2003sem2	128 14.41	95 10.70	218 24.55	447 50.34	888
2004sem1	45 17.58	28 10.94	64 25.00	119 46.48	256
2004sem2	27 14.52	15 8.06	65 34.95	79 42.47	186
2005sem1	73 13.96	67 12.81	153 29.25	230 43.98	523
2005sem2	44 11.08	36 9.07	115 28.97	202 50.88	397
Total	317	241	615	1077	2250
Frequency Missing = 360					

Table 70					
Table of period by Q_17					
period	Q_17(What symbol do you expect to get?)				
Frequency Row Pct	A	B	C	D	Total
2003sem2	282 31.79	263 29.65	274 30.89	68 7.67	887
2004sem1	93 36.61	84 33.07	62 24.41	15 5.91	254
2004sem2	56 30.27	66 35.68	56 30.27	7 3.78	185
2005sem1	159 30.23	191 36.31	149 28.33	27 5.13	526
2005sem2	100 25.25	115 29.04	143 36.11	38 9.60	396
Total	690	719	684	155	2248
Frequency Missing = 362					

Table 71				
Table of period by Q_18				
Period	Q_18(How easy or difficult to you expect this course to be?)			
Frequency Row Pct	Easy	Not Easy	Not so difficult	Total
2003sem2	54 7.69	335 47.72	313 44.59	702
2004sem1	18 9.18	111 56.63	67 34.18	196
2004sem2	15 10.07	79 53.02	55 36.91	149
2005sem1	34 7.78	198 45.31	205 46.91	437
2005sem2	26 8.70	161 53.85	112 37.46	299
Total	147	884	752	1783
Frequency Missing = 827				

Table 72					
Table of period by Q_19					
period	Q_19(How many online courses have you registered for?)				
Frequency Row Pct	None	One	Two to four	Five or more	Total
2003sem2	692 78.10	117 13.21	44 4.97	33 3.72	886
2004sem1	224 88.19	20 7.87	7 2.76	3 1.18	254
2004sem2	151 82.07	18 9.78	7 3.80	8 4.35	184
2005sem1	428 81.52	69 13.14	14 2.67	14 2.67	525
2005sem2	320 81.01	48 12.15	12 3.04	15 3.80	395
Total	1815	272	84	73	2244
Frequency Missing = 366					

Table 73					
Table of period by Q_20					
period	Q_20(I like to read)				
Frequency Row Pct	Strongly agree	Agree	Disagree	Strongly disagree	Total
2003sem2	324 36.53	463 52.20	80 9.02	20 2.25	887
2004sem1	73 28.85	145 57.31	27 10.67	8 3.16	253
2004sem2	59 31.89	99 53.51	22 11.89	5 2.70	185
2005sem1	189 36.07	262 50.00	58 11.07	15 2.86	524
2005sem2	119 30.05	229 57.83	36 9.09	12 3.03	396
Total	764	1198	223	60	2245
Frequency Missing = 365					

Table 74					
Table of period by Q_21					
period	Q_21(I am apprehensive about working with other students)				
Frequency Row Pct	Strongly agree	Agree	Disagree	Strongly disagree	Total
2003sem2	164 18.53	513 57.97	161 18.19	47 5.31	885
2004sem1	48 18.97	133 52.57	54 21.34	18 7.11	253
2004sem2	40 22.22	97 53.89	31 17.22	12 6.67	180
2005sem1	101 19.50	287 55.41	99 19.11	31 5.98	518
2005sem2	65 16.67	212 54.36	80 20.51	33 8.46	390
Total	418	1242	425	141	2226
Frequency Missing = 384					

Table 75					
Table of period by Q_22					
period	Q_22(My friends think that I am well organised)				
Frequency Row Pct	Strongly agree	Agree	Disagree	Strongly disagree	Total
2003sem2	203 22.91	561 63.32	101 11.40	21 2.37	886
2004sem1	55 21.65	156 61.42	37 14.57	6 2.36	254
2004sem2	51 27.72	107 58.15	20 10.87	6 3.26	184
2005sem1	105 20.27	325 62.74	76 14.67	12 2.32	518
2005sem2	93 23.37	234 58.79	61 15.33	10 2.51	398
Total	507	1383	295	55	2240
Frequency Missing = 370					

Table 76					
Table of period by Q_23					
period	Q_23(I have difficulty expressing my ideas in writing)				
Frequency Row Pct	Strongly agree	Agree	Disagree	Strongly disagree	Total
2003sem2	79 8.90	253 28.49	351 39.53	205 23.09	888
2004sem1	18 7.09	73 28.74	104 40.94	59 23.23	254
2004sem2	25 13.66	53 28.96	65 35.52	40 21.86	183
2005sem1	44 8.43	150 28.74	205 39.27	123 23.56	522
2005sem2	33 8.40	118 30.03	149 37.91	93 23.66	393
Total	199	647	874	520	2240
Frequency Missing = 370					

Table 77					
Table of period by Q_24					
period	Q_24(I like to take part in class discussions)				
Frequency Row Pct	Strongly agree	Agree	Disagree	Strongly disagree	Total
2003sem2	150 16.99	463 52.43	214 24.24	56 6.34	883
2004sem1	53 21.12	129 51.39	54 21.51	15 5.98	251
2004sem2	32 17.58	77 42.31	52 28.57	21 11.54	182
2005sem1	96 18.60	250 48.45	137 26.55	33 6.40	516
2005sem2	74 18.78	181 45.94	107 27.16	32 8.12	394
Total	405	1100	564	157	2226
Frequency Missing = 384					

Table 78					
Table of period by Q_25					
period	Q_25(I planned some regular times per week to work)				
Frequency Row Pct	Strongly agree	Agree	Disagree	Strongly disagree	Total
2003sem2	230 26.68	507 58.82	110 12.76	15 1.74	862
2004sem1	55 22.18	159 64.11	32 12.90	2 0.81	248
2004sem2	40 21.86	104 56.83	32 17.49	7 3.83	183
2005sem1	107 21.15	306 60.47	82 16.21	11 2.17	506
2005sem2	69 17.83	223 57.62	83 21.45	12 3.10	387
Total	501	1299	339	47	2186
Frequency Missing = 424					

Table 79					
Table of period by Q_26					
period	Q_26(Learning is an enjoyable experience)				
Frequency Row Pct	Strongly agree	Agree	Disagree	Strongly disagree	Total
2003sem2	284 33.06	482 56.11	72 8.38	21 2.44	859
2004sem1	97 39.11	129 52.02	17 6.85	5 2.02	248
2004sem2	55 30.05	106 57.92	17 9.29	5 2.73	183
2005sem1	156 31.01	282 56.06	59 11.73	6 1.19	503
2005sem2	104 26.74	235 60.41	43 11.05	7 1.80	389
Total	696	1234	208	44	2182
Frequency Missing = 428					

Table 80					
Table of period by Q_27					
period	Q_27(I tend to put things off until the last minute)				
Frequency Row Pct	Strongly agree	Agree	Disagree	Strongly disagree	Total
2003sem2	87 10.12	299 34.77	312 36.28	162 18.84	860
2004sem1	22 8.94	64 26.02	94 38.21	66 26.83	246
2004sem2	18 9.84	67 36.61	66 36.07	32 17.49	183
2005sem1	56 11.07	163 32.21	199 39.33	88 17.39	506
2005sem2	54 13.92	148 38.14	138 35.57	48 12.37	388
Total	237	741	809	396	2183
Frequency Missing = 427					

Table 81					
Table of period by Q_28					
period	Q_28(I like working on my own)				
Frequency Row Pct	Strongly agree	Agree	Disagree	Strongly disagree	Total
2003sem2	211 24.45	463 53.65	161 18.66	28 3.24	863
2004sem1	62 25.00	130 52.42	49 19.76	7 2.82	248
2004sem2	41 22.40	96 52.46	37 20.22	9 4.92	183
2005sem1	121 23.87	254 50.10	122 24.06	10 1.97	507
2005sem2	109 28.17	192 49.61	78 20.16	8 2.07	387
Total	544	1135	447	62	2188
Frequency Missing = 422					

Table 82					
Table of period by Q_29					
period	Q_29(I like working on the computer)				
Frequency Row Pct	Strongly agree	Agree	Disagree	Strongly disagree	Total
2003sem2	308 36.11	419 49.12	102 11.96	24 2.81	853
2004sem1	95 38.46	107 43.32	30 12.15	15 6.07	247
2004sem2	62 34.07	79 43.41	33 18.13	8 4.40	182
2005sem1	143 28.37	265 52.58	77 15.28	19 3.77	504
2005sem2	97 25.19	208 54.03	60 15.58	20 5.19	385
Total	705	1078	302	86	2171
Frequency Missing = 439					

Table 83					
Table of period by Q_30					
period	Q_30(I like to do tutorials to enhance my learning)				
Frequency Row Pct	Strongly agree	Agree	Disagree	Strongly disagree	Total
2003sem2	329 37.34	480 54.48	59 6.70	13 1.48	881
2004sem1	103 40.87	131 51.98	13 5.16	5 1.98	252
2004sem2	63 35.00	89 49.44	22 12.22	6 3.33	180
2005sem1	168 32.62	285 55.34	55 10.68	7 1.36	515
2005sem2	108 27.76	225 57.84	49 12.60	7 1.80	389
Total	771	1210	198	38	2217
Frequency Missing = 393					

Table 84					
Table of period by Q_31					
period	Q_31(I perceive online tutorials to be problem)				
Frequency Row Pct	Strongly agree	Agree	Disagree	Strongly disagree	Total
2003sem2	83 9.43	276 31.36	418 47.50	103 11.70	880
2004sem1	28 11.11	62 24.60	129 51.19	33 13.10	252
2004sem2	23 12.78	56 31.11	81 45.00	20 11.11	180
2005sem1	36 6.99	156 30.29	265 51.46	58 11.26	515
2005sem2	36 9.18	136 34.69	180 45.92	40 10.20	392
Total	206	686	1073	254	2219
Frequency Missing = 391					

Table 85				
Table of period by Q_32				
period	Q_32(This course important for my future employee)			
Frequency Row Pct	Strongly agree	Agree	Disagree	Total
2003sem2	346 40.05	419 48.50	99 11.46	864
2004sem1	103 42.56	122 50.41	17 7.02	242
2004sem2	57 33.14	96 55.81	19 11.05	172
2005sem1	191 37.82	245 48.51	69 13.66	505
2005sem2	111 29.29	195 51.45	73 19.26	379
Total	808	1077	277	2162
Frequency Missing = 448				

Table 86					
Table of period by Q_33					
period	Q_33(Your previous experience with personal computer)				
Frequency Row Pct	Novice	Ocassionally	Frequently	Daily	Total
2003sem2	102 11.53	300 33.90	299 33.79	184 20.79	885
2004sem1	59 23.32	78 30.83	78 30.83	38 15.02	253
2004sem2	26 14.36	52 28.73	59 32.60	44 24.31	181
2005sem1	58 11.33	177 34.57	161 31.45	116 22.66	512
2005sem2	47 12.02	134 34.27	124 31.71	86 21.99	391
Total	292	741	721	468	2222
Frequency Missing = 388					

Table 87					
Table of period by Q_34					
period	Q_34(Your previous experience with email)				
Frequency Row Pct	Novice	Ocassionally	Frequently	Daily	Total
2003sem2	131 14.79	316 35.67	290 32.73	149 16.82	886
2004sem1	99 39.13	81 32.02	53 20.95	20 7.91	253
2004sem2	27 14.92	62 34.25	58 32.04	34 18.78	181
2005sem1	129 25.05	189 36.70	135 26.21	62 12.04	515
2005sem2	45 11.57	146 37.53	134 34.45	64 16.45	389
Total	431	794	670	329	2224
Frequency Missing = 386					

Table 88					
Table of period by Q_35					
period	Q_35(Your previous experience with word processors)				
Frequency Row Pct	Novice	Ocassionally	Frequently	Daily	Total
2003sem2	120 13.59	379 42.92	287 32.50	97 10.99	883
2004sem1	75 29.76	88 34.92	74 29.37	15 5.95	252
2004sem2	27 14.92	67 37.02	60 33.15	27 14.92	181
2005sem1	85 16.63	206 40.31	167 32.68	53 10.37	511
2005sem2	52 13.33	164 42.05	134 34.36	40 10.26	390
Total	359	904	722	232	2217
Frequency Missing = 393					

Table 89					
Table of period by Q_36					
period	Q_36(Your previous experience with word browsers)				
Frequency Row Pct	Novice	Ocassionally	Frequently	Daily	Total
2003sem2	150 17.03	335 38.02	278 31.56	118 13.39	881
2004sem1	94 37.30	78 30.95	58 23.02	22 8.73	252
2004sem2	31 17.13	70 38.67	55 30.39	25 13.81	181
2005sem1	139 27.10	179 34.89	123 23.98	72 14.04	513
2005sem2	59 15.17	151 38.82	127 32.65	52 13.37	389
Total	473	813	641	289	2216
Frequency Missing = 394					

Table 90					
Table of period by Q_37					
period	Q_37(Your current feeling about computers are:)				
Frequency Row Pct	Stimulating	Somewhat stimulating	Somewhat dull	Dull	Total
2003sem2	451 51.72	362 41.51	53 6.08	6 0.69	872
2004sem1	130 51.79	102 40.64	11 4.38	8 3.19	251
2004sem2	82 45.81	81 45.25	15 8.38	1 0.56	179
2005sem1	253 49.41	213 41.60	40 7.81	6 1.17	512
2005sem2	163 42.34	189 49.09	31 8.05	2 0.52	385
Total	1079	947	150	23	2199
Frequency Missing = 411					

Table 91					
Table of period by Q_38					
period	Q_38(Your current feelings about using computers)				
Frequency Row Pct	Fun	Somewhat fun	Somewhat dreary	Dreary	Total
2003sem2	550 63.29	280 32.22	34 3.91	5 0.58	869
2004sem1	162 64.54	75 29.88	7 2.79	7 2.79	251
2004sem2	94 52.51	74 41.34	9 5.03	2 1.12	179
2005sem1	285 56.44	192 38.02	24 4.75	4 0.79	505
2005sem2	202 52.88	157 41.10	21 5.50	2 0.52	382
Total	1293	778	95	20	2186
Frequency Missing = 424					

Table 92					
Table of period by Q_39					
period	Q_39(Your current feelings about using computers)				
Frequency Row Pct	Easy	SOmewhat easy	Somewhat difficult	Difficult	Total
2003sem2	335 38.55	403 46.38	118 13.58	13 1.50	869
2004sem1	80 32.00	109 43.60	50 20.00	11 4.40	250
2004sem2	68 37.99	86 48.04	23 12.85	2 1.12	179
2005sem1	165 32.54	258 50.89	79 15.58	5 0.99	507
2005sem2	113 29.82	214 56.46	48 12.66	4 1.06	379
Total	761	1070	318	35	2184
Frequency Missing = 426					

Table 93					
Table of period by Q_40					
period	Q_40(Your current feelings about using computers)				
Frequency Row Pct	Personal	Somewhat personal	Somewhat impersonal	Impersonal	Total
2003sem2	358 41.34	299 34.53	119 13.74	90 10.39	866
2004sem1	94 37.60	100 40.00	37 14.80	19 7.60	250
2004sem2	71 39.44	55 30.56	37 20.56	17 9.44	180
2005sem1	180 35.50	185 36.49	89 17.55	53 10.45	507
2005sem2	145 37.66	131 34.03	71 18.44	38 9.87	385
Total	848	770	353	217	2188
Frequency Missing = 422					

Table 94					
Table of period by Q_41					
period	Q_41(Your current feelings about using computers)				
Frequency Row Pct	Hindering	Somewhat hindering	Somewhat helpful	Helpful	Total
2003sem2	47 5.39	55 6.31	182 20.87	588 67.43	872
2004sem1	11 4.40	17 6.80	54 21.60	168 67.20	250
2004sem2	16 8.94	24 13.41	38 21.23	101 56.42	179
2005sem1	22 4.34	45 8.88	108 21.30	332 65.48	507
2005sem2	26 6.79	33 8.62	104 27.15	220 57.44	383
Total	122	174	486	1409	2191
Frequency Missing = 419					

Table 95					
Table of period by Q_42					
Period	Q_42(Your current feelings about using computers)				
Frequency Row Pct	Threatening	Somewhat threatening	Somewhat not threatening	Not threatening	Total
2003sem2	48 5.51	113 12.97	129 14.81	581 66.70	871
2004sem1	13 5.24	38 15.32	33 13.31	164 66.13	248
2004sem2	14 7.73	30 16.57	28 15.47	109 60.22	181
2005sem1	29 5.74	59 11.68	80 15.84	337 66.73	505
2005sem2	25 6.53	64 16.71	82 21.41	212 55.35	383
Total	129	304	352	1403	2188
Frequency Missing = 422					

Table 96					
Table of period by Q_43					
period	Q_43(Do you currently have access to a personal computer?)				
Frequency Row Pct	I am currently employed	Yes I have convenient access from work	No I have no access from work	Yes I have limited access from work	Total
2003sem2	572 66.59	64 7.45	162 18.86	61 7.10	859
2004sem1	177 73.75	12 5.00	44 18.33	7 2.92	240
2004sem2	110 60.77	16 8.84	42 23.20	13 7.18	181
2005sem1	339 68.48	53 10.71	76 15.35	27 5.45	495
2005sem2	246 65.25	38 10.08	72 19.10	21 5.57	377
Total	1444	183	396	129	2152
Frequency Missing = 458					

Table 97			
Table of period by Q_44			
period	Q_44(Do you currently use a personal computer in your room?)		
Frequency Row Pct	Yes	No	Total
2003sem2	431 49.03	448 50.97	879
2004sem1	110 44.35	138 55.65	248
2004sem2	112 61.54	70 38.46	182
2005sem1	287 57.17	215 42.83	502
2005sem2	220 57.44	163 42.56	383
Total	1160	1034	2194
Frequency Missing = 416			

Table 98			
Table of period by Q_45			
Period	Q_45(If you answered yes in Q40, do you have a modem?)		
Frequency Row Pct	Yes	No	Total
2003sem2	235 37.30	395 62.70	630
2004sem1	58 34.94	108 65.06	166
2004sem2	73 51.77	68 48.23	141
2005sem1	186 49.60	189 50.40	375
2005sem2	138 46.46	159 53.54	297
Total	690	919	1609
Frequency Missing = 1001			

Table 99			
Table of period by Q_46			
Period	Q_46, do you have a printer?		
Frequency Row Pct	Yes	No	Total
2003sem2	284 48.30	304 51.70	588
2004sem1	69 47.92	75 52.08	144
2004sem2	78 58.21	56 41.79	134
2005sem1	194 58.43	138 41.57	332
2005sem2	148 53.62	128 46.38	276
Total	773	701	1474
Frequency Missing = 1136			

Table 100			
Table of period by Q_47			
period	Q_47, do you have an email address?		
Frequency Row Pct	Yes	No	Total
2003sem2	512 78.89	137 21.11	649
2004sem1	108 62.43	65 37.57	173
2004sem2	112 76.71	34 23.29	146
2005sem1	266 69.09	119 30.91	385
2005sem2	239 78.88	64 21.12	303
Total	1237	419	1656
Frequency Missing = 954			

C6_3: POST-QUESTIONNAIRE

EXPECTATIONS AND FEELINGS ABOUT LEARNING MODES AND PROCESSES

Please select a response that corresponds to the following scale of each statement

SA=Strongly agree, A=Agree, D=Disagree, SD=Strongly Disagree

1. I like working on the computer

SA	A	D	SD

2. I like doing tutorials to enhance my learning

SA	A	D	SD

3. I perceive online tutorials to be a problem

SA	A	D	SD

4. Do you think online tutorials can replace the network tutorials?

SA	A	D	SD

5. What symbol do you expect to receive in this course?

A	B	C	D	Other

6. How easy/difficult did you find this course to be?

Easy	Not so easy	Not so difficult	Difficult

For each of the following pairs of words, please click the response that is closest to your

CURRENT FEELINGS ABOUT USING COMPUTERS

7.

Stimulating	Somewhat Stimulating	Somewhat dull	Dull

8.

Fun	Somewhat Fun	Somewhat dreary	Dreary

9.

Easy	Somewhat Easy	Somewhat Difficult	Difficult

10.

Personal	Somewhat personal
Somewhat impersonal	Impersonal

11.

Hindering	Somewhat hindering
Somewhat helpful	Helpful

12.

Threatening	Somewhat threatening
Somewhat not threatening	Not threatening

EQUIPMENT ACCESS

13. How often did you do your tutorials?

Very often	Often	Occasionally	Seldom

14. Did you get access to the computers?

Always	Occasionally	Seldom	Never

15. Did you have problem accessing the tutorials?

Always	Occasionally	Seldom	Never

16. Did you get enough assistance at the lab?

Always	Occasionally	Seldom	Never

17. Where you able to work out problems without assistance?

Always	Occasionally	Seldom	Never

18. Do you think we should continue using the online tutorials?

SA	A	D	SD

19. Which type of tutorials do you prefer?

Online tutorials	Classroom tutorials

20. Any comments??

THANK YOU FOR YOUR PARTICIPATION

C6_4: POST-QUESTIONNAIRE TABLES

Table 101					
Table of period by R_1					
Period	R_1(I like working on the computer)				
Frequency Row Pct	Strongly agree	Agree	Disagree	Strongly disagree	Total
2003sem2	241 47.63	227 44.86	23 4.55	15 2.96	506
2004sem1	21 43.75	22 45.83	1 2.08	4 8.33	48
2004sem2	136 58.37	73 31.33	14 6.01	10 4.29	233
2005sem1	22 40.74	26 48.15	3 5.56	3 5.56	54
2005sem2	27 42.86	28 44.44	5 7.94	3 4.76	63
Total	447	376	46	35	904
Frequency Missing = 1706					

Table 102					
Table of period by R_2					
period	R_2(I like doing tutorials to enhance my learning)				
Frequency Row Pct	Strongly agree	Agree	Disagree	Strongly disagree	Total
2003sem2	214 42.29	244 48.22	39 7.71	9 1.78	506
2004sem1	25 52.08	20 41.67	2 4.17	1 2.08	48
2004sem2	129 56.33	80 34.93	16 6.99	4 1.75	229
2005sem1	20 37.74	28 52.83	2 3.77	3 5.66	53
2005sem2	28 45.16	26 41.94	4 6.45	4 6.45	62
Total	416	398	63	21	898
Frequency Missing = 1712					

Table 103					
Table of period by R_3					
period	R_3(I perceive online tutorials to be a problem)				
Frequency Row Pct	Strongly agree	Agree	Disagree	Strongly disagree	Total
2003sem2	60 11.93	166 33.00	210 41.75	67 13.32	503
2004sem1	5 10.42	14 29.17	19 39.58	10 20.83	48
2004sem2	55 23.71	60 25.86	65 28.02	52 22.41	232
2005sem1	9 17.65	15 29.41	16 31.37	11 21.57	51
2005sem2	8 12.70	29 46.03	17 26.98	9 14.29	63
Total	137	284	327	149	897
Frequency Missing = 1713					

Table 104					
Table of period by R_4					
period	R_4(Do you think online tutorials can replace network tutorials?)				
Frequency Row Pct	Strongly agree	Agree	Disagree	Strongly disagree	Total
2003sem2	67 13.43	224 44.89	178 35.67	30 6.01	499
2004sem1	4 8.33	26 54.17	15 31.25	3 6.25	48
2004sem2	63 28.77	89 40.64	50 22.83	17 7.76	219
2005sem1	10 20.83	26 54.17	9 18.75	3 6.25	48
2005sem2	7 11.11	32 50.79	17 26.98	7 11.11	63
Total	151	397	269	60	877
Frequency Missing = 1733					

Table 105					
Table of period by R_5					
period	R_5(What symbol do you expect to receive in this course?)				
Frequency Row Pct	A	B	C	D	Total
2003sem2	141 28.37	139 27.97	165 33.20	52 10.46	497
2004sem1	15 31.25	19 39.58	13 27.08	1 2.08	48
2004sem2	90 40.00	67 29.78	53 23.56	15 6.67	225
2005sem1	8 17.39	16 34.78	13 28.26	9 19.57	46
2005sem2	13 21.67	21 35.00	12 20.00	14 23.33	60
Total	267	262	256	91	876
Frequency Missing = 1734					

Table 106					
Table of period by R_6					
period	R_6(How easy or difficult did you find this course to be?)				
Frequency Row Pct	Easy	Not easy	Not so difficult	Difficult	Total
2003sem2	41 8.15	230 45.73	181 35.98	51 10.14	503
2004sem1	2 4.17	27 56.25	14 29.17	5 10.42	48
2004sem2	57 24.78	95 41.30	60 26.09	18 7.83	230
2005sem1	5 10.00	21 42.00	11 22.00	13 26.00	50
2005sem2	6 9.52	30 47.62	13 20.63	14 22.22	63
Total	111	403	279	101	894
Frequency Missing = 1716					

Table 107					
Table of period by R_7					
period	R_7(Your current feelings about using computers are?)				
Frequency Row Pct	Stimulating	Somewhat stimulating	Somewhat dull	Dull	Total
2003sem2	217 43.66	218 43.86	46 9.26	16 3.22	497
2004sem1	20 41.67	22 45.83	2 4.17	4 8.33	48
2004sem2	122 56.48	64 29.63	25 11.57	5 2.31	216
2005sem1	19 38.00	23 46.00	5 10.00	3 6.00	50
2005sem2	24 40.68	28 47.46	4 6.78	3 5.08	59
Total	402	355	82	31	870
Frequency Missing = 1740					

Table 109					
Table of period by R_9					
period	R_9(Your current feelings about using computers are?)				
Frequency Row Pct	Easy	SOmewhat easy	Somewhat difficult	Difficult	Total
2003sem2	162 32.93	240 48.78	82 16.67	8 1.63	492

Table 108					
Table of period by R_8					
period	R_8(Your current feelings about using computers are?)				
Frequency Row Pct	Fun	Somewhat fun	Somewhat dreary	Dreary	Total
2003sem2	231 46.86	198 40.16	53 10.75	11 2.23	493
2004sem1	23 47.92	18 37.50	3 6.25	4 8.33	48
2004sem2	117 53.92	64 29.49	31 14.29	5 2.30	217
2005sem1	21 42.00	19 38.00	9 18.00	1 2.00	50
2005sem2	27 45.76	22 37.29	8 13.56	2 3.39	59
Total	419	321	104	23	867
Frequency Missing = 1743					

Table 109					
Table of period by R_9					
period	R_9(Your current feelings about using computers are?)				Total
Frequency Row Pct	Easy	SOmewhat easy	Somewhat difficult	Difficult	
2004sem1	12 25.00	23 47.92	10 20.83	3 6.25	48
2004sem2	92 42.59	87 40.28	32 14.81	5 2.31	216
2005sem1	20 41.67	22 45.83	4 8.33	2 4.17	48
2005sem2	19 31.67	31 51.67	6 10.00	4 6.67	60
Total	305	403	134	22	864
Frequency Missing = 1746					

Table 110					
Table of period by R_10					
period	R_10(Your current feelings about using computers are?)				
Frequency Row Pct	Personal	Somewhat personal	Somewhat impersonal	Impersonal	Total
2003sem2	152 30.58	161 32.39	96 19.32	88 17.71	497
2004sem1	17 36.17	17 36.17	10 21.28	3 6.38	47
2004sem2	78 36.45	54 25.23	33 15.42	49 22.90	214
2005sem1	14 28.57	12 24.49	14 28.57	9 18.37	49
2005sem2	11 18.64	18 30.51	17 28.81	13 22.03	59
Total	272	262	170	162	866
Frequency Missing = 1744					

Table 111					
Table of period by R_11					
period	R_11(Your current feelings about using computers are)				
Frequency Row Pct	Hindering	Somewhat hindering	Somewhat helpful	Helpful	Total
2003sem2	27 5.45	71 14.34	130 26.26	267 53.94	495
2004sem1	5 10.42	2 4.17	8 16.67	33 68.75	48
2004sem2	21 9.55	31 14.09	38 17.27	130 59.09	220
2005sem1	6 12.00	6 12.00	20 40.00	18 36.00	50
2005sem2	6 10.17	10 16.95	18 30.51	25 42.37	59
Total	65	120	214	473	872
Frequency Missing = 1738					

Table 112					
Table of period by R_12					
period	R_12(Your current feelings about using computers are?)				
Frequency Row Pct	Threatening	Somewhat threatening	Somewhat not threatening	Not threatening	Total
2003sem2	23 4.63	67 13.48	79 15.90	328 66.00	497
2004sem1	2 4.26	4 8.51	12 25.53	29 61.70	47
2004sem2	20 9.05	38 17.19	21 9.50	142 64.25	221
2005sem1	7 14.00	5 10.00	9 18.00	29 58.00	50
2005sem2	7 11.86	11 18.64	10 16.95	31 52.54	59
Total	59	125	131	559	874
Frequency Missing = 1736					

Table 113					
Table of period by R_13					
period	R_13(How often did you do your tutorials?)				
Frequency Row Pct	Very often	Often	Occasionally	Seldom	Total
2003sem2	171 34.69	218 44.22	94 19.07	10 2.03	493
2004sem1	19 39.58	24 50.00	5 10.42	0 0.00	48
2004sem2	87 42.23	77 37.38	36 17.48	6 2.91	206
2005sem1	8 16.67	23 47.92	15 31.25	2 4.17	48
2005sem2	26 44.83	25 43.10	5 8.62	2 3.45	58
Total	311	367	155	20	853
Frequency Missing = 1757					

Table 114					
Table of period by R_14					
period	R_14(Did you get access to the computers?)				
Frequency Row Pct	Always	Occassionally	Seldom	Never	Total
2003sem2	65 13.13	290 58.59	122 24.65	18 3.64	495
2004sem1	7 15.56	25 55.56	12 26.67	1 2.22	45
2004sem2	71 34.30	111 53.62	24 11.59	1 0.48	207
2005sem1	16 33.33	23 47.92	7 14.58	2 4.17	48
2005sem2	22 38.60	27 47.37	8 14.04	0 0.00	57
Total	181	476	173	22	852
Frequency Missing = 1758					

Table 115					
Table of period by R_15					
period	R_15(Did you have a problem accessing the tutorials?)				
Frequency Row Pct	Always	Occassionally	Seldom	Never	Total
2003sem2	62 12.70	268 54.92	97 19.88	61 12.50	488
2004sem1	5 10.42	25 52.08	9 18.75	9 18.75	48
2004sem2	22 10.38	79 37.26	47 22.17	64 30.19	212
2005sem1	6 12.50	21 43.75	14 29.17	7 14.58	48
2005sem2	12 20.69	26 44.83	10 17.24	10 17.24	58
Total	107	419	177	151	854
Frequency Missing = 1756					

Table 116					
Table of period by R_16					
period	R_16(Did you get enough assistance at the lab?)				
Frequency Row Pct	Always	Occassionally	Seldom	Never	Total
2003sem2	54 10.95	159 32.25	168 34.08	112 22.72	493
2004sem1	8 17.02	20 42.55	13 27.66	6 12.77	47
2004sem2	39 18.40	102 48.11	52 24.53	19 8.96	212
2005sem1	5 10.42	23 47.92	13 27.08	7 14.58	48
2005sem2	8 14.04	23 40.35	17 29.82	9 15.79	57
Total	114	327	263	153	857
Frequency Missing = 1753					

Table 117					
Table of period by R_17					
period	R_17(Were you able to work out the problems without assistance?)				
Frequency Row Pct	Always	Occassionally	Seldom	Never	Total
2003sem2	92 18.62	295 59.72	83 16.80	24 4.86	494
2004sem1	5 10.42	38 79.17	4 8.33	1 2.08	48
2004sem2	31 14.62	135 63.68	35 16.51	11 5.19	212
2005sem1	7 15.22	32 69.57	4 8.70	3 6.52	46
2005sem2	11 18.97	38 65.52	7 12.07	2 3.45	58
Total	146	538	133	41	858
Frequency Missing = 1752					

Table 118					
Table of period by R_18					
period	R_18(Do you think we should continue using the online tutorials?)				
Frequency Row Pct	Strongly agree	Agree	Disagree	Strongly disagree	Total
2003sem2	211 42.71	185 37.45	60 12.15	38 7.69	494
2004sem1	28 58.33	14 29.17	1 2.08	5 10.42	48
2004sem2	105 50.00	71 33.81	18 8.57	16 7.62	210
2005sem1	21 43.75	20 41.67	4 8.33	3 6.25	48
2005sem2	20 33.90	30 50.85	5 8.47	4 6.78	59
Total	385	320	88	66	859
Frequency Missing = 1751					

Table 119			
Table of period by R_19			
Period	R_19(Which type of tutorials do you prefer?)		
Frequency Row Pct	Online tutorials	Classroom tutorials	Total
2003sem2	335 67.81	159 32.19	494
2004sem1	38 79.17	10 20.83	48
2004sem2	143 68.42	66 31.58	209
2005sem1	38 80.85	9 19.15	47
2005sem2	34 58.62	24 41.38	58
Total	588	268	856
Frequency Missing = 1754			

Table 120					
Table of Q_1 by R_2					
Q_1(Gender)	R_2(I like doing tutorials to enhance my learning)				
Frequency Row Pct	Strongly agree	Agree	Disagree	Strongly disagree	Total
Male	150 45.45	152 46.06	24 7.27	4 1.21	330
Female	169 45.55	167 45.01	25 6.74	10 2.70	371
Total	319	319	49	14	701
Frequency Missing = 1909					

Table 121					
Table of Q_1 by R_5					
Q_1(Gender)	R_5(What symbol do you expect to receive in this course?)				
Frequency Row Pct	A	B	C	D	Total
Male	109 33.44	103 31.60	84 25.77	30 9.20	326
Female	100 27.55	99 27.27	115 31.68	49 13.50	363
Total	209	202	199	79	689
Frequency Missing = 1921					

Table 122					
Table of Q_1 by R_6					
Q_1(Gender)	R_6(How easy or difficult did you find this course to be?)				
Frequency Row Pct	Easy	Not easy	Not so difficult	Difficult	Total
Male	45 13.68	150 45.59	96 29.18	38 11.55	329
Female	36 9.73	174 47.03	121 32.70	39 10.54	370
Total	81	324	217	77	699
Frequency Missing = 1911					

Table 123					
Table of Q_2 by R_2					
Q_2(Age)	R_2(I like doing tutorials to enhance my learning)				
Frequency Row Pct	Strongly agree	Agree	Disagree	Strongly disagree	Total
15 - 19	190 45.02	195 46.21	28 6.64	9 2.13	422
20 - 24	109 47.19	102 44.16	15 6.49	5 2.16	231
25 - 29	10 52.63	8 42.11	1 5.26	0 0.00	19
30 - 43	7 33.33	11 52.38	3 14.29	0 0.00	21
35 and over	2 33.33	2 33.33	2 33.33	0 0.00	6
Total	318	318	49	14	699
Frequency Missing = 1911					

Table 124					
Table of Q_2 by R_6					
Q_2(Age)	R_6(How easy or difficult did you find this course to be?)				
Frequency Row Pct	Easy	Not easy	Not so difficult	Difficult	Total
15 - 19	47 11.14	185 43.84	136 32.23	54 12.80	422
20 - 24	28 12.12	112 48.48	72 31.17	19 8.23	231
25 - 29	4 21.05	8 42.11	5 26.32	2 10.53	19
30 - 43	2 9.52	12 57.14	5 23.81	2 9.52	21
35 and over	0 0.00	5 100.00	0 0.00	0 0.00	5
Total	81	322	218	77	698
Frequency Missing = 1912					

Table 125					
Table of Q_2 by R_13					
Q_2(Age)	R_13(How often did you do your tutorials?)				
Frequency Row Pct	Very often	Often	Occasionally	Seldom	Total
15 - 19	147 36.39	179 44.31	70 17.33	8 1.98	404
20 - 24	77 35.16	87 39.73	49 22.37	6 2.74	219
25 - 29	6 33.33	6 33.33	5 27.78	1 5.56	18
30 - 43	10 47.62	8 38.10	2 9.52	1 4.76	21
35 and over	1 20.00	3 60.00	1 20.00	0 0.00	5
Total	241	283	127	16	667
Frequency Missing = 1943					

Table 126					
Table of Q_4 by R_2					
Q_4(Ethnic background?)	R_2(I like doing tutorials to enhance my learning)				
Frequency Row Pct	Strongly agree	Agree	Disagree	Strongly disagree	Total
Black	123 56.94	78 36.11	11 5.09	4 1.85	216
Coloured	144 38.30	193 51.33	32 8.51	7 1.86	376
Indian	36 49.32	31 42.47	4 5.48	2 2.74	73
White	8 57.14	6 42.86	0 0.00	0 0.00	14
Other	5 41.67	6 50.00	1 8.33	0 0.00	12
Total	316	314	48	13	691
Frequency Missing = 1919					

Table 127					
Table of Q_4 by R_5					
Q_4(Ethnic background?)	R_5(What symbol do you expect to receive in this course?)				
Frequency Row Pct	A	B	C	D	Total
Black	83 39.71	50 23.92	53 25.36	23 11.00	209
Coloured	90 24.19	118 31.72	120 32.26	44 11.83	372
Indian	22 30.14	19 26.03	24 32.88	8 10.96	73
White	6 42.86	5 35.71	0 0.00	3 21.43	14
Other	3 25.00	7 58.33	1 8.33	1 8.33	12
Total	204	199	198	79	680
Frequency Missing = 1930					

Table 128					
Table of Q_4 by R_6					
Q_4(Ethnic background?)	R_6(How easy or difficult did you find this course to be?)				
Frequency Row Pct	Easy	Not easy	Not so difficult	Difficult	Total
Black	19 9.05	96 45.71	84 40.00	11 5.24	210
Coloured	42 11.02	177 46.46	106 27.82	56 14.70	381
Indian	12 16.44	33 45.21	21 28.77	7 9.59	73
White	2 14.29	7 50.00	4 28.57	1 7.14	14
Other	3 25.00	6 50.00	2 16.67	1 8.33	12
Total	78	319	217	76	690
Frequency Missing = 1920					

Table 129					
Table of Q_4 by R_13					
Q_4(Ethnic background?)	R_13(How often did you do your tutorials?)				
Frequency Row Pct	Very often	Often	Occasionally	Seldom	Total
Black	68 33.66	76 37.62	52 25.74	6 2.97	202
Coloured	129 35.54	169 46.56	56 15.43	9 2.48	363
Indian	31 44.93	23 33.33	15 21.74	0 0.00	69
White	5 35.71	8 57.14	1 7.14	0 0.00	14
Other	4 33.33	6 50.00	1 8.33	1 8.33	12
Total	237	282	125	16	660
Frequency Missing = 1950					

Table 131					
Table of Q_17 by R_13					
Q_17(What symbol do you expect to get?)	R_13(How often did you do your tutorials?)				
Frequency Row Pct	Very often	Often	Occasionally	Seldom	Total
A	89 44.50	76 38.00	33 16.50	2 1.00	200
B	74 33.33	99 44.59	41 18.47	8 3.60	222
C	58 30.05	86 44.56	46 23.83	3 1.55	193
D	10 29.41	16 47.06	5 14.71	3 8.82	34
Total	231	277	125	16	649
Frequency Missing = 1961					

Table 132					
Table of Q_7 by R_5					
Q_7(What degree are you persuing?)	R_5(What symbol do you expect to receive in this course?)				
Frequency Row Pct	A	B	C	D	Total
BSc	24 28.57	25 29.76	27 32.14	8 9.52	84
BComm	144 30.19	143 29.98	138 28.93	52 10.90	477
BAdmin	21 30.00	16 22.86	22 31.43	11 15.71	70
Nondegree	0 0.00	0 0.00	1 100.00	0 0.00	1
Other	15 31.25	14 29.17	12 25.00	7 14.58	48
Total	204	198	200	78	680
Frequency Missing = 1930					

Table 134					
Table of Q_9 by R_15					
Q_9(Are you staying?)	R_15(Did you have a problem accessing the tutorials?)				
Frequency Row Pct	Always	Occassionally	Seldom	Never	Total
Friends_relatives	11 12.50	43 48.86	19 21.59	15 17.05	88
With parents	57 12.31	232 50.11	97 20.95	77 16.63	463
Own home	14 13.86	51 50.50	15 14.85	21 20.79	101
Total	82	326	131	113	652
Frequency Missing = 1958					

Table 133					
Table of Q_17 by R_5					
Q_17(What symbol do you expect to get?)	R_5(What symbol do you expect to receive in this course?)				
Frequency Row Pct	A	B	C	D	Total
A	102 49.28	61 29.47	30 14.49	14 6.76	207
B	68 30.09	73 32.30	65 28.76	20 8.85	226
C	25 12.56	55 27.64	89 44.72	30 15.08	199
D	6 17.14	7 20.00	8 22.86	14 40.00	35
Total	201	196	192	78	667
Frequency Missing = 1943					

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Table 135											
		What symbol do you expect to receive in this course?								All	
		A		B		C		D			
		N	PctN	N	PctN	N	PctN	N	PctN	N	PctN
period	Gender										
2003sem2	Male	51	30.36	51	30.36	49	29.17	17	10.12	168	100.00
	Female	59	27.06	54	24.77	76	34.86	29	13.30	218	100.00
	All	110	28.50	105	27.20	125	32.38	46	11.92	386	100.00
2004sem1	Gender										
	Male	9	33.33	10	37.04	8	29.63	.	.	27	100.00
	Female	6	33.33	7	38.89	4	22.22	1	5.56	18	100.00
	All	15	33.33	17	37.78	12	26.67	1	2.22	45	100.00
2004sem2	Gender										
	Male	39	46.43	24	28.57	18	21.43	3	3.57	84	100.00
	Female	29	32.95	26	29.55	23	26.14	10	11.36	88	100.00
	All	68	39.53	50	29.07	41	23.84	13	7.56	172	100.00
2005sem1	Gender										
	Male	5	26.32	7	36.84	4	21.05	3	15.79	19	100.00
	Female	1	4.55	7	31.82	8	36.36	6	27.27	22	100.00
	All	6	14.63	14	34.15	12	29.27	9	21.95	41	100.00
2005sem2	Gender										
	Male	5	17.86	11	39.29	5	17.86	7	25.00	28	100.00
	Female	5	29.41	5	29.41	4	23.53	3	17.65	17	100.00
	All	10	22.22	16	35.56	9	20.00	10	22.22	45	100.00

Table 136

Table 137

		What symbol do you expect to receive in this course?									
		A		B		C		D		All	
		N	PctN	N	PctN	N	PctN	N	PctN	N	PctN
Period	I mainly do statistics because:										
2003sem2	Of professional job related interest	98	26.63	82	22.34	46	12.50	36	9.78	368	100.00
	Of general interest	21	35.00	16	26.67	10	16.67	5	8.33	60	100.00
	It is required for my major	16	33.33	10	20.83	17	35.42	5	10.42	48	100.00
	It is required for my graduation	6	19.79	37	48.75	28	29.17	12	12.50	96	100.00
	All	48	27.75	41	23.70	62	35.84	22	12.72	173	100.00
		104	27.59	104	27.59	125	33.16	44	11.67	377	100.00
2004sem1	I mainly do statistics because:										
	Of professional job related interest	10	40.40	12	32.81	4	11.98	38	14.81	170	100.00
	Of general interest	5	71.43	1	14.29	1	14.29	.	.	7	100.00
	It is required for my major	2	50.00	2	50.00	.	.	.	.	4	100.00
	It is required for my graduation	4	30.77	6	46.15	3	23.08	.	.	13	100.00
	All	4	19.05	8	38.10	8	38.10	1	4.76	21	100.00
		15	33.33	17	37.78	12	26.67	1	2.22	45	100.00
2004sem2	I mainly do statistics because:										
	Of professional job related interest	17	39.53	12	27.91	1	2.33	43	30.07	430	100.00
	Of general interest	8	42.11	5	26.32	6	31.58	.	.	19	100.00
	It is required for my major	43	27.22	40	25.32	10	6.33	15	9.49	158	100.00
	It is required for my graduation	31	53.45	10	17.24	13	22.41	4	6.90	58	100.00
	All	22	30.56	27	37.50	18	25.00	5	6.94	72	100.00
		65	39.63	47	28.66	40	24.39	12	7.32	164	100.00
2005sem1	I mainly do statistics because:										
	Of professional job related interest	48	28.24	41	24.12	13	7.65	17	10.00	170	100.00
	Of general interest	1	25.00	2	50.00	1	25.00	.	.	4	100.00
	It is required for my major	1	20.00	2	40.00	2	40.00	.	.	5	100.00
	It is required for my graduation	14	34.15	12	29.27	9	21.95	41	100.00	410	100.00
	All	2	16.67	5	41.67	2	16.67	3	25.00	12	100.00
		2	10.53	5	26.32	6	31.58	6	31.58	19	100.00
		14	34.15	12	29.27	9	21.95	41	100.00	410	100.00
2005sem2	I mainly do statistics because:	6	15.00	14	35.00	11	27.50	9	22.50	40	100.00
	Of professional job related interest	14	34.15	9	21.95	8	19.51	10	24.39	410	100.00
	Of general interest	2	66.67	.	.	1	33.33	.	.	3	100.00
	It is required for my major	3	23.08	4	30.77	1	15.38	4	30.77	13	100.00
	It is required for my graduation	4	20.00	7	35.00	5	25.00	4	20.00	20	100.00
	All	10	23.81	14	33.33	8	19.05	10	23.81	42	100.00
		14	33.33	9	21.43	9	21.43	10	23.81	420	100.00

Table 138

		What symbol do you expect to receive in this course?									
		A		B		C		D		All	
		N	PctN	N	PctN	N	PctN	N	PctN	N	PctN
Period	How easy or difficult to you expect this course to be?										
2003sem2	Easy	8	32.00	9	36.00	5	20.00	3	12.00	25	100.00
	Not Easy	32	22.86	42	30.00	49	35.00	17	12.14	140	100.00
	Not so difficult	41	29.71	35	25.36	48	34.78	14	10.14	138	100.00
	All	81	26.73	86	28.38	102	33.66	34	11.22	303	100.00
2004sem1	How easy or difficult to you expect this course to be?										
	Easy	3	60.00	.	.	2	40.00	.	.	5	100.00
	Not Easy	5	33.33	6	40.00	4	26.67	.	.	15	100.00
	Not so difficult	1	7.69	7	53.85	5	38.46	.	.	13	100.00
	All	9	27.27	13	39.39	11	33.33	.	.	33	100.00
2004sem2	How easy or difficult to you expect this course to be?										
	Easy	7	63.64	1	9.09	3	27.27	.	.	11	100.00
	Not Easy	31	43.06	19	26.39	16	22.22	6	8.33	72	100.00
	Not so difficult	16	31.37	19	37.25	13	25.49	3	5.88	51	100.00
	All	54	40.30	39	29.10	32	23.88	9	6.72	134	100.00
2005sem1	How easy or difficult to you expect this course to be?										
	Easy	.	.	1	50.00	1	50.00	.	.	2	100.00
	Not Easy	2	13.33	5	33.33	4	26.67	4	26.67	15	100.00
	Not so difficult	3	27.27	2	18.18	4	36.36	2	18.18	11	100.00
	All	5	17.86	8	28.57	9	32.14	6	21.43	28	100.00

Table 138

		What symbol do you expect to receive in this course?									
		A		B		C		D		All	
		N	PctN	N	PctN	N	PctN	N	PctN	N	PctN
2005sem2	How easy or difficult to you expect this course to be?										
	Easy	3	75.00	1	25.00	.	.	.	.	4	100.00
	Not Easy	2	10.00	9	45.00	4	20.00	5	25.00	20	100.00
	Not so difficult	4	36.36	4	36.36	1	9.09	2	18.18	11	100.00
	All	9	25.71	14	40.00	5	14.29	7	20.00	35	100.00

Table 138											
		What symbol do you expect to receive in this course?									
		A		B		C		D		All	
		N	PctN	N	PctN	N	PctN	N	PctN	N	PctN

Table 139

		What symbol do you expect to receive in this course?								All	
		A		B		C		D			
		N	PctN	N	PctN	N	PctN	N	PctN	N	PctN
Period	I planned some regular times per week to work										
2003sem2	Strongly agree	33	34.38	30	31.25	24	25.00	9	9.38	96	100.00
	Agree	60	27.40	64	29.22	75	34.25	20	9.13	219	100.00
	Disagree	10	20.41	9	18.37	19	38.78	11	22.45	49	100.00
	Strongly disagree	3	42.86	.	.	2	28.57	2	28.57	7	100.00
	All	106	28.57	103	27.76	120	32.35	42	11.32	371	100.00
2004sem1	I planned some regular times per week to work										
	Strongly agree	3	42.86	1	14.29	3	42.86	.	.	7	100.00
	Agree	11	34.38	12	37.50	8	25.00	1	3.13	32	100.00
	Disagree	1	33.33	2	66.67	.	.	.	.	3	100.00
	Strongly disagree	.	.	1	100.00	.	.	.	.	1	100.00
	All	15	34.88	16	37.21	11	25.58	1	2.33	43	100.00
2004sem2	I planned some regular times per week to work										
	Strongly agree	19	57.58	7	21.21	5	15.15	2	6.06	33	100.00
	Agree	32	35.16	33	36.26	19	20.88	7	7.69	91	100.00
	Disagree	11	35.48	7	22.58	12	38.71	1	3.23	31	100.00
	Strongly disagree	3	50.00	.	.	1	16.67	2	33.33	6	100.00
	All	65	40.37	47	29.19	37	22.98	12	7.45	161	100.00
2005sem1	I planned some regular times per week to work										
	Strongly agree	1	20.00	3	60.00	.	.	1	20.00	5	100.00
	Agree	4	16.00	9	36.00	7	28.00	5	20.00	25	100.00
	Disagree	1	10.00	2	20.00	4	40.00	3	30.00	10	100.00
	All	6	15.00	14	35.00	11	27.50	9	22.50	40	100.00
2005sem2	I planned some regular times per week to work										
	Strongly agree	4	57.14	1	14.29	1	14.29	1	14.29	7	100.00
	Agree		24.0				28.0		20.0		

Table 140											
		What symbol do you expect to receive in this course?								All	
		A		B		C		D			
		N	PctN	N	PctN	N	PctN	N	PctN	N	PctN
period	What degree are you persuing?										
2003sem2	BSc	8	16.33	14	28.57	21	42.86	6	12.24	49	100.00
	BComm	78	29.89	69	26.44	81	31.03	33	12.64	261	100.00
	BAdmin	11	26.83	12	29.27	14	34.15	4	9.76	41	100.00
	Nondegree	.	.	.	.	1	100.00	.	.	1	100.00
	Other	10	31.25	10	31.25	9	28.13	3	9.38	32	100.00
	All	107	27.86	105	27.34	126	32.81	46	11.98	384	100.00
2004sem1	What degree are you persuing?										
	BSc	2	25.00	3	37.50	3	37.50	.	.	8	100.00
	BComm	10	32.26	14	45.16	6	19.35	1	3.23	31	100.00
	BAdmin	1	33.33	.	.	2	66.67	.	.	3	100.00
	Other	.	.	.	.	1	100.00	.	.	1	100.00
	All	13	30.23	17	39.53	12	27.91	1	2.33	43	100.00

Table 140											
		What symbol do you expect to receive in this course?									
		A		B		C		D		All	
		N	PctN	N	PctN	N	PctN	N	PctN	N	PctN
2004sem2	What degree are you persuing?										
	BSc	11	57.89	5	26.32	1	5.26	2	10.53	19	100.00
	BComm	45	37.82	37	31.09	33	27.73	4	3.36	119	100.00
	BAdmin	9	40.91	4	18.18	5	22.73	4	18.18	22	100.00
	Other	3	30.00	2	20.00	2	20.00	3	30.00	10	100.00
	All	68	40.00	48	28.24	41	24.12	13	7.65	170	100.00
2005sem1	What degree are you persuing?										
	BSc	1	33.33	.	.	2	66.67	.	.	3	100.00
	BComm	4	11.76	13	38.24	10	29.41	7	20.59	34	100.00
	BAdmin	.	.	.	.	.	.	1	100.00	1	100.00
	Other	1	33.33	1	33.33	.	.	1	33.33	3	100.00
	All	6	14.63	14	34.15	12	29.27	9	21.95	41	100.00
2005sem2	What degree are you persuing?										
	BSc	2	40.00	3	60.00	.	.	.	.	5	100.00
	BComm	7	21.88	10	31.25	8	25.00	7	21.88	32	100.00
	BAdmin	.	.	.	.	1	33.33	2	66.67	3	100.00
	Other	1	50.00	1	50.00	.	.	.	.	2	100.00
	All	10	23.81	14	33.33	9	21.43	9	21.43	42	100.00

Table 141

		I mainly do statistics because:			
		Of professional job related interest	Of general interest	It is required for my major	It is required for my graduation
What symbol do you expect to receive in this course?					
A	N	36	25	59	80
	PctN	37.50	33.33	30.73	26.23
B	N	27	19	62	88
	PctN	28.13	25.33	32.29	28.85
C	N	26	23	48	99
	PctN	27.08	30.67	25.00	32.46
D	N	7	8	23	38
	PctN	7.29	10.67	11.98	12.46
All	N	96	75	192	305
	PctN	100.00	100.00	100.00	100.00

Table 142					
		I planned some regular times per week to work			
		Strongly agree	Agree	Disagree	Strongly disagree
What symbol do you expect to receive in this course?					
A	N	60	113	23	6
	PctN	40.54	28.83	23.00	37.50
B	N	42	125	24	2
	PctN	28.38	31.89	24.00	12.50
C	N	33	116	35	3
	PctN	22.30	29.59	35.00	18.75
D	N	13	38	18	5
	PctN	8.78	9.69	18.00	31.25
All	N	148	392	100	16
	PctN	100.00	100.00	100.00	100.00

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APPENDIX D: CHARACTERISTICS TABLES

D1_1: FREQUENCY PROCEDURE- TEST TUTORIALS

Table 1			
2003 Sem2 Table of n_tests by n_tuts			
n_tests	n_tuts		
Frequency Percent Row Pct Col Pct	15	16	Total
3	15 1.51 7.28 20.83	191 19.25 92.72 20.76	206 20.77
4	57 5.75 7.25 79.17	729 73.49 92.75 79.24	786 79.23
Total	72 7.26	920 92.74	992 100.00

Table 2	
2003 Sem2 Table of Variables	
22 With Variables:	tut1_3 tut4_7 tut8_11 tut12_16 tut_total n_tuts tut1 tut2 tut3 tut4 tut5 tut6 tut7 tut8 tut9 tut10 tut11 tut12 tut13 tut14 tut15 tut16
7 Variables:	test1 test2 test3 test4 test_tot4 best3 final

Table 3						
2003 Sem2 Table of Simple Statistics						
Variable	N	Mean	Std Dev	Median	Minimum	Maximum
tut1_3	992	227.31351	88.62817	269.50000	0	307.00000
tut4_7	992	311.46169	122.14213	375.00000	0	400.00000
tut8_11	992	197.48790	106.75254	235.50000	0	400.00000
tut12_16	992	257.34476	160.93506	280.00000	0	500.00000
tut_total	992	993.60786	399.21219	1104	0	1507
n_tuts	992	15.92742	0.25958	16.00000	15.00000	16.00000
tut1	992	79.94859	29.34547	93.00000	0	107.00000
tut2	992	76.61290	33.67305	100.00000	0	100.00000
tut3	992	70.75202	39.00662	100.00000	0	100.00000
tut4	992	81.08569	30.14616	93.00000	0	100.00000
tut5	992	85.52520	31.23327	100.00000	0	100.00000
tut6	992	73.78629	37.43856	93.00000	0	100.00000
tut7	992	71.06452	40.20141	89.00000	0	100.00000
tut8	920	72.42609	37.46832	92.00000	0	100.00000
tut9	992	5.47984	22.39638	0	0	100.00000
tut10	992	68.09476	41.15756	100.00000	0	100.00000
tut11	992	56.74395	40.19105	80.00000	0	100.00000
tut12	992	49.47480	38.25602	58.00000	0	100.00000
tut13	992	55.85282	41.04702	67.00000	0	100.00000
tut14	992	57.24294	40.69260	80.00000	0	100.00000
tut15	992	43.95565	38.64637	58.00000	0	100.00000
tut16	992	50.81855	41.87273	67.00000	0	100.00000
test1	976	73.41189	21.36708	80.00000	0	100.00000
test2	967	53.86763	18.88000	50.00000	0	100.00000
test3	930	49.09677	19.44442	50.00000	10.00000	100.00000
test4	889	58.62992	19.53373	60.00000	0	100.00000
test_tot4	992	223.30847	54.79474	220.00000	70.00000	380.00000

Table 3						
2003 Sem2 Table of Simple Statistics						
Variable	**N**	**Mean**	**Std Dev**	**Median**	**Minimum**	**Maximum**
Best3	992	193.33871	41.96272	200.00000	70.00000	300.00000
Final	992	71.42915	15.88471	72.12333	20.40667	109.64000

Table 4							
2003 Sem2 Table of Spearman Correlation Coefficients							
Spearman Correlation Coefficients Prob > |r| under H0: Rho=0 Number of Observations							
	test1	test2	test3	test4	test_tot4	best3	final
tut1_3	0.21727 <.0001 976	0.21152 <.0001 967	0.26391 <.0001 930	0.23657 <.0001 889	0.37084 <.0001 992	0.34703 <.0001 992	0.58402 <.0001 992
tut4_7	0.12490 <.0001 976	0.16679 <.0001 967	0.19380 <.0001 930	0.17618 <.0001 889	0.30195 <.0001 992	0.25004 <.0001 992	0.55606 <.0001 992
tut8_11	0.16072 <.0001 976	0.17619 <.0001 967	0.24025 <.0001 930	0.23750 <.0001 889	0.35298 <.0001 992	0.30799 <.0001 992	0.64491 <.0001 992
tut12_16	0.21029 <.0001 976	0.18837 <.0001 967	0.21000 <.0001 930	0.21567 <.0001 889	0.37177 <.0001 992	0.31735 <.0001 992	0.65719 <.0001 992
tut_total	0.22049 <.0001 976	0.22216 <.0001 967	0.27509 <.0001 930	0.26069 <.0001 889	0.42568 <.0001 992	0.36959 <.0001 992	0.74741 <.0001 992
N_tuts	0.03378 0.2918 976	0.07519 0.0194 967	0.07331 0.0254 930	0.02340 0.4860 889	0.08114 0.0106 992	0.07398 0.0198 992	0.11447 0.0003 992
tut1	0.17695 <.0001 976	0.17628 <.0001 967	0.21820 <.0001 930	0.18883 <.0001 889	0.29983 <.0001 992	0.27987 <.0001 992	0.46896 <.0001 992
tut2	0.16197 <.0001 976	0.15189 <.0001 967	0.22224 <.0001 930	0.18694 <.0001 889	0.28890 <.0001 992	0.26701 <.0001 992	0.46843 <.0001 992
tut3	0.18979 <.0001 976	0.18772 <.0001 967	0.23008 <.0001 930	0.20316 <.0001 889	0.33233 <.0001 992	0.30889 <.0001 992	0.53850 <.0001 992
tut4	0.13939 <.0001 976	0.13007 <.0001 967	0.15996 <.0001 930	0.19671 <.0001 889	0.28467 <.0001 992	0.24783 <.0001 992	0.48363 <.0001 992
tut5	0.06141 0.0551 976	0.09534 0.0030 967	0.15981 <.0001 930	0.10871 0.0012 889	0.22662 <.0001 992	0.15613 <.0001 992	0.44727 <.0001 992
tut6	0.09734 0.0023 976	0.11668 0.0003 967	0.15617 <.0001 930	0.13308 <.0001 889	0.24493 <.0001 992	0.20143 <.0001 992	0.48273 <.0001 992
tut7	0.07249 0.0235 976	0.14363 <.0001 967	0.17741 <.0001 930	0.14914 <.0001 889	0.24626 <.0001 992	0.19329 <.0001 992	0.48589 <.0001 992

Table 4							
2003 Sem2 Table of Spearman Correlation Coefficients							
Spearman Correlation Coefficients Prob > |r| under H0: Rho=0 Number of Observations							
	test1	test2	test3	test4	test_tot4	best3	final
tut8	0.16022 <.0001 906	0.16079 <.0001 896	0.20460 <.0001 864	0.19505 <.0001 823	0.31324 <.0001 920	0.26498 <.0001 920	0.55256 <.0001 920
tut9	-0.08005 0.0124 976	-0.02776 0.3886 967	0.11302 0.0006 930	0.07038 0.0359 889	0.01379 0.6644 992	0.01443 0.6500 992	0.04328 0.1732 992
tut10	0.10919 0.0006 976	0.12313 0.0001 967	0.14984 <.0001 930	0.16513 <.0001 889	0.25197 <.0001 992	0.21666 <.0001 992	0.51005 <.0001 992
tut11	0.15790 <.0001 976	0.19310 <.0001 967	0.18360 <.0001 930	0.23537 <.0001 889	0.33163 <.0001 992	0.29474 <.0001 992	0.59328 <.0001 992
tut12	0.12888 <.0001 976	0.16167 <.0001 967	0.20029 <.0001 930	0.21192 <.0001 889	0.33141 <.0001 992	0.27770 <.0001 992	0.57000 <.0001 992
tut13	0.17810 <.0001 976	0.12215 0.0001 967	0.20617 <.0001 930	0.23102 <.0001 889	0.32414 <.0001 992	0.27895 <.0001 992	0.53439 <.0001 992
tut14	0.14017 <.0001 976	0.16661 <.0001 967	0.19307 <.0001 930	0.23586 <.0001 889	0.31192 <.0001 992	0.27859 <.0001 992	0.56852 <.0001 992
tut15	0.16207 <.0001 976	0.15721 <.0001 967	0.12705 0.0001 930	0.09270 0.0057 889	0.25898 <.0001 992	0.21514 <.0001 992	0.49184 <.0001 992
tut16	0.21183 <.0001 976	0.14824 <.0001 967	0.15237 <.0001 930	0.14203 <.0001 889	0.28320 <.0001 992	0.24715 <.0001 992	0.47804 <.0001 992

D1_2: UNIVARIATE PROCEDURE -TUTORIAL TOTAL

Table 5			
2003 Sem2 Table of Moments			
Moments			
N	992	**Sum Weights**	992
Mean	993.607863	**Sum Observations**	985659
Std Deviation	399.212194	**Variance**	159370.376
Skewness	-0.8858683	**Kurtosis**	-0.1003501
Uncorrected SS	1137294575	**Corrected SS**	157936042
Coeff Variation	40.178043	**Std Error Mean**	12.6749998

Table 6			
2003 Sem2 Table of Basic Statistical Measures			
Location		**Variability**	
Mean	993.608	**Std Deviation**	399.21219
Median	1104.000	**Variance**	159370
Mode	0.000	**Range**	1507
		Interquartile Range	564.00000

Table 7				
2003 Sem2Table of Tests for Location: Mu0=0				
Test	**Statistic**		**p Value**	
Student's t	**T**	78.39115	**Pr > |t|**	<.0001
Sign	**M**	478	**Pr >= |M|**	<.0001
Signed Rank	**S**	228723	**Pr >= |S|**	<.0001

Table 8	
2003 Sem2 Table of Quantile Estimates	
Quantiles (Definition 5)	
Quantile	Estimate
100% Max	1507
99%	1498
95%	1461
90%	1415
75% Q3	1315
50% Median	1104
25% Q1	751
10%	367
5%	150
1%	0
0% Min	0

Table 9			
2003 Sem2 Table of Extreme Observations			
Lowest		Highest	
Value	Obs	Value	Obs
0	909	1500	541
0	872	1500	685
0	854	1500	735
0	824	1504	454
0	750	1507	586

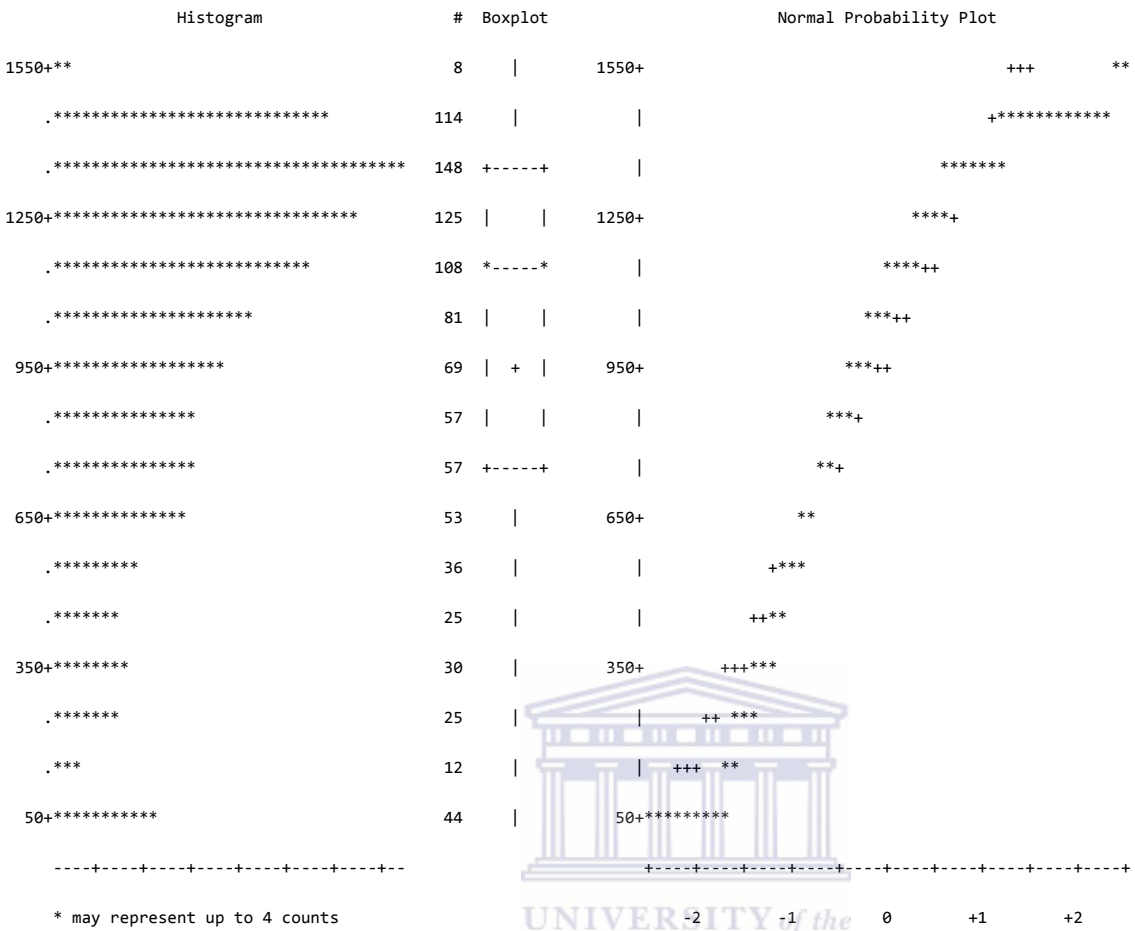


Figure 43: 2003 Second Semester Normal Probability Plots for Tutorial Total

D1_3: UNIVARIATE PROCEDURE - BEST 3

Table 10			
2003 Sem2 Table of Moments			
N	992	**Sum Weights**	992
Mean	193.33871	**Sum Observations**	191792
Std Deviation	41.9627218	**Variance**	1760.87002
Skewness	-0.2247212	**Kurtosis**	-0.2716605
Uncorrected SS	38825840	**Corrected SS**	1745022.19
Coeff Variation	21.7042526	**Std Error Mean**	1.33231775

Table 11			
2003 Sem2 Table of Basic Statistical Measures			
Location		**Variability**	
Mean	193.3387	**Std Deviation**	41.96272
Median	200.0000	**Variance**	1761
Mode	220.0000	**Range**	230.00000
		Interquartile Range	60.00000

Table 12				
2003 Sem2 Table of Tests for Location: Mu0=0				
Test	**Statistic**		**p Value**	
Student's t	**T**	145.1146	**Pr > |t|**	<.0001
Sign	**M**	496	**Pr >= |M|**	<.0001
Signed Rank	**S**	246264	**Pr >= |S|**	<.0001

Table 13	
2003 Sem2 Table of quantile Estimates	
Quantiles (Definition 5)	
Quantile	Estimate
100% Max	300
99%	280
95%	260
90%	250
75% Q3	220
50% Median	200
25% Q1	160
10%	140
5%	120
1%	90
0% Min	70

Table 14			
2003 Sem2 Table of Extreme Observations			
Lowest		Highest	
Value	Obs	Value	Obs
70	931	290	175
70	833	290	450
70	205	290	871
80	732	300	856
80	724	300	921

Table 15			
2003 Sem2 Table of Moments			
N	992	**Sum Weights**	992
Mean	71.4291465	**Sum Observations**	70857.7133
Std Deviation	15.8847134	**Variance**	252.324119
Skewness	-0.3617215	**Kurtosis**	-0.0277144
Uncorrected SS	5311359.19	**Corrected SS**	250053.201
Coeff Variation	22.2384197	**Std Error Mean**	0.50434015


```
                Histogram                   #  Boxplot

305+*                                       2     |
```

```
  .**                                        3     |
  .*****                                     9     |
  .**********                               19     |
  .****************                         32     |
  .******************                       37     |
  .********************************         66     |
  .********************************         65     |
  .******************************************   91  +-----+
  .******************************************    90  |     |
  .****************************************      88  *-----*
  .**************************************       82  |  +  |
  .******************************************   86  |     |
  .********************************           69  |     |
  .*****************************              59  +-----+
  .*****************************              57     |
  .************************                   50     |
  .******************                       36     |
  .**********                               20     |
  .*****                                     9     |
  .****                                      7     |
  .***                                       6     |
  .***                                       6     |
75+**                                        3     |
   ----+----+----+----+----+----+----+----+----+-
   * may represent up to 2 counts
```


Figure 44: 2003 Second Semester Histogram for Best3

```
                Normal Probability Plot
305+                                          *
   |                                         +*
   |                                       +****
```

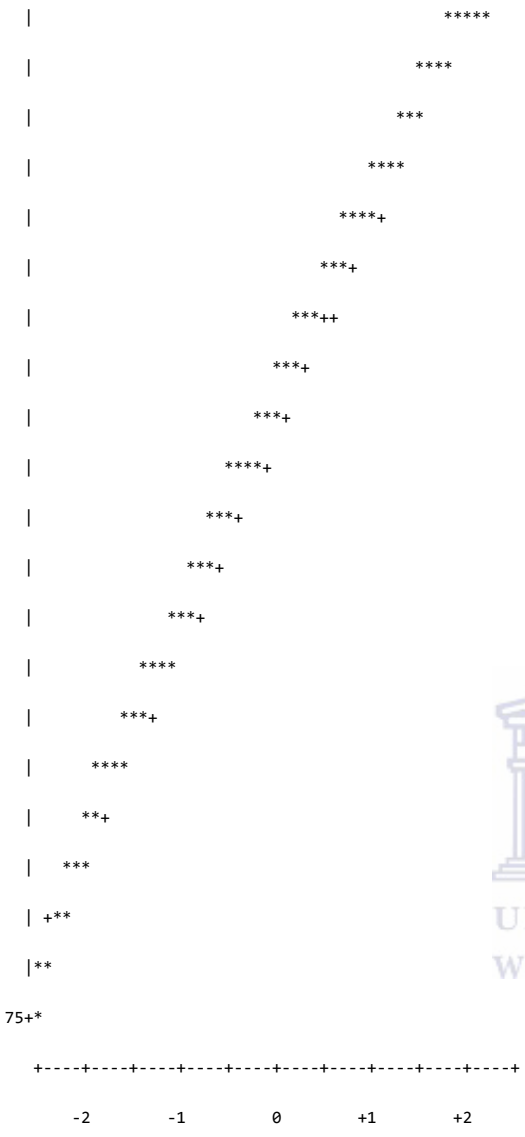


Figure 45: 2003 Second Semester Normal Probability Plot for Best3

D1_4: UNIVARIATE PROCEDURE – FINAL

Table 16			
2003 Sem2 Table of Basic Statistical Measures			
Location		Variability	
Mean	71.42915	Std Deviation	15.88471
Median	72.12333	Variance	252.32412
Mode	40.00000	Range	89.23333
		Interquartile Range	22.33333

Table 17				
2003 Sem2 Table of Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	T	141.6289	Pr > |t|	<.0001
Sign	M	496	Pr >= |M|	<.0001
Signed Rank	S	246264	Pr >= |S|	<.0001

Table 18	
2003 Sem2 Table of Quantile Estimates	
Quantiles (Definition 5)	
Quantile	Estimate
100% Max	109.6400
99%	101.9400
95%	94.9467
90%	91.5800
75% Q3	83.0700

Table 18	
2003 Sem2 Table of Quantile Estimates	
Quantiles (Definition 5)	
Quantile	**Estimate**
50% Median	72.1233
25% Q1	60.7367
10%	50.6667
5%	44.1400
1%	28.5267
0% Min	20.4067

Table 19			
2003 Sem2 Table of Extreme Observations			
Lowest		**Highest**	
Value	**Obs**	**Value**	**Obs**
20.4067	205	104.627	417
21.0867	833	104.833	450
21.3333	673	106.653	871
21.3333	263	109.220	856
21.3333	142	109.640	921

Histogram # Boxplot Normal Probability Plot

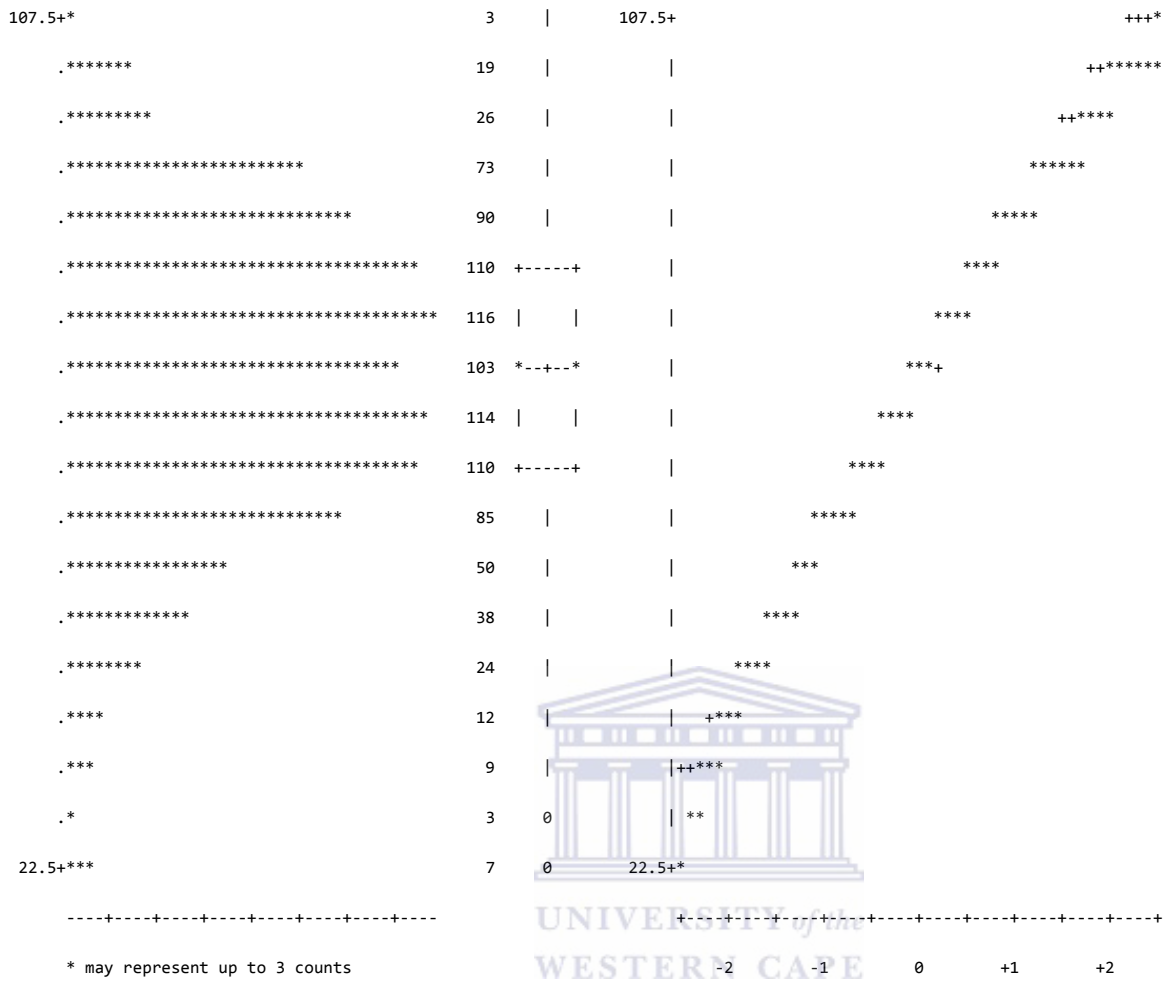


Figure 46: 2003 Second Semester Normal Probability Plots for Final

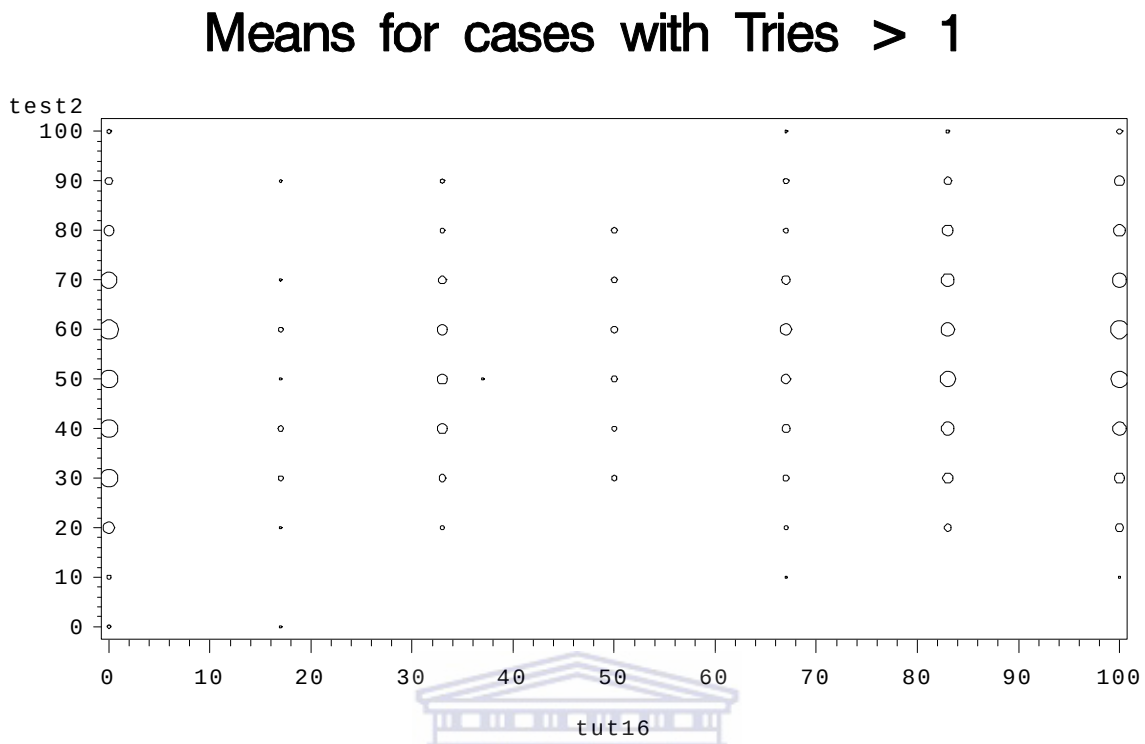


Figure 47: 2003 Second Semester Dot Plots for Means of Final

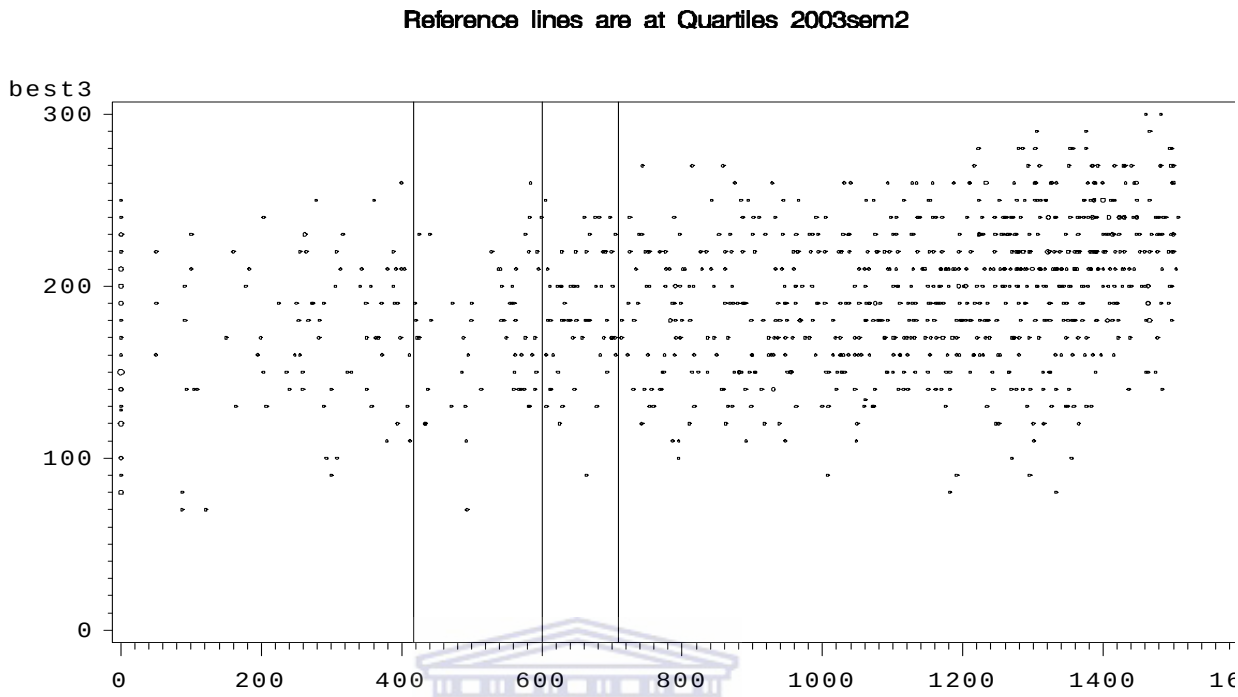


Figure 48: 2003 Second Semester

D1_5: MEANS PROCEDURE - ALL VARIABLES

Table 20					
2003 Sem2 Table of Estimates					
Variable	**N**	**Mean**	**Std Dev**	**Minimum**	**Maximum**
Tutorial	21350	8.4939110	4.8988012	1.0000000	16.0000000
studnum	21350	2370534.08	737165.91	2004796.00	9927385.00
TestDate	0	.	.	.	.
Score	21350	62.5350820	37.7877774	0	100.0000000
Time	21350	18.2511475	15.5856600	0	60.0000000
Semester	21350	2003.00	0	2003.00	2003.00
order	21350	12418.64	6916.87	1.0000000	23973.00

D1_6: UNIVARIATE PROCEDURE – SCORE

Table 21			
2003 Sem2 Table of Moments			
N	21350	**Sum Weights**	21350
Mean	62.535082	**Sum Observations**	1335124
Std Deviation	37.7877774	**Variance**	1427.91612
Skewness	-0.5492199	**Kurtosis**	-1.2258175
Uncorrected SS	113976670	**Corrected SS**	30484581.2
Coeff Variation	60.4265257	**Std Error Mean**	0.25861422

Table 22			
2003 Sem2 Table of Basic Statistical Measures			
Location		**Variability**	
Mean	62.5351	**Std Deviation**	37.78778
Median	76.0000	**Variance**	1428
Mode	100.0000	**Range**	100.00000
		Interquartile Range	67.00000

Table 23				
2003 Sem2 Table of Tests for Location: Mu0=0				
Test	**Statistic**		**p Value**	
Student's t	**T**	241.8084	**Pr > |t|**	<.0001
Sign	**M**	8946	**Pr >= |M|**	<.0001
Signed Rank	**S**	80035389	**Pr >= |S|**	<.0001

Table 24	
2003 Sem2 Table of Quantile Estimates	
Quantiles (Definition 5)	
Quantile	**Estimate**
100% Max	100
99%	100
95%	100
90%	100
75% Q3	100
50% Median	76
25% Q1	33
10%	0
5%	0
1%	0
0% Min	0

Table 25			
2003 Sem2 Table of Extreme Observations			
Lowest		Highest	
Value	Obs	Value	Obs
0	21339	100	21283
0	21338	100	21287
0	21337	100	21305
0	21336	100	21340
0	21335	100	21344


```
                    Histogram                       #  Boxplot

102.5+**********************************************  6488  +-----+
```

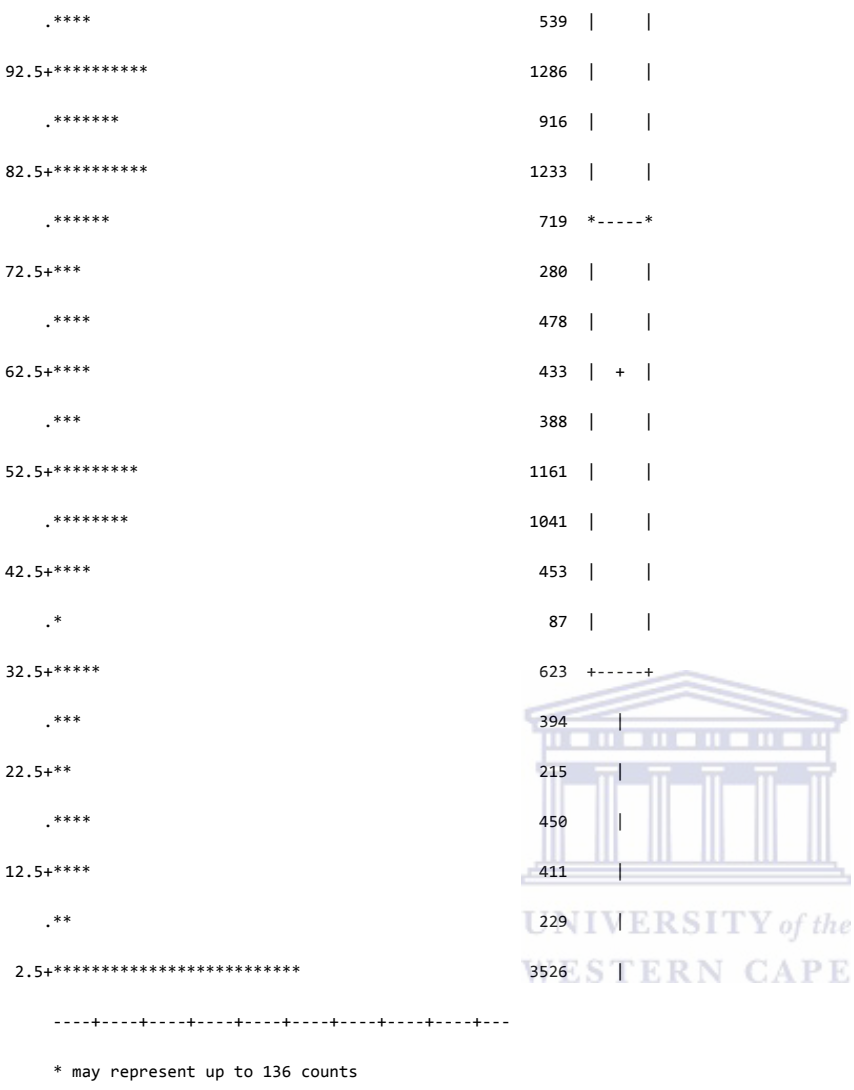
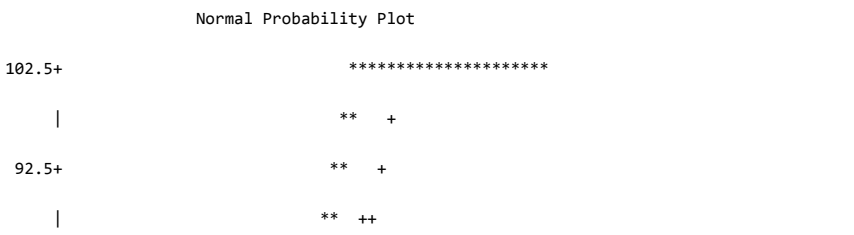


Figure 49: 2003 Second Semester Normal Probability Plots for Score



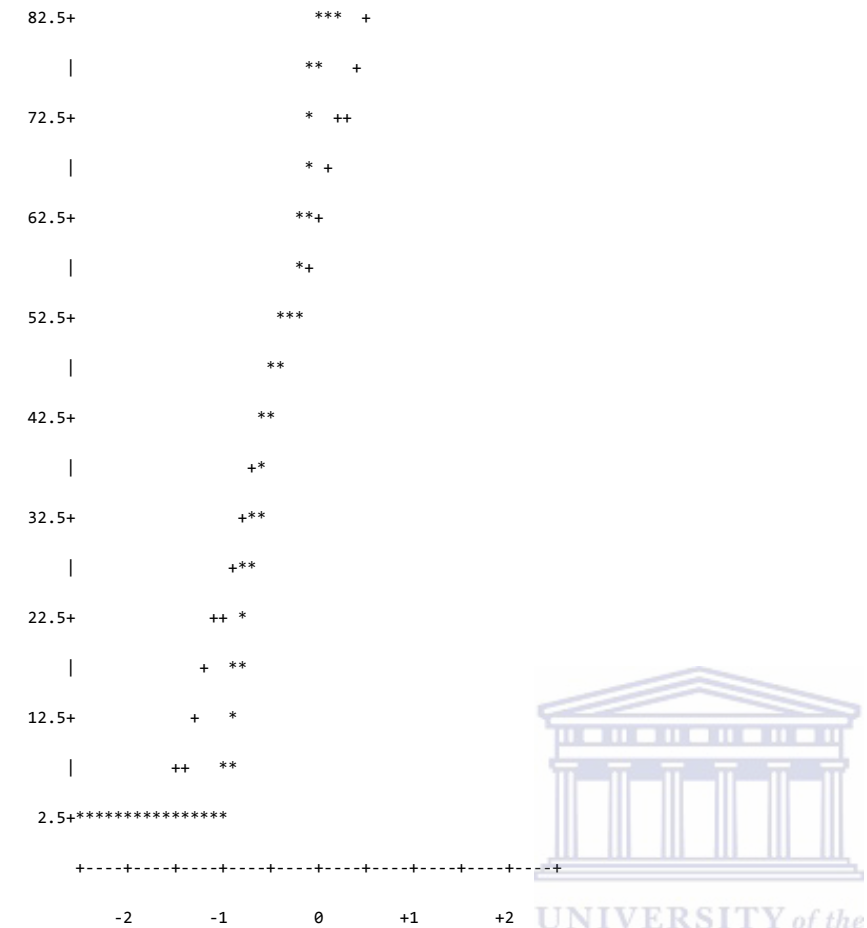
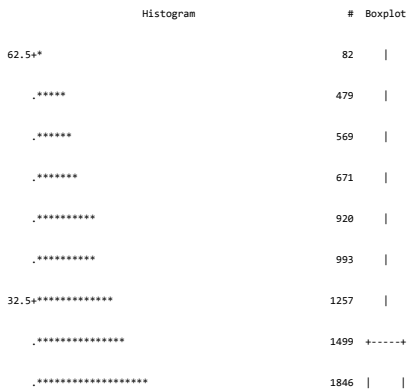


Figure 50: 2003 Second Semester Normal Probability Plots for Score



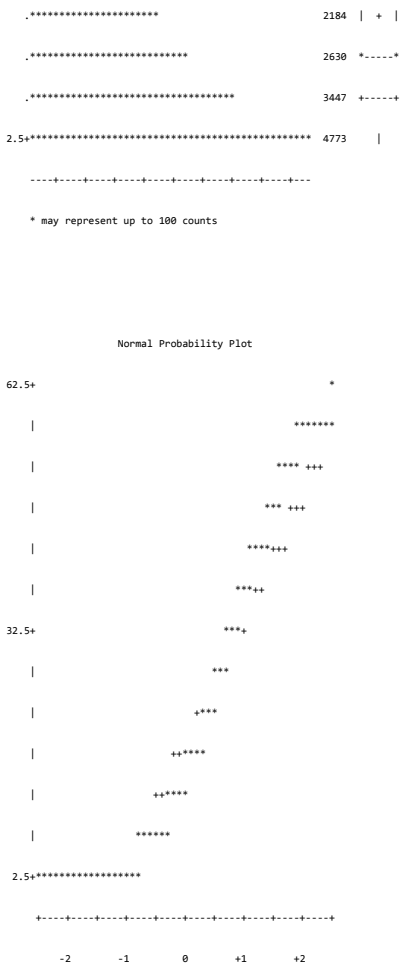


Figure 51: 2003 Second Semester Normal Probability Plots for Time

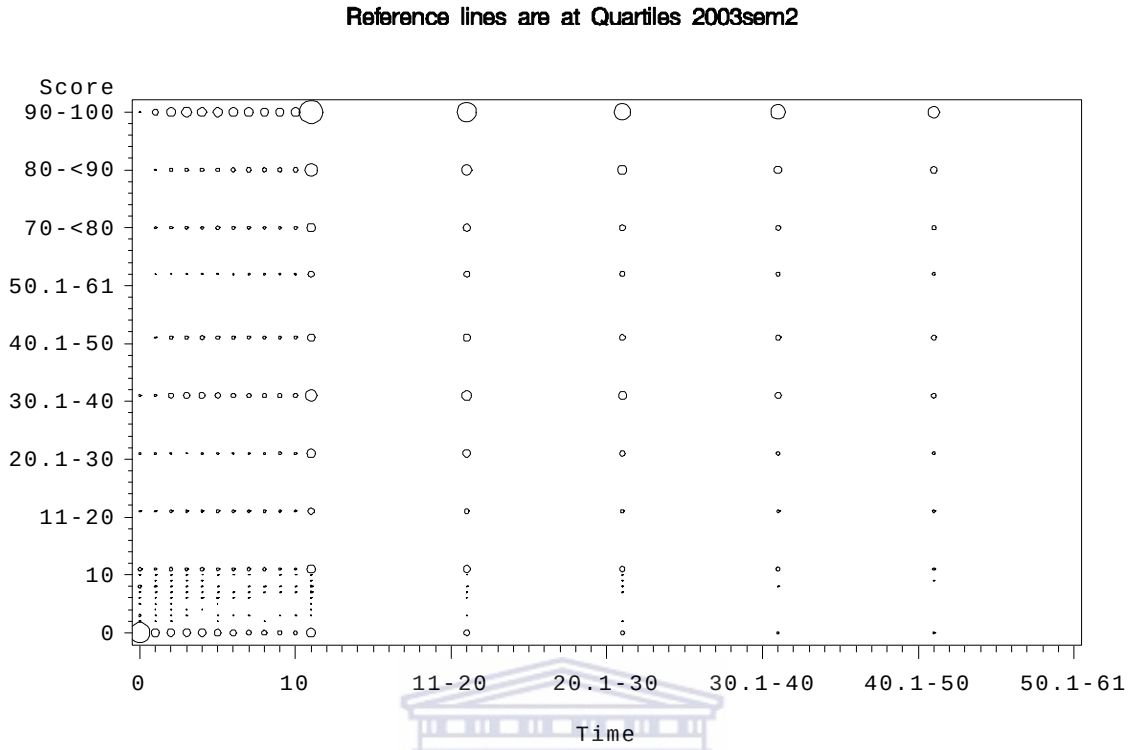


Figure 52: 2003 Second Semester

Table 31													
2003 Sem2 Table of Tutorial by Score													
Tutorial	**Score**												
Frequency **Percent** **Row Pct** **Col Pct**	**0**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11-20**	**20.1-30**	**30.1-40**
1	65 0.30 6.08 1.88	9 0.04 0.84 69.23	0 0.00 0.00 0.00	6 0.03 0.56 100.00	5 0.02 0.47 38.46	0 0.00 0.00 0.00	9 0.04 0.84 15.25	0 0.00 0.00 0.00	14 0.07 1.31 87.50	2 0.01 0.19 6.06	15 0.07 1.40 1.58	8 0.04 0.75 1.56	41 0.19 3.84 4.72
2	314 1.47 15.54 9.08	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	197 0.92 9.75 38.48	0 0.00 0.00 0.00
3	173 0.81 13.69 5.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	259 1.21 20.49 27.29	82 0.38 6.49 16.02	0 0.00 0.00 0.00
4	54 0.25 4.37 1.56	0 0.00 0.00 0.00	28 0.13 2.27 57.14	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	11 0.05 0.89 18.64	0 0.00 0.00 0.00	0 0.00 0.00 0.00	18 0.08 1.46 54.55	11 0.05 0.89 1.16	17 0.08 1.38 3.32	19 0.09 1.54 2.19
5	197 0.92 7.89 5.70	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	8 0.04 0.32 24.24	46 0.22 1.84 4.85	38 0.18 1.52 7.42	12 0.06 0.48 1.38
6	92 0.43 7.65 2.66	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	39 0.18 3.24 66.10	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	40 0.19 3.33 4.21	52 0.24 4.32 10.16	37 0.17 3.08 4.26
7	145 0.68 11.65 4.19	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	22 0.10 1.77 2.32	33 0.15 2.65 6.45	23 0.11 1.85 2.65
8	95 0.44 10.54 2.75	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	55 0.26 6.10 60.44	0 0.00 0.00 0.00	0 0.00 0.00 0.00	50 0.23 5.55 5.27	19 0.09 2.11 3.71	26 0.12 2.89 3.00
10	157 0.74 15.42 4.54	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	1 0.00 0.10 3.03	61 0.29 5.99 6.43	4 0.02 0.39 0.78	85 0.40 8.35 9.79

Table 31													
2003 Sem2 Table of Tutorial by Score													
Tutorial	**Score**												
Frequency **Percent** **Row Pct** **Col Pct**	**0**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11-20**	**20.1-30**	**30.1-40**
11	121 0.57 12.25 3.50	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	44 0.21 4.45 4.64	1 0.00 0.10 0.20	79 0.37 8.00 9.10
12	145 0.68 13.17 4.19	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	11 0.05 1.00 12.09	0 0.00 0.00 0.00	0 0.00 0.00 0.00	10 0.05 0.91 1.05	16 0.07 1.45 3.13	113 0.53 10.26 13.02
13	535 2.51 23.02 15.47	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	347 1.63 14.93 36.56	0 0.00 0.00 0.00	391 1.83 16.82 45.05
14	93 0.44 9.58 2.69	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	4 0.02 0.41 30.77	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	4 0.02 0.41 12.12	1 0.00 0.10 0.11	3 0.01 0.31 0.59	6 0.03 0.62 0.69
15	1143 5.35 47.68 33.05	0 0.00 0.00 0.00	18 0.08 0.75 36.73	0 0.00 0.00 0.00	2 0.01 0.08 15.38	50 0.23 2.09 100.00	0 0.00 0.00 0.00	24 0.11 1.00 26.37	1 0.00 0.04 6.25	0 0.00 0.00 0.00	40 0.19 1.67 4.21	33 0.15 1.38 6.45	34 0.16 1.42 3.92
16	129 0.60 11.56 3.73	4 0.02 0.36 30.77	3 0.01 0.27 6.12	0 0.00 0.00 0.00	2 0.01 0.18 15.38	0 0.00 0.00 0.00	0 0.00 0.00 0.00	1 0.00 0.09 1.10	1 0.00 0.09 6.25	0 0.00 0.00 0.00	3 0.01 0.27 0.32	9 0.04 0.81 1.76	2 0.01 0.18 0.23
Total	3458 16.20	13 0.06	49 0.23	6 0.03	13 0.06	50 0.23	59 0.28	91 0.43	16 0.07	33 0.15	949 4.44	512 2.40	868 4.07

Table 32

2003 Sem2 Table of Tutorial by Score

Tutorial	Score						
Frequency Percent Row Pct Col Pct	40.1-50	50.1-61	61.1-<70	70-<80	80-<90	90-100	Total
1	125 0.59 11.69 5.77	61 0.29 5.71 5.75	62 0.29 5.80 11.40	102 0.48 9.54 10.21	126 0.59 11.79 5.86	419 1.96 39.20 5.04	1069 5.01
2	472 2.21 23.35 21.77	0 0.00 0.00 0.00	0 0.00 0.00 0.00	309 1.45 15.29 30.93	0 0.00 0.00 0.00	729 3.41 36.07 8.77	2021 9.47
3	33 0.15 2.61 1.52	30 0.14 2.37 2.83	0 0.00 0.00 0.00	39 0.18 3.09 3.90	98 0.46 7.75 4.56	550 2.58 43.51 6.62	1264 5.92
4	23 0.11 1.86 1.06	27 0.13 2.18 2.55	13 0.06 1.05 2.39	28 0.13 2.27 2.80	150 0.70 12.14 6.98	837 3.92 67.72 10.07	1236 5.79
5	72 0.34 2.88 3.32	102 0.48 4.09 9.62	0 0.00 0.00 0.00	135 0.63 5.41 13.51	247 1.16 9.90 11.49	1639 7.68 65.67 19.72	2496 11.69
6	50 0.23 4.16 2.31	30 0.14 2.49 2.83	25 0.12 2.08 4.60	78 0.37 6.48 7.81	94 0.44 7.81 4.37	666 3.12 55.36 8.01	1203 5.63
7	29 0.14 2.33 1.34	26 0.12 2.09 2.45	38 0.18 3.05 6.99	77 0.36 6.18 7.71	293 1.37 23.53 13.63	559 2.62 44.90 6.72	1245 5.83
8	48 0.22 5.33 2.21	24 0.11 2.66 2.26	47 0.22 5.22 8.64	46 0.22 5.11 4.60	59 0.28 6.55 2.75	432 2.02 47.95 5.20	901 4.22
10	6 0.03 0.59 0.28	132 0.62 12.97 12.45	0 0.00 0.00 0.00	2 0.01 0.20 0.20	83 0.39 8.15 3.86	487 2.28 47.84 5.86	1018 4.77
11	4 0.02 0.40 0.18	182 0.85 18.42 17.17	0 0.00 0.00 0.00	7 0.03 0.71 0.70	309 1.45 31.28 14.38	241 1.13 24.39 2.90	988 4.63
12	120 0.56 10.90 5.54	132 0.62 11.99 12.45	128 0.60 11.63 23.53	137 0.64 12.44 13.71	117 0.55 10.63 5.44	172 0.81 15.62 2.07	1101 5.16
13	140 0.66 6.02 6.46	0 0.00 0.00 0.00	191 0.89 8.22 35.11	0 0.00 0.00 0.00	381 1.78 16.39 17.73	339 1.59 14.59 4.08	2324 10.89

Table 32							
2003 Sem2 Table of Tutorial by Score							
Tutorial	**Score**						**Total**
Frequency **Percent** **Row Pct** **Col Pct**	**40.1-50**	**50.1-61**	**61.1-<70**	**70-<80**	**80-<90**	**90-100**	
14	1 0.00 0.10 0.05	7 0.03 0.72 0.66	10 0.05 1.03 1.84	18 0.08 1.85 1.80	114 0.53 11.74 5.30	710 3.33 73.12 8.54	971 4.55
15	128 0.60 5.34 5.90	274 1.28 11.43 25.85	22 0.10 0.92 4.04	17 0.08 0.71 1.70	78 0.37 3.25 3.63	533 2.50 22.24 6.41	2397 11.23
16	917 4.30 82.17 42.30	33 0.15 2.96 3.11	8 0.04 0.72 1.47	4 0.02 0.36 0.40	0 0.00 0.00 0.00	0 0.00 0.00 0.00	1116 5.23
Total	2168 10.15	1060 4.96	544 2.55	999 4.68	2149 10.07	8313 38.94	21350 100.00

Table 33												
2003 Sem2 Table of Tutorial by Time												
Tutorial	Time											
Frequency Percent Row Pct Col Pct	0	1	2	3	4	5	6	7	8	9	10	11-20
1	55 0.26 5.14 3.32	9 0.04 0.84 1.75	11 0.05 1.03 1.37	6 0.03 0.56 0.65	7 0.03 0.65 0.80	4 0.02 0.37 0.50	5 0.02 0.47 0.68	1 0.00 0.09 0.15	4 0.02 0.37 0.61	8 0.04 0.75 1.38	4 0.02 0.37 0.67	149 0.70 13.94 3.24
2	262 1.23 12.96 15.79	80 0.37 3.96 15.56	108 0.51 5.34 13.43	119 0.56 5.89 12.98	95 0.44 4.70 10.81	112 0.52 5.54 13.91	104 0.49 5.15 14.19	93 0.44 4.60 13.84	77 0.36 3.81 11.68	65 0.30 3.22 11.25	68 0.32 3.36 11.47	436 2.04 21.57 9.49
3	113 0.53 8.94 6.81	27 0.13 2.14 5.25	13 0.06 1.03 1.62	21 0.10 1.66 2.29	18 0.08 1.42 2.05	23 0.11 1.82 2.86	10 0.05 0.79 1.36	23 0.11 1.82 3.42	22 0.10 1.74 3.34	26 0.12 2.06 4.50	18 0.08 1.42 3.04	297 1.39 23.50 6.47
4	48 0.22 3.88 2.89	18 0.08 1.46 3.50	15 0.07 1.21 1.87	18 0.08 1.46 1.96	14 0.07 1.13 1.59	38 0.18 3.07 4.72	24 0.11 1.94 3.27	31 0.15 2.51 4.61	28 0.13 2.27 4.25	32 0.15 2.59 5.54	39 0.18 3.16 6.58	279 1.31 22.57 6.08
5	125 0.59 5.01 7.53	96 0.45 3.85 18.68	140 0.66 5.61 17.41	158 0.74 6.33 17.23	133 0.62 5.33 15.13	103 0.48 4.13 12.80	113 0.53 4.53 15.42	119 0.56 4.77 17.71	95 0.44 3.81 14.42	85 0.40 3.41 14.71	98 0.46 3.93 16.53	612 2.87 24.52 13.33
6	62 0.29 5.15 3.74	24 0.11 2.00 4.67	35 0.16 2.91 4.35	37 0.17 3.08 4.03	23 0.11 1.91 2.62	31 0.15 2.58 3.85	43 0.20 3.57 5.87	39 0.18 3.24 5.80	50 0.23 4.16 7.59	40 0.19 3.33 6.92	28 0.13 2.33 4.72	236 1.11 19.62 5.14
7	66 0.31 5.30 3.98	33 0.15 2.65 6.42	65 0.30 5.22 8.08	56 0.26 4.50 6.11	59 0.28 4.74 6.71	42 0.20 3.37 5.22	51 0.24 4.10 6.96	50 0.23 4.02 7.44	42 0.20 3.37 6.37	43 0.20 3.45 7.44	36 0.17 2.89 6.07	261 1.22 20.96 5.68
8	92 0.43 10.21 5.55	17 0.08 1.89 3.31	14 0.07 1.55 1.74	8 0.04 0.89 0.87	8 0.04 0.89 0.91	11 0.05 1.22 1.37	13 0.06 1.44 1.77	15 0.07 1.66 2.23	22 0.10 2.44 3.34	7 0.03 0.78 1.21	20 0.09 2.22 3.37	172 0.81 19.09 3.75
10	65 0.30 6.39 3.92	14 0.07 1.38 2.72	9 0.04 0.88 1.12	5 0.02 0.49 0.55	15 0.07 1.47 1.71	16 0.07 1.57 1.99	18 0.08 1.77 2.46	17 0.08 1.67 2.53	24 0.11 2.36 3.64	25 0.12 2.46 4.33	35 0.16 3.44 5.90	230 1.08 22.59 5.01
11	80 0.37 8.10 4.82	11 0.05 1.11 2.14	10 0.05 1.01 1.24	5 0.02 0.51 0.55	10 0.05 1.01 1.14	13 0.06 1.32 1.61	28 0.13 2.83 3.82	21 0.10 2.13 3.13	20 0.09 2.02 3.03	24 0.11 2.43 4.15	22 0.10 2.23 3.71	210 0.98 21.26 4.57
12	109 0.51 9.90 6.57	37 0.17 3.36 7.20	32 0.15 2.91 3.98	23 0.11 2.09 2.51	38 0.18 3.45 4.32	39 0.18 3.54 4.84	36 0.17 3.27 4.91	37 0.17 3.36 5.51	28 0.13 2.54 4.25	29 0.14 2.63 5.02	26 0.12 2.36 4.38	223 1.04 20.25 4.86
13	117 0.55 5.03 7.05	42 0.20 1.81 8.17	47 0.22 2.02 5.85	40 0.19 1.72 4.36	48 0.22 2.07 5.46	46 0.22 1.98 5.71	60 0.28 2.58 8.19	57 0.27 2.45 8.48	86 0.40 3.70 13.05	77 0.36 3.31 13.32	83 0.39 3.57 14.00	742 3.48 31.93 16.16

Table 33												
2003 Sem2 Table of Tutorial by Time												
Tutorial	**Time**											
Frequency **Percent** **Row Pct** **Col Pct**	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11-20**
14	48 0.22 4.94 2.89	17 0.08 1.75 3.31	5 0.02 0.51 0.62	3 0.01 0.31 0.33	6 0.03 0.62 0.68	12 0.06 1.24 1.49	7 0.03 0.72 0.95	20 0.09 2.06 2.98	25 0.12 2.57 3.79	24 0.11 2.47 4.15	25 0.12 2.57 4.22	291 1.36 29.97 6.34
15	298 1.40 12.43 17.96	72 0.34 3.00 14.01	241 1.13 10.05 29.98	326 1.53 13.60 35.55	315 1.48 13.14 35.84	262 1.23 10.93 32.55	186 0.87 7.76 25.38	117 0.55 4.88 17.41	108 0.51 4.51 16.39	77 0.36 3.21 13.32	67 0.31 2.80 11.30	265 1.24 11.06 5.77
16	119 0.56 10.66 7.17	17 0.08 1.52 3.31	59 0.28 5.29 7.34	92 0.43 8.24 10.03	90 0.42 8.06 10.24	53 0.25 4.75 6.58	35 0.16 3.14 4.77	32 0.15 2.87 4.76	28 0.13 2.51 4.25	16 0.07 1.43 2.77	24 0.11 2.15 4.05	189 0.89 16.94 4.12
Total	1659 7.77	514 2.41	804 3.77	917 4.30	879 4.12	805 3.77	733 3.43	672 3.15	659 3.09	578 2.71	593 2.78	4592 21.51

Table 34					
2003 Sem2 Table of Tutorial by Time					
Tutorial	Time				
Frequency Percent Row Pct Col Pct	20.1-30	30.1-40	40.1-50	50.1-61	Total
1	249 1.17 23.29 7.68	242 1.13 22.64 11.14	188 0.88 17.59 12.29	127 0.59 11.88 12.70	1069 5.01
2	196 0.92 9.70 6.04	113 0.53 5.59 5.20	61 0.29 3.02 3.99	32 0.15 1.58 3.20	2021 9.47
3	258 1.21 20.41 7.96	187 0.88 14.79 8.61	123 0.58 9.73 8.04	85 0.40 6.72 8.50	1264 5.92
4	235 1.10 19.01 7.25	179 0.84 14.48 8.24	151 0.71 12.22 9.87	87 0.41 7.04 8.70	1236 5.79
5	325 1.52 13.02 10.02	152 0.71 6.09 7.00	90 0.42 3.61 5.88	52 0.24 2.08 5.20	2496 11.69
6	177 0.83 14.71 5.46	139 0.65 11.55 6.40	139 0.65 11.55 9.08	100 0.47 8.31 10.00	1203 5.63
7	182 0.85 14.62 5.61	120 0.56 9.64 5.52	90 0.42 7.23 5.88	49 0.23 3.94 4.90	1245 5.83
8	144 0.67 15.98 4.44	141 0.66 15.65 6.49	129 0.60 14.32 8.43	88 0.41 9.77 8.80	901 4.22
10	173 0.81 16.99 5.33	153 0.72 15.03 7.04	122 0.57 11.98 7.97	97 0.45 9.53 9.70	1018 4.77
11	189 0.89 19.13 5.83	141 0.66 14.27 6.49	113 0.53 11.44 7.39	91 0.43 9.21 9.10	988 4.63
12	168 0.79 15.26 5.18	121 0.57 10.99 5.57	76 0.36 6.90 4.97	79 0.37 7.18 7.90	1101 5.16
13	514 2.41 22.12 15.85	237 1.11 10.20 10.91	90 0.42 3.87 5.88	38 0.18 1.64 3.80	2324 10.89

Table 34					
2003 Sem2 Table of Tutorial by Time					
Tutorial	**Time**				
Frequency **Percent** **Row Pct** **Col Pct**	**20.1-30**	**30.1-40**	**40.1-50**	**50.1-61**	**Total**
14	204 0.96 21.01 6.29	144 0.67 14.83 6.63	94 0.44 9.68 6.14	46 0.22 4.74 4.60	971 4.55
15	47 0.22 1.96 1.45	9 0.04 0.38 0.41	5 0.02 0.21 0.33	2 0.01 0.08 0.20	2397 11.23
16	182 0.85 16.31 5.61	94 0.44 8.42 4.33	59 0.28 5.29 3.86	27 0.13 2.42 2.70	1116 5.23
Total	3243 15.19	2172 10.17	1530 7.17	1000 4.68	21350 100.00

Table 35	
2003 Sem2 Table of the 2 Variables	
2 Variables:	Time Score

Table 36						
2003 Sem2 Table of Simple Statistics						
Variable	**N**	**Mean**	**Std Dev**	**Median**	**Minimum**	**Maximum**
Time	21350	18.25115	15.58566	14.00000	0	60.00000
Score	21350	62.53508	37.78778	76.00000	0	100.00000

Table 37		
2003 Sem2 Table with Spearman Correlation Coefficient of Time & Score		
Spearman Correlation Coefficients, N = 21350 Prob > |r| under H0: Rho=0		
	Time	**Score**
Time	1.00000	0.33614 <.0001
Score	0.33614 <.0001	1.00000

Table 38									
2003 Sem2 Table of All Variables									
Tutorial	**N Obs**	**Variable**	**Minimum**	**10th Pctl**	**Mean**	**Median**	**75th Pctl**	**90th Pctl**	**Maximum**
1	165	tries	2.0	2.0	2.7	2.0	3.0	4.0	13.0
		max_score	5.0	48.0	82.4	91.0	98.0	100.0	100.0
		improve	0.0	0.0	27.3	24.0	48.0	57.0	100.0
		first_score	0.0	9.0	55.0	50.0	78.0	93.0	100.0
		tries_max	1.0	1.0	2.3	2.0	3.0	4.0	13.0
		post_max_tries	0.0	0.0	0.4	0.0	0.0	1.0	5.0
		first_time	1.0	14.0	33.6	34.0	45.0	54.0	59.0
		total_time	3.0	39.0	83.0	74.0	99.0	128.0	470.0
		best_time	2.0	15.0	32.6	32.0	43.0	52.0	60.0
2	378	tries	2.0	2.0	2.7	2.0	3.0	4.0	18.0
		max_score	0.0	50.0	85.6	100.0	100.0	100.0	100.0
		improve	0.0	0.0	34.9	25.0	50.0	75.0	100.0
		first_score	0.0	25.0	50.7	50.0	75.0	100.0	100.0
		tries_max	1.0	1.0	2.3	2.0	3.0	4.0	18.0
		post_max_tries	0.0	0.0	0.5	0.0	1.0	2.0	10.0
		first_time	1.0	3.0	17.1	13.0	23.0	37.0	60.0
		total_time	2.0	11.0	36.0	30.0	50.0	70.0	150.0
		best_time	1.0	2.0	12.2	8.0	15.0	29.0	59.0
3	192	tries	2.0	2.0	2.6	2.0	3.0	4.0	7.0
		max_score	0.0	14.0	70.1	86.0	100.0	100.0	100.0
		improve	0.0	0.0	39.9	29.0	86.0	86.0	100.0
		first_score	0.0	0.0	30.2	14.0	43.0	100.0	100.0
		tries_max	1.0	1.0	2.1	2.0	3.0	3.0	7.0
		post_max_tries	0.0	0.0	0.5	0.0	1.0	2.0	4.0
		first_time	1.0	4.0	23.1	19.0	36.0	48.0	60.0
		total_time	2.0	21.0	58.0	55.5	76.0	97.0	166.0
		best_time	1.0	9.0	26.7	24.5	38.0	47.0	59.0
4	188	tries	2.0	2.0	2.5	2.0	3.0	4.0	8.0
		max_score	7.0	83.0	88.7	93.0	97.0	100.0	100.0
		improve	0.0	0.0	23.8	7.0	45.0	79.0	100.0
		first_score	0.0	7.0	65.0	86.0	93.0	97.0	100.0
		tries_max	1.0	1.0	2.0	2.0	2.0	3.0	8.0
		post_max_tries	0.0	0.0	0.5	0.0	1.0	1.0	3.0
		first_time	1.0	4.0	24.4	22.5	37.0	48.0	57.0
		total_time	6.0	21.0	55.0	51.0	72.5	98.0	192.0
		best_time	2.0	6.0	23.7	21.0	33.5	49.0	58.0
5	869	tries	2.0	2.0	2.5	2.0	3.0	4.0	8.0
		max_score	0.0	90.0	96.7	100.0	100.0	100.0	100.0
		improve	0.0	0.0	6.9	0.0	0.0	23.0	100.0
		first_score	0.0	70.0	89.8	100.0	100.0	100.0	100.0
		tries_max	1.0	1.0	1.3	1.0	1.0	2.0	7.0
		post_max_tries	0.0	0.0	1.1	1.0	1.0	2.0	6.0
		first_time	1.0	3.0	15.3	12.0	21.0	32.0	59.0
		total_time	2.0	9.0	36.1	31.0	49.0	70.0	163.0
		best_time	1.0	3.0	15.2	12.0	21.0	34.0	59.0
6	171	tries	2.0	2.0	2.4	2.0	3.0	3.0	10.0
		max_score	0.0	36.0	82.8	100.0	100.0	100.0	100.0
		improve	0.0	0.0	29.8	15.0	50.0	79.0	100.0
		first_score	0.0	7.0	53.0	50.0	86.0	100.0	100.0
		tries_max	1.0	1.0	1.9	2.0	2.0	3.0	5.0
		post_max_tries	0.0	0.0	0.5	0.0	1.0	2.0	5.0
		first_time	1.0	4.0	20.6	16.0	32.0	44.0	60.0
		total_time	4.0	13.0	45.4	45.0	62.0	73.0	126.0
		best_time	1.0	5.0	21.3	17.0	32.0	45.0	60.0

Table 38									
2003 Sem2 Table of All Variables									
Tutorial	**N Obs**	**Variable**	**Minimum**	**10th Pctl**	**Mean**	**Median**	**75th Pctl**	**90th Pctl**	**Maximum**
7	184	tries	2.0	2.0	2.5	2.0	3.0	4.0	12.0
		max_score	0.0	67.0	88.8	100.0	100.0	100.0	100.0
		improve	0.0	0.0	33.3	11.0	67.0	89.0	100.0
		first_score	0.0	0.0	55.5	67.0	89.0	100.0	100.0
		tries_max	1.0	1.0	2.0	2.0	2.0	3.0	8.0
		post_max_tries	0.0	0.0	0.5	0.0	1.0	1.0	5.0
		first_time	1.0	2.0	19.0	15.5	30.0	41.0	60.0
		total_time	3.0	12.0	40.0	35.0	57.0	70.0	134.0
		best_time	1.0	3.0	17.2	13.0	25.0	38.0	60.0
8	103	tries	2.0	2.0	2.3	2.0	2.0	3.0	7.0
		max_score	0.0	17.0	74.5	83.0	100.0	100.0	100.0
		improve	0.0	0.0	35.0	25.0	59.0	83.0	100.0
		first_score	0.0	0.0	39.5	33.0	67.0	92.0	100.0
		tries_max	1.0	1.0	2.0	2.0	2.0	3.0	7.0
		post_max_tries	0.0	0.0	0.3	0.0	1.0	1.0	2.0
		first_time	1.0	2.0	20.7	15.0	34.0	48.0	57.0
		total_time	7.0	19.0	54.0	52.0	71.0	85.0	150.0
		best_time	1.0	9.0	27.0	25.0	40.0	49.0	57.0
10	169	tries	2.0	2.0	2.5	2.0	3.0	3.0	11.0
		max_score	0.0	30.0	83.6	100.0	100.0	100.0	100.0
		improve	0.0	0.0	42.1	40.0	60.0	80.0	100.0
		first_score	0.0	0.0	41.5	40.0	60.0	80.0	100.0
		tries_max	1.0	1.0	2.1	2.0	3.0	3.0	6.0
		post_max_tries	0.0	0.0	0.3	0.0	1.0	1.0	7.0
		first_time	1.0	7.0	27.6	25.0	40.0	53.0	60.0
		total_time	6.0	23.0	59.9	58.0	77.0	100.0	198.0
		best_time	1.0	7.0	23.0	19.0	32.0	42.0	60.0
11	146	tries	2.0	2.0	2.3	2.0	2.0	3.0	7.0
		max_score	0.0	60.0	81.0	80.0	100.0	100.0	100.0
		improve	0.0	0.0	32.3	30.0	40.0	60.0	100.0
		first_score	0.0	0.0	48.6	60.0	60.0	80.0	100.0
		tries_max	1.0	1.0	2.1	2.0	2.0	3.0	7.0
		post_max_tries	0.0	0.0	0.2	0.0	0.0	1.0	2.0
		first_time	1.0	5.0	24.7	24.0	35.0	48.0	60.0
		total_time	4.0	22.0	55.4	52.0	75.0	101.0	118.0
		best_time	1.0	9.0	26.2	22.0	38.0	51.0	59.0
12	194	tries	2.0	2.0	2.4	2.0	3.0	3.0	8.0
		max_score	0.0	50.0	73.6	75.0	92.0	100.0	100.0
		improve	0.0	0.0	28.3	25.0	42.0	59.0	100.0
		first_score	0.0	0.0	45.3	50.0	67.0	83.0	100.0
		tries_max	1.0	1.0	2.2	2.0	2.0	3.0	7.0
		post_max_tries	0.0	0.0	0.2	0.0	0.0	1.0	6.0
		first_time	1.0	2.0	20.9	17.0	32.0	47.0	59.0
		total_time	2.0	16.0	49.2	43.0	68.0	86.0	141.0
		best_time	1.0	5.0	21.8	17.0	32.0	50.0	58.0

Table 38									
2003 Sem2 Table of All Variables									
Tutorial	**N Obs**	**Variable**	**Minimum**	**10th Pctl**	**Mean**	**Median**	**75th Pctl**	**90th Pctl**	**Maximum**
13	548	tries	2.0	2.0	3.4	3.0	4.0	6.0	14.0
		max_score	0.0	33.0	75.3	83.0	100.0	100.0	100.0
		improve	0.0	0.0	48.3	50.0	83.0	100.0	100.0
		first_score	0.0	0.0	27.1	17.0	33.0	67.0	100.0
		tries_max	1.0	1.0	2.9	2.0	4.0	5.0	14.0
		post_max_tries	0.0	0.0	0.5	0.0	1.0	2.0	13.0
		first_time	1.0	5.0	21.7	20.5	30.0	40.0	60.0
		total_time	3.0	22.0	62.8	56.0	84.0	113.0	273.0
		best_time	1.0	7.0	19.1	17.0	26.0	34.0	57.0
14	110	tries	2.0	2.0	2.3	2.0	2.0	3.0	6.0
		max_score	0.0	86.0	93.5	100.0	100.0	100.0	100.0
		improve	0.0	0.0	24.1	9.0	33.0	90.0	100.0
		first_score	0.0	0.0	69.4	86.0	95.0	100.0	100.0
		tries_max	1.0	1.0	1.9	2.0	2.0	3.0	6.0
		post_max_tries	0.0	0.0	0.4	0.0	1.0	1.0	2.0
		first_time	1.0	4.0	21.9	19.5	32.0	45.0	60.0
		total_time	2.0	22.0	46.3	42.0	57.0	77.5	125.0
		best_time	1.0	8.0	20.9	18.0	26.0	36.5	60.0
15	489	tries	2.0	2.0	3.6	3.0	4.0	6.0	15.0
		max_score	0.0	33.0	80.0	100.0	100.0	100.0	100.0
		improve	0.0	0.0	62.0	65.0	100.0	100.0	100.0
		first_score	0.0	0.0	18.0	0.0	42.0	53.0	100.0
		tries_max	1.0	1.0	3.1	2.0	4.0	6.0	14.0
		post_max_tries	0.0	0.0	0.5	0.0	0.0	2.0	11.0
		first_time	1.0	2.0	7.3	5.0	9.0	15.0	41.0
		total_time	2.0	7.0	23.1	19.0	29.0	45.0	126.0
		best_time	1.0	2.0	6.2	5.0	7.0	12.0	42.0
16	173	tries	2.0	2.0	2.4	2.0	3.0	3.0	5.0
		max_score	0.0	48.0	48.6	48.0	48.0	48.0	72.0
		improve	0.0	0.0	4.0	0.0	1.0	15.0	55.0
		first_score	0.0	45.0	44.6	48.0	48.0	48.0	72.0
		tries_max	1.0	1.0	1.3	1.0	2.0	2.0	4.0
		post_max_tries	0.0	0.0	1.0	1.0	1.0	2.0	4.0
		first_time	1.0	3.0	18.3	16.0	27.0	41.0	58.0
		total_time	4.0	7.0	42.2	38.0	62.0	79.0	145.0
		best_time	2.0	4.0	19.1	17.0	27.0	39.0	59.0

APPENDIX D2:TUTORIAL_TEST IMPROVEMENTS 2004 SEMESTER 1

D2_1: FREQUENCY PROCEDURE - TEST TUTORIALS

Table 1			
2004 Sem1 Table of n_tests by n_tuts			
n_tests	**n_tuts**		
Frequency **Percent** **Row Pct** **Col Pct**	**15**	**16**	**Total**
3	2 1.32 7.14 33.33	26 17.11 92.86 17.81	28 18.42
4	4 2.63 3.23 66.67	120 78.95 96.77 82.19	124 81.58
Total	6 3.95	146 96.05	152 100.00

Table 2	
2004 Sem1 Table of Variables	
22 With Variables:	tut1_3 tut4_7 tut8_11 tut12_16 tut_total n_tuts tut1 tut2 tut3 tut4 tut5 tut6 tut7 tut8 tut9 tut10 tut11 tut12 tut13 tut14 tut15 tut16
7 Variables:	Test1 test2 test3 test4 test_tot4 best3 final

Table 3						
2004 Sem1 Table of Simple Statistics						
Variable	**N**	**Mean**	**Std Dev**	**Median**	**Minimum**	**Maximum**
tut1_3	152	269.46711	60.80246	297.00000	0	300.00000
tut4_7	152	362.78947	78.31391	397.00000	0	400.00000
tut8_11	152	260.15132	70.66466	300.00000	0	380.00000
tut12_16	152	90.91447	38.42615	100.00000	0	275.00000
tut_total	152	983.32237	191.95117	1066	300.00000	1343
n_tuts	152	15.96053	0.19536	16.00000	15.00000	16.00000
tut1	152	90.16447	18.78122	98.00000	0	100.00000
tut2	152	91.28289	23.77110	100.00000	0	100.00000
tut3	152	88.01974	28.79419	100.00000	0	100.00000
tut4	152	92.45395	19.57219	100.00000	0	100.00000
tut5	152	92.96053	21.77059	100.00000	0	100.00000
tut6	152	89.92105	25.84942	100.00000	0	100.00000
tut7	152	87.45395	29.16676	100.00000	0	100.00000
tut8	146	89.34932	26.47617	100.00000	0	100.00000
tut9	152	90.18421	28.59200	100.00000	0	100.00000
tut10	152	83.22368	32.21620	100.00000	0	100.00000
tut11	152	0.92105	8.08525	0	0	80.00000
tut12	152	1.59211	11.35132	0	0	92.00000
tut13	152	81.03289	36.29486	100.00000	0	100.00000
tut14	152	1.31579	11.43274	0	0	100.00000
tut15	152	0	0	0	0	0
tut16	152	6.97368	13.76431	0	0	40.00000
test1	151	64.71523	17.90843	60.00000	20.00000	100.00000
test2	148	49.45946	19.78743	50.00000	10.00000	100.00000
test3	144	58.75000	20.23896	60.00000	10.00000	100.00000
test4	137	54.24818	21.68416	50.00000	16.00000	100.00000
test_tot4	152	217.00000	56.31369	210.00000	90.00000	380.00000
best3	152	186.40789	43.12270	190.00000	80.00000	290.00000
final	152	69.37522	13.31403	71.15667	31.37333	96.85333

Table 4							
2004 Sem1 Table of spearman Correlation Coefficient							
Spearman Correlation Coefficients Prob > |r| under H0: Rho=0 Number of Observations							
	test1	test2	test3	test4	test_tot4	best3	final
tut1_3	0.23297 0.0040 151	0.02221 0.7887 148	0.17530 0.0356 144	0.08068 0.3487 137	0.24778 0.0021 152	0.22690 0.0049 152	0.34454 <.0001 152
tut4_7	0.16979 0.0371 151	0.07669 0.3542 148	0.18973 0.0227 144	0.22129 0.0094 137	0.31016 0.0001 152	0.28406 0.0004 152	0.41435 <.0001 152
tut8_11	0.10763 0.1884 151	0.10009 0.2262 148	0.22489 0.0067 144	0.18242 0.0329 137	0.26792 0.0008 152	0.26853 0.0008 152	0.42520 <.0001 152
tut12_16	-0.00464 0.9549 151	0.04225 0.6101 148	0.14976 0.0732 144	0.15927 0.0630 137	0.14624 0.0722 152	0.14852 0.0678 152	0.28173 0.0004 152
tut_total	0.12133 0.1378 151	0.08114 0.3269 148	0.25628 0.0019 144	0.20175 0.0181 137	0.33944 <.0001 152	0.30636 0.0001 152	0.47791 <.0001 152
n_tuts	0.16167 0.0473 151	0.07854 0.3427 148	0.15345 0.0663 144	0.05722 0.5066 137	0.20124 0.0129 152	0.18753 0.0207 152	0.23563 0.0035 152
tut1	0.21218 0.0089 151	-0.04254 0.6077 148	0.13215 0.1144 144	-0.03927 0.6487 137	0.15951 0.0497 152	0.14327 0.0783 152	0.24963 0.0019 152
tut2	0.21801 0.0072 151	0.16746 0.0419 148	0.13864 0.0975 144	0.16275 0.0574 137	0.30084 0.0002 152	0.25558 0.0015 152	0.36222 <.0001 152
tut3	0.17868 0.0282 151	0.10542 0.2023 148	0.13667 0.1024 144	0.13335 0.1203 137	0.26106 0.0012 152	0.24484 0.0024 152	0.36184 <.0001 152
tut4	0.13920 0.0883 151	0.11713 0.1563 148	0.18167 0.0293 144	0.10746 0.2114 137	0.22414 0.0055 152	0.20178 0.0127 152	0.29431 0.0002 152
tut5	-0.00715 0.9306 151	-0.00081 0.9922 148	0.14688 0.0790 144	0.09334 0.2780 137	0.14612 0.0724 152	0.13232 0.1042 152	0.23046 0.0043 152
tut6	0.16311 0.0454 151	-0.05163 0.5332 148	0.16895 0.0429 144	0.16248 0.0578 137	0.19276 0.0173 152	0.20262 0.0123 152	0.32099 <.0001 152
tut7	0.10199 0.2127 151	0.05261 0.5254 148	0.02578 0.7590 144	0.23206 0.0064 137	0.21854 0.0068 152	0.19379 0.0167 152	0.32322 <.0001 152

Table 4							
2004 Sem1 Table of spearman Correlation Coefficient							
Spearman Correlation Coefficients Prob > |r| under H0: Rho=0 Number of Observations							
	test1	test2	test3	test4	test_tot4	best3	final
tut8	0.08833 0.2908 145	0.13967 0.0962 143	0.23112 0.0062 139	0.21131 0.0154 131	0.24673 0.0027 146	0.26729 0.0011 146	0.36387 <.0001 146
tut9	0.08739 0.2860 151	0.04021 0.6275 148	0.08220 0.3274 144	0.15144 0.0773 137	0.16429 0.0431 152	0.17327 0.0328 152	0.29624 0.0002 152
tut10	0.05043 0.5386 151	0.05910 0.4755 148	0.12520 0.1349 144	0.09949 0.2474 137	0.17198 0.0341 152	0.15449 0.0574 152	0.25648 0.0014 152
tut11	-0.04025 0.6237 151	0.01022 0.9019 148	0.00749 0.9290 144	0.14255 0.0966 137	0.09210 0.2591 152	0.05699 0.4856 152	0.11556 0.1563 152
tut12	-0.01903 0.8166 151	0.01504 0.8561 148	-0.04816 0.5665 144	0.08508 0.3229 137	0.05807 0.4773 152	0.01072 0.8957 152	0.06052 0.4589 152
tut13	0.20203 0.0129 151	-0.03724 0.6531 148	0.06911 0.4105 144	0.29925 0.0004 137	0.16906 0.0373 152	0.21394 0.0081 152	0.32040 <.0001 152
tut14	-0.03975 0.6280 151	0.00972 0.9067 148	0.00795 0.9246 144	0.14256 0.0966 137	0.09223 0.2584 152	0.05737 0.4827 152	0.11580 0.1554 152
tut15	. . 151	. . 148	. . 144	. . 137	. . 152	. . 152	. . 152
tut16	-0.21570 0.0078 151	0.09930 0.2298 148	0.17554 0.0353 144	-0.36179 <.0001 137	-0.06639 0.4164 152	-0.09955 0.2224 152	-0.11180 0.1703 152

Table 5			
2004 Sem1 Table of Moments			
N	152	Sum Weights	152
Mean	983.322368	Sum Observations	149465
Std Deviation	191.951173	Variance	36845.253
Skewness	-1.8036639	Kurtosis	2.93874231
Uncorrected SS	152535911	Corrected SS	5563633.2
Coeff Variation	19.520676	Std Error Mean	15.5692961

Table 6			
2004 Sem1 Table of Basic Statistical Measures			
Location		Variability	
Mean	983.322	Std Deviation	191.95117
Median	1066.000	Variance	36845
Mode	1100.000	Range	1043
		Interquartile Range	147.50000

Table 7				
2004 Sem1 Table of Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	63.15779	Pr > |t|	<.0001
Sign	M	76	Pr >= |M|	<.0001
Signed Rank	S	5814	Pr >= |S|	<.0001

Table 8	
2004 Sem1 Table of Quantile Estiamtes	
Quantiles (Definition 5)	
Quantile	Estimate
100% Max	1343.0
99%	1320.0
95%	1112.0
90%	1100.0
75% Q3	1098.0
50% Median	1066.0
25% Q1	950.5
10%	726.0
5%	504.0
1%	354.0
0% Min	300.0

Table 9			
2004 Sem1 Table of Extreme Observations			
Lowest		Highest	
Value	Obs	Value	Obs
300	112	1122	7
354	145	1140	30
363	24	1140	120
373	117	1320	74
421	45	1343	148

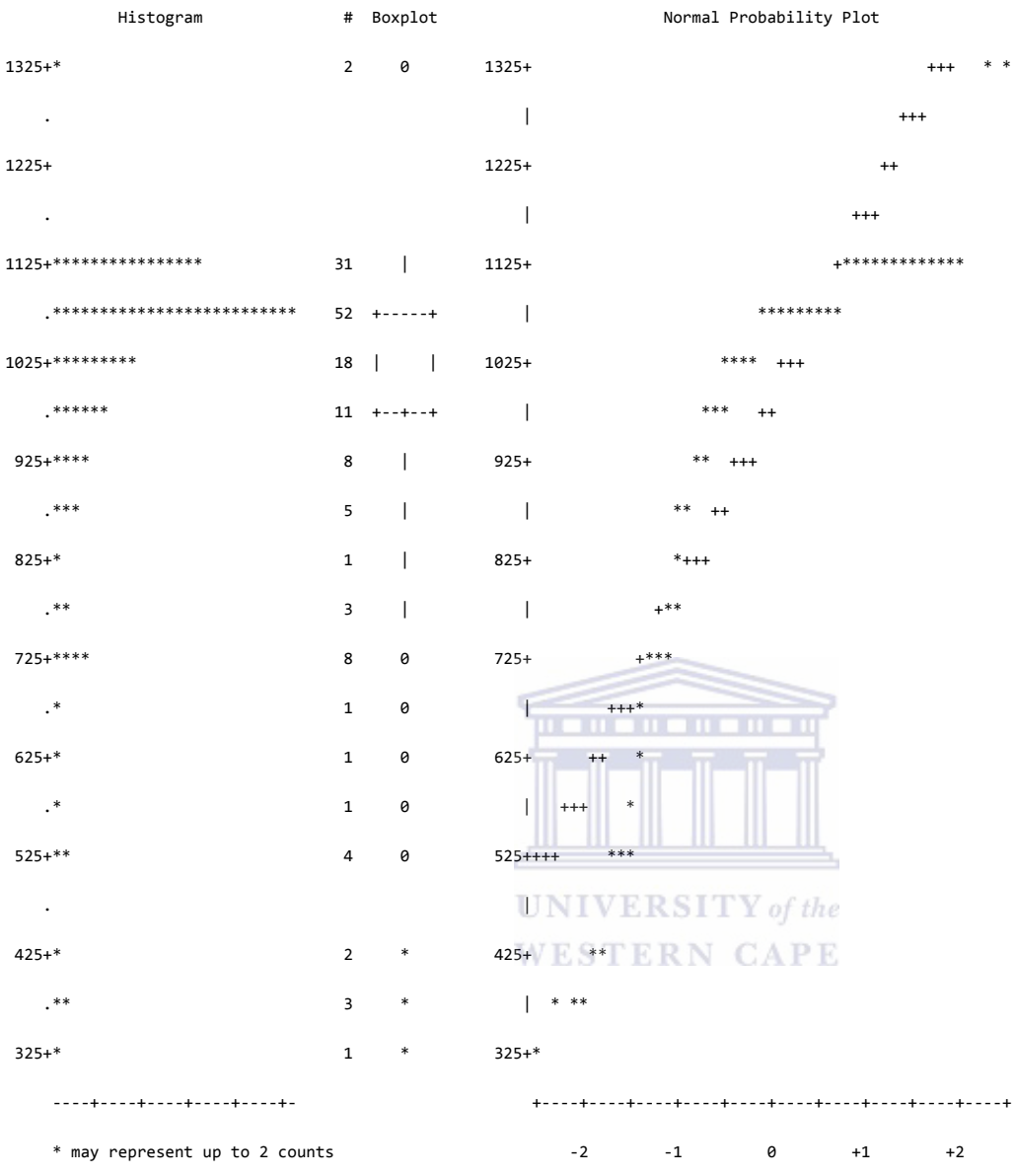


Figure 53: 2004 First Semester Normal Probability Plots for Tutorial Total

D2_3: UNIVARIATE PROCEDURE - BEST 3

Table 10			
2004 Sem1 Table of Moments			
N	152	**Sum Weights**	152
Mean	217	**Sum Observations**	32984
Std Deviation	56.3136909	**Variance**	3171.23179
Skewness	0.28562269	**Kurtosis**	-0.010223
Uncorrected SS	7636384	**Corrected SS**	478856
Coeff Variation	25.9510097	**Std Error Mean**	4.56764349

Table 11			
2004 Sem1 Table of Basic Statistical Measures			
Location		**Variability**	
Mean	217.0000	**Std Deviation**	56.31369
Median	210.0000	**Variance**	3171
Mode	210.0000	**Range**	290.00000
		Interquartile Range	83.00000

Table 12				
2004 Sem1 Table of Tests for Location: Mu0=0				
Test	**Statistic**		**p Value**	
Student's t	**t**	47.50809	**Pr > |t|**	<.0001
Sign	**M**	76	**Pr >= |M|**	<.0001
Signed Rank	**S**	5814	**Pr >= |S|**	<.0001

Table 13	
2004 Sem1 table of Quantile Estimates	
Quantiles (Definition 5)	
Quantile	Estimate
100% Max	380
99%	360
95%	320
90%	290
75% Q3	255
50% Median	210
25% Q1	172
10%	150
5%	120
1%	96
0% Min	90

Table 14			
2004 Sem1 Table of Extreme Observations			
Lowest		Highest	
Value	Obs	Value	Obs
90	20	330	41
96	151	340	57
104	5	340	142
110	119	360	27
110	112	380	136

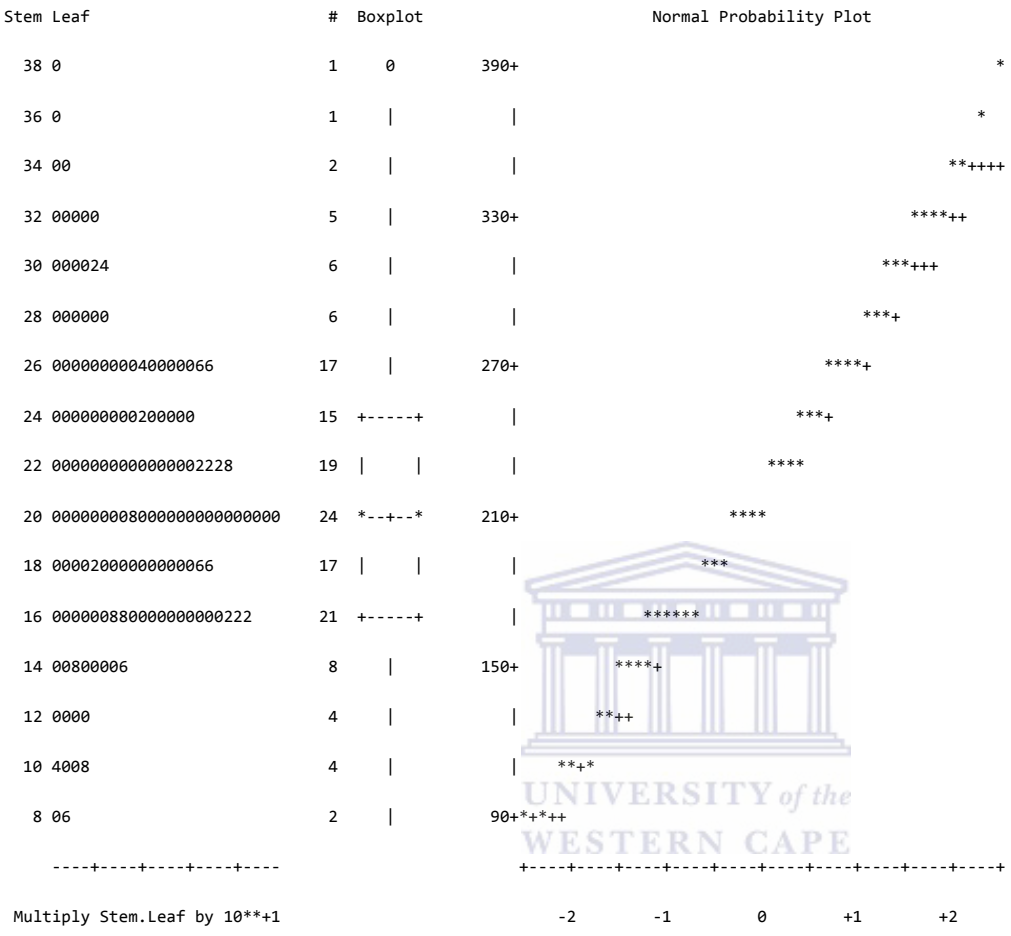


Figure 54: 2004 First Semester Normal Probability Plots for Best3

D2_4: UNIVARIATE PROCEDURE – FINAL

Table 15			
2004 Sem1 Table of Moments			
N	152	**Sum Weights**	152
Mean	186.407895	**Sum Observations**	28334
Std Deviation	43.1227042	**Variance**	1859.56762
Skewness	-0.0040871	**Kurtosis**	-0.3631877
Uncorrected SS	5562476	**Corrected SS**	280794.711
Coeff Variation	23.1335182	**Std Error Mean**	3.49771318

Table 16			
2004 Sem1 Table of Basic Statistical Measures			
Location		**Variability**	
Mean	186.4079	**Std Deviation**	43.12270
Median	190.0000	**Variance**	1860
Mode	220.0000	**Range**	210.00000
		Interquartile Range	60.00000

Table 17				
2004 Sem1 Table of Tests for Location: Mu0=0				
Test	**Statistic**		**p Value**	
Student's t	**T**	53.29422	**Pr > |t|**	<.0001
Sign	**M**	76	**Pr >= |M|**	<.0001
Signed Rank	**S**	5814	**Pr >= |S|**	<.0001

Table 18	
2004 Sem1 Table of Quantile Estimates	
Quantiles (Definition 5)	
Quantile	Estimate
100% Max	290
99%	290
95%	260
90%	240
75% Q3	220
50% Median	190
25% Q1	160
10%	130
5%	118
1%	90
0% Min	80

Table 19			
2004 Sem1 Table of Extreme Observations			
Lowest		Highest	
Value	Obs	Value	Obs
80	151	270	57
90	20	270	104
100	119	280	27
100	1	290	136
104	5	290	142

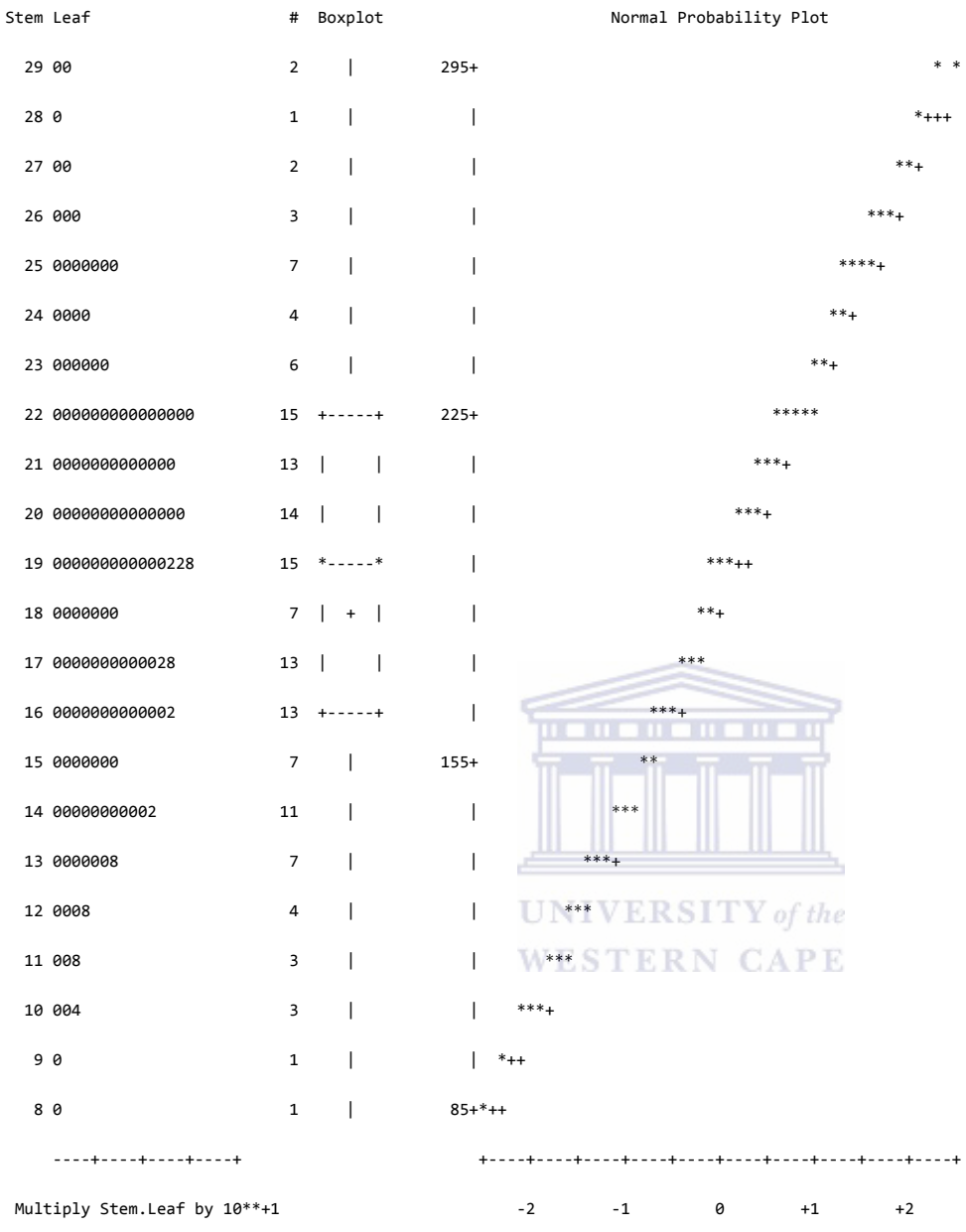


Figure 55: 2004 First Semester Normal Probability Plots for Final

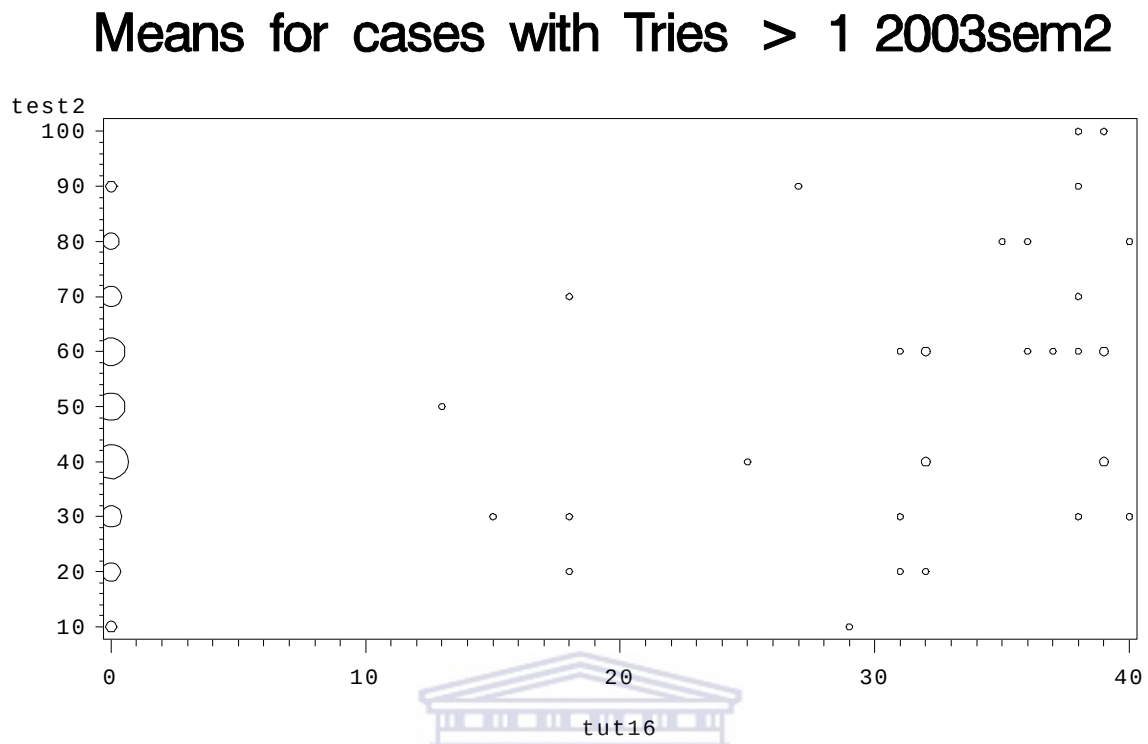


Figure 56: 2004 First Semester Dot Plot for Means of Final

Figure 57: 2004 First Semester

D2_5: UNIVARIATE PROCEDURE – SCORE

Table 20			
2004 Sem1 Table of Moments			
N	5146	**Sum Weights**	5146
Mean	72.1245628	**Sum Observations**	371153
Std Deviation	35.218411	**Variance**	1240.33647
Skewness	-1.0017494	**Kurtosis**	-0.4630078
Uncorrected SS	33150779	**Corrected SS**	6381531.16
Coeff Variation	48.829982	**Std Error Mean**	0.49094729

Table 21			
2004 Sem1 Table of Basic Statistical Measures			
Location		**Variability**	
Mean	72.1246	**Std Deviation**	35.21841
Median	90.0000	**Variance**	1240
Mode	100.0000	**Range**	100.00000
		Interquartile Range	50.00000

Table 22	
2004 Sem1 Table of Quantile Estimates	
Quantiles (Definition 5)	
Quantile	Estimate
100% Max	100
99%	100
95%	100
90%	100
75% Q3	100
50% Median	90
25% Q1	50
10%	0
5%	0
1%	0
0% Min	0

Table 23				
2004 Sem1 Table of Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	T	146.909	Pr > |t|	<.0001
Sign	M	2298.5	Pr >= |M|	<.0001
Signed Ran			S|	<.0001

Table 24			
2004 Sem1 Table of Extreme Observations			
Lowest		Highest	
Value	Obs	Value	Obs
0	5132	100	5140
0	5131	100	5141
0	5124	100	5143
0	5115	100	5144
0	5112	100	5146

```
                    Histogram                        #  Boxplot
102.5+************************************************  2233  +-----+
     .****                                            155  |     |
 92.5+*****                                           225  *-----*
     .****                                            169  |     |
 82.5+*********                                       420  |     |
     .***                                             122  |     |
 72.5+*                                                47  |  +  |
     .***                                             125  |     |
 62.5+**                                               80  |     |
     .**                                               66  |     |
 52.5+*****                                           220  +-----+
     .****                                            164     |
 42.5+**                                               93     |
     .*                                                19     |
```

```
32.5+****                                          158     |
    .**                                             50     |
22.5+*                                              35     |
    .**                                             93     |
12.5+**                                             73     |
    .*                                              35     |
 2.5+***********                                   564     |
     ----+----+----+----+----+----+----+----+----+---
     * may represent up to 47 counts
```

Figure 58: 2004 First Semester Histogram for Score

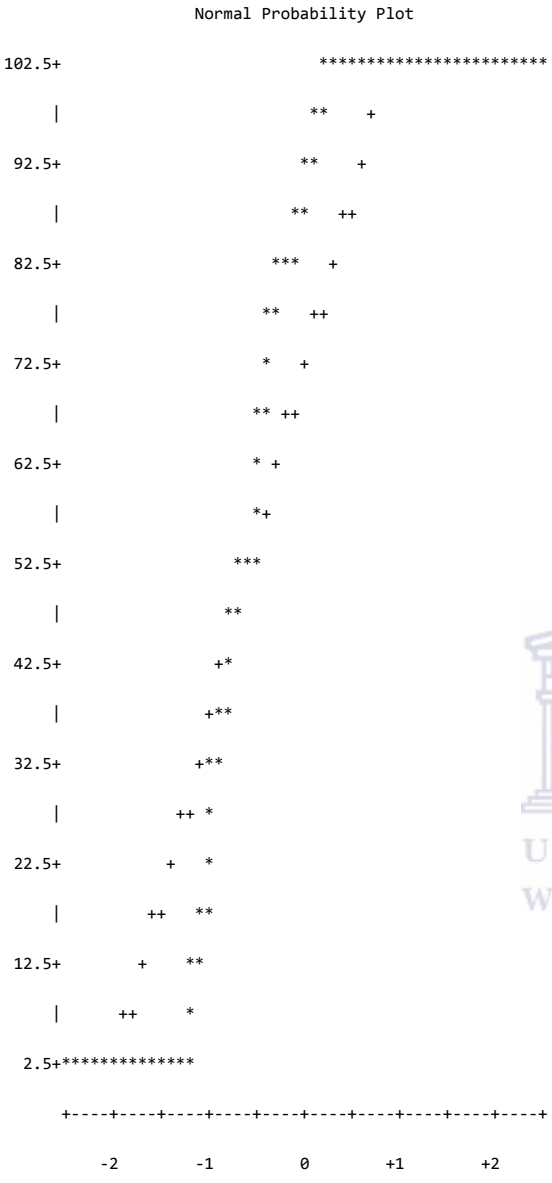


Figure 59: 2004 First Semester Normal Probability Plot for Score

D2_6: UNIVARIATE PROCEDURE - TIME

Table 25			
2004 Sem1 Table of Moments			
N	5146	**Sum Weights**	5146
Mean	20.338904	**Sum Observations**	104664
Std Deviation	16.241131	**Variance**	263.774335
Skewness	0.64503877	**Kurtosis**	-0.611101
Uncorrected SS	3485870	**Corrected SS**	1357118.95
Coeff Variation	79.8525375	**Std Error Mean**	0.22640258

Table 26			
2004 Sem1 Tables of Basic Statistical Measures			
Location		Variability	
Mean	20.33890	Std Deviation	16.24113
Median	17.00000	Variance	263.77433
Mode	0.00000	Range	60.00000
		Interquartile Range	26.00000

Table 27				
2004 Sem1 Tables of Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	89.83512	Pr > |t|	<.0001
Sign	M	2413.5	Pr >= |M|	<.0001
Signed Rank	S	5826189	Pr >= |S|	<.0001

Table 28	
2004 Sem1 Table of Quantile Estimates	
Quantiles (Definition 5)	
Quantile	Estimate
100% Max	60
99%	59
95%	52
90%	46
75% Q3	32
50% Median	17
25% Q1	6
10%	2
5%	0
1%	0
0% Min	0

Table 29			
2004 Sem1 Table of Extreme Observations			
Lowest		Highest	
Value	Obs	Value	Obs
0	5132	60	4266
0	5131	60	4419
0	5126	60	4742
0	5124	60	5099
0	5115	60	5145

62.5+** 23 |

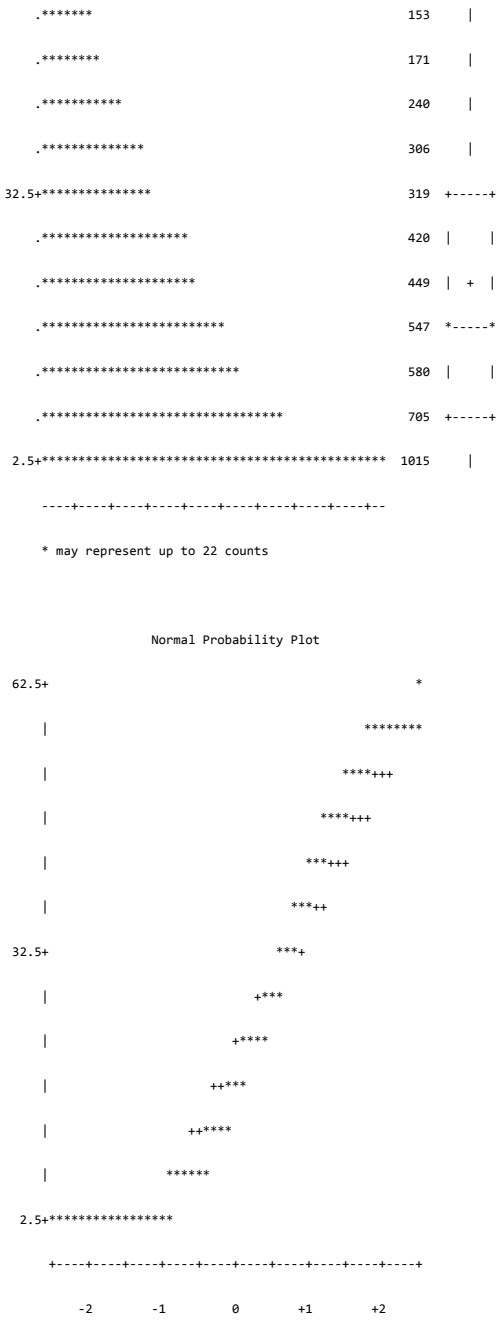


Figure 60: 2004 First Semester Normal Probability Plots for Time

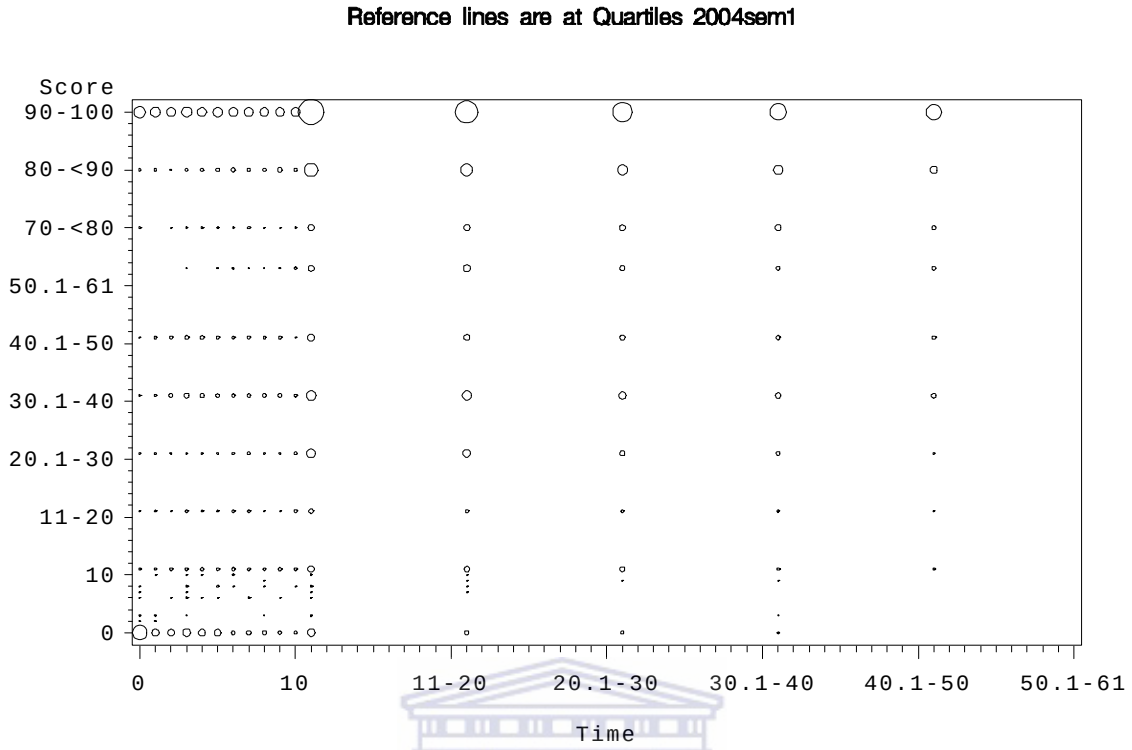


Figure 61: 2004 First Semester

Table 30												
2004 Sem1 Table of Tutorial by Score												
Tutorial	**Score**											
Frequency Percent Row Pct Col Pct	**0**	**2**	**3**	**6**	**7**	**8**	**9**	**10**	**11-20**	**20.1-30**	**30.1-40**	**40.1-50**
1	4 0.08 1.48 0.73	1 0.02 0.37 33.33	0 0.00 0.00 0.00	0 0.00 0.00 0.00	1 0.02 0.37 25.00	0 0.00 0.00 0.00	4 0.08 1.48 100.00	0 0.00 0.00 0.00	4 0.08 1.48 2.29	3 0.06 1.11 4.11	11 0.21 4.06 5.29	26 0.51 9.59 6.97
2	15 0.29 3.72 2.73	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	21 0.41 5.21 28.77	0 0.00 0.00 0.00	72 1.40 17.87 19.30
3	42 0.82 13.08 7.65	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	39 0.76 12.15 22.29	12 0.23 3.74 16.44	0 0.00 0.00 0.00	15 0.29 4.67 4.02
4	6 0.12 1.82 1.09	0 0.00 0.00 0.00	5 0.10 1.52 41.67	0 0.00 0.00 0.00	3 0.06 0.91 75.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	5 0.10 1.52 55.56	2 0.04 0.61 1.14	3 0.06 0.91 4.11	6 0.12 1.82 2.88	6 0.12 1.82 1.61
5	7 0.14 2.06 1.28	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	1 0.02 0.29 11.11	0 0.00 0.00 0.00	4 0.08 1.18 5.48	5 0.10 1.47 2.40	1 0.02 0.29 0.27
6	19 0.37 6.01 3.46	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	8 0.16 2.53 4.57	7 0.14 2.22 9.59	8 0.16 2.53 3.85	14 0.27 4.43 3.75
7	22 0.43 6.40 4.01	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	5 0.10 1.45 2.86	5 0.10 1.45 6.85	4 0.08 1.16 1.92	4 0.08 1.16 1.07
8	13 0.25 5.73 2.37	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	6 0.12 2.64 42.86	0 0.00 0.00 0.00	0 0.00 0.00 0.00	4 0.08 1.76 2.29	3 0.06 1.32 4.11	4 0.08 1.76 1.92	5 0.10 2.20 1.34
9	13 0.25 3.44 2.37	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	3 0.06 0.79 1.71	0 0.00 0.00 0.00	0 0.00 0.00 0.00	5 0.10 1.32 1.34
10	9 0.17 4.04 1.64	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	1 0.02 0.45 11.11	8 0.16 3.59 4.57	0 0.00 0.00 0.00	19 0.37 8.52 9.13	0 0.00 0.00 0.00
11	12 0.23 4.43 2.19	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	1 0.02 0.37 11.11	10 0.19 3.69 5.71	1 0.02 0.37 1.37	12 0.23 4.43 5.77	0 0.00 0.00 0.00

Table 30												
2004 Sem1 Table of Tutorial by Score												
Tutorial	**Score**											
Frequency Percent Row Pct Col Pct	**0**	**2**	**3**	**6**	**7**	**8**	**9**	**10**	**11-20**	**20.1-30**	**30.1-40**	**40.1-50**
12	17 0.33 6.20 3.10	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	4 0.08 1.46 28.57	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	4 0.08 1.46 5.48	12 0.23 4.38 5.77	18 0.35 6.57 4.83
13	113 2.20 18.99 20.58	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	74 1.44 12.44 42.29	0 0.00 0.00 0.00	121 2.35 20.34 58.17	48 0.93 8.07 12.87
14	14 0.27 6.93 2.55	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	1 0.02 0.50 11.11	1 0.02 0.50 0.57	0 0.00 0.00 0.00	1 0.02 0.50 0.48	0 0.00 0.00 0.00
15	227 4.41 48.09 41.35	0 0.00 0.00 0.00	4 0.08 0.85 33.33	13 0.25 2.75 100.00	0 0.00 0.00 0.00	4 0.08 0.85 28.57	0 0.00 0.00 0.00	0 0.00 0.00 0.00	15 0.29 3.18 8.57	6 0.12 1.27 8.22	4 0.08 0.85 1.92	15 0.29 3.18 4.02
16	16 0.31 8.94 2.91	2 0.04 1.12 66.67	3 0.06 1.68 25.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	2 0.04 1.12 1.14	4 0.08 2.23 5.48	1 0.02 0.56 0.48	144 2.80 80.45 38.61
Total	549 10.67	3 0.06	12 0.23	13 0.25	4 0.08	14 0.27	4 0.08	9 0.17	175 3.40	73 1.42	208 4.04	373 7.25

Table 31						
2004 Sem1 Table of Tutorial by Score						
Tutorial	Score					
Frequency Percent Row Pct Col Pct	50.1-61	61.1-<70	70-<80	80-<90	90-100	Total
1	8 0.16 2.95 3.96	10 0.19 3.69 7.35	23 0.45 8.49 13.61	29 0.56 10.70 4.92	147 2.86 54.24 5.63	271 5.27
2	0 0.00 0.00 0.00	0 0.00 0.00 0.00	22 0.43 5.46 13.02	0 0.00 0.00 0.00	273 5.31 67.74 10.45	403 7.83
3	5 0.10 1.56 2.48	0 0.00 0.00 0.00	6 0.12 1.87 3.55	15 0.29 4.67 2.55	187 3.63 58.26 7.16	321 6.24
4	7 0.14 2.12 3.47	1 0.02 0.30 0.74	8 0.16 2.42 4.73	17 0.33 5.15 2.89	261 5.07 79.09 9.99	330 6.41
5	9 0.17 2.65 4.46	0 0.00 0.00 0.00	6 0.12 1.76 3.55	17 0.33 5.00 2.89	290 5.64 85.29 11.10	340 6.61
6	1 0.02 0.32 0.50	6 0.12 1.90 4.41	16 0.31 5.06 9.47	15 0.29 4.75 2.55	222 4.31 70.25 8.50	316 6.14
7	6 0.12 1.74 2.97	13 0.25 3.78 9.56	15 0.29 4.36 8.88	68 1.32 19.77 11.54	202 3.93 58.72 7.73	344 6.68
8	4 0.08 1.76 1.98	7 0.14 3.08 5.15	7 0.14 3.08 4.14	11 0.21 4.85 1.87	163 3.17 71.81 6.24	227 4.41
9	11 0.21 2.91 5.45	0 0.00 0.00 0.00	4 0.08 1.06 2.37	23 0.45 6.08 3.90	319 6.20 84.39 12.21	378 7.35
10	23 0.45 10.31 11.39	0 0.00 0.00 0.00	0 0.00 0.00 0.00	23 0.45 10.31 3.90	140 2.72 62.78 5.36	223 4.33
11	35 0.68 12.92 17.33	0 0.00 0.00 0.00	4 0.08 1.48 2.37	196 3.81 72.32 33.28	0 0.00 0.00 0.00	271 5.27

Table 31						
2004 Sem1 Table of Tutorial by Score						
Tutorial	Score					
Frequency Percent Row Pct Col Pct	50.1-61	61.1-<70	70-<80	80-<90	90-100	Total
12	22 0.43 8.03 10.89	44 0.86 16.06 32.35	50 0.97 18.25 29.59	47 0.91 17.15 7.98	56 1.09 20.44 2.14	274 5.32
13	0 0.00 0.00 0.00	50 0.97 8.40 36.76	0 0.00 0.00 0.00	94 1.83 15.80 15.96	95 1.85 15.97 3.64	595 11.56
14	2 0.04 0.99 0.99	1 0.02 0.50 0.74	4 0.08 1.98 2.37	19 0.37 9.41 3.23	159 3.09 78.71 6.08	202 3.93
15	66 1.28 13.98 32.67	2 0.04 0.42 1.47	2 0.04 0.42 1.18	15 0.29 3.18 2.55	99 1.92 20.97 3.79	472 9.17
16	3 0.06 1.68 1.49	2 0.04 1.12 1.47	2 0.04 1.12 1.18	0 0.00 0.00 0.00	0 0.00 0.00 0.00	179 3.48
Total	202 3.93	136 2.64	169 3.28	589 11.45	2613 50.78	5146 100.00

Table 32												
2004 Sem1 Table of Tutorial by Time												
Tutorial	**Time**											
Frequency **Percent** **Row Pct** **Col Pct**	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11-20**
1	3 0.06 1.11 0.94	0 0.00 0.00 0.00	1 0.02 0.37 0.66	0 0.00 0.00 0.00	0 0.00 0.00 0.00	1 0.02 0.37 0.60	0 0.00 0.00 0.00	0 0.00 0.00 0.00	2 0.04 0.74 1.59	1 0.02 0.37 0.76	1 0.02 0.37 0.81	29 0.56 10.70 2.66
2	7 0.14 1.74 2.19	6 0.12 1.49 3.75	11 0.21 2.73 7.28	24 0.47 5.96 11.27	16 0.31 3.97 9.30	17 0.33 4.22 10.18	30 0.58 7.44 22.22	23 0.45 5.71 15.86	12 0.23 2.98 9.52	15 0.29 3.72 11.36	24 0.47 5.96 19.51	100 1.94 24.81 9.16
3	19 0.37 5.92 5.96	2 0.04 0.62 1.25	4 0.08 1.25 2.65	7 0.14 2.18 3.29	1 0.02 0.31 0.58	3 0.06 0.93 1.80	2 0.04 0.62 1.48	2 0.04 0.62 1.38	3 0.06 0.93 2.38	3 0.06 0.93 2.27	8 0.16 2.49 6.50	61 1.19 19.00 5.59
4	6 0.12 1.82 1.88	1 0.02 0.30 0.63	0 0.00 0.00 0.00	2 0.04 0.61 0.94	4 0.08 1.21 2.33	3 0.06 0.91 1.80	4 0.08 1.21 2.96	9 0.17 2.73 6.21	10 0.19 3.03 7.94	9 0.17 2.73 6.82	6 0.12 1.82 4.88	81 1.57 24.55 7.42
5	5 0.10 1.47 1.57	5 0.10 1.47 3.13	8 0.16 2.35 5.30	10 0.19 2.94 4.69	18 0.35 5.29 10.47	18 0.35 5.29 10.78	13 0.25 3.82 9.63	17 0.33 5.00 11.72	15 0.29 4.41 11.90	21 0.41 6.18 15.91	15 0.29 4.41 12.20	107 2.08 31.47 9.80
6	13 0.25 4.11 4.08	1 0.02 0.32 0.63	4 0.08 1.27 2.65	5 0.10 1.58 2.35	10 0.19 3.16 5.81	10 0.19 3.16 5.99	5 0.10 1.58 3.70	10 0.19 3.16 6.90	7 0.14 2.22 5.56	9 0.17 2.85 6.82	9 0.17 2.85 7.32	70 1.36 22.15 6.41
7	9 0.17 2.62 2.82	6 0.12 1.74 3.75	8 0.16 2.33 5.30	9 0.17 2.62 4.23	7 0.14 2.03 4.07	11 0.21 3.20 6.59	12 0.23 3.49 8.89	9 0.17 2.62 6.21	10 0.19 2.91 7.94	11 0.21 3.20 8.33	7 0.14 2.03 5.69	98 1.90 28.49 8.97
8	12 0.23 5.29 3.76	1 0.02 0.44 0.63	1 0.02 0.44 0.66	2 0.04 0.88 0.94	0 0.00 0.00 0.00	2 0.04 0.88 1.20	2 0.04 0.88 1.48	2 0.04 0.88 1.38	0 0.00 0.00 0.00	1 0.02 0.44 0.76	2 0.04 0.88 1.63	39 0.76 17.18 3.57
9	126 2.45 33.33 39.50	82 1.59 21.69 51.25	33 0.64 8.73 21.85	25 0.49 6.61 11.74	9 0.17 2.38 5.23	15 0.29 3.97 8.98	5 0.10 1.32 3.70	3 0.06 0.79 2.07	10 0.19 2.65 7.94	3 0.06 0.79 2.27	6 0.12 1.59 4.88	30 0.58 7.94 2.75
10	3 0.06 1.35 0.94	3 0.06 1.35 1.88	0 0.00 0.00 0.00	2 0.04 0.90 0.94	1 0.02 0.45 0.58	2 0.04 0.90 1.20	3 0.06 1.35 2.22	2 0.04 0.90 1.38	2 0.04 0.90 1.59	1 0.02 0.45 0.76	3 0.06 1.35 2.44	43 0.84 19.28 3.94
11	9 0.17 3.32 2.82	3 0.06 1.11 1.88	1 0.02 0.37 0.66	0 0.00 0.00 0.00	3 0.06 1.11 1.74	5 0.10 1.85 2.99	8 0.16 2.95 5.93	7 0.14 2.58 4.83	10 0.19 3.69 7.94	7 0.14 2.58 5.30	7 0.14 2.58 5.69	73 1.42 26.94 6.68

Table 32												
2004 Sem1 Table of Tutorial by Time												
Tutorial	**Time**											
Frequency **Percent** **Row Pct** **Col Pct**	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11-20**
12	12 0.23 4.38 3.76	8 0.16 2.92 5.00	2 0.04 0.73 1.32	4 0.08 1.46 1.88	4 0.08 1.46 2.33	3 0.06 1.09 1.80	2 0.04 0.73 1.48	4 0.08 1.46 2.76	7 0.14 2.55 5.56	4 0.08 1.46 3.03	7 0.14 2.55 5.69	41 0.80 14.96 3.75
13	16 0.31 2.69 5.02	13 0.25 2.18 8.13	17 0.33 2.86 11.26	22 0.43 3.70 10.33	20 0.39 3.36 11.63	19 0.37 3.19 11.38	15 0.29 2.52 11.11	23 0.45 3.87 15.86	15 0.29 2.52 11.90	23 0.45 3.87 17.42	17 0.33 2.86 13.82	189 3.67 31.76 17.31
14	7 0.14 3.47 2.19	2 0.04 0.99 1.25	1 0.02 0.50 0.66	1 0.02 0.50 0.47	1 0.02 0.50 0.58	2 0.04 0.99 1.20	3 0.06 1.49 2.22	5 0.10 2.48 3.45	0 0.00 0.00 0.00	3 0.06 1.49 2.27	3 0.06 1.49 2.44	57 1.11 28.22 5.22
15	55 1.07 11.65 17.24	22 0.43 4.66 13.75	55 1.07 11.65 36.42	87 1.69 18.43 40.85	67 1.30 14.19 38.95	49 0.95 10.38 29.34	24 0.47 5.08 17.78	25 0.49 5.30 17.24	18 0.35 3.81 14.29	17 0.33 3.60 12.88	5 0.10 1.06 4.07	42 0.82 8.90 3.85
16	17 0.33 9.50 5.33	5 0.10 2.79 3.13	5 0.10 2.79 3.31	13 0.25 7.26 6.10	11 0.21 6.15 6.40	7 0.14 3.91 4.19	7 0.14 3.91 5.19	4 0.08 2.23 2.76	5 0.10 2.79 3.97	4 0.08 2.23 3.03	3 0.06 1.68 2.44	32 0.62 17.88 2.93
Total	319 6.20	160 3.11	151 2.93	213 4.14	172 3.34	167 3.25	135 2.62	145 2.82	126 2.45	132 2.57	123 2.39	1092 21.22

Table 33					
2004 Sem1 Table of Tutorial by Time					
Tutorial	Time				
Frequency Percent Row Pct Col Pct	20.1-30	30.1-40	40.1-50	50.1-61	Total
1	61 1.19 22.51 7.17	69 1.34 25.46 11.29	52 1.01 19.19 11.87	51 0.99 18.82 16.40	271 5.27
2	64 1.24 15.88 7.52	34 0.66 8.44 5.56	11 0.21 2.73 2.51	9 0.17 2.23 2.89	403 7.83
3	70 1.36 21.81 8.23	61 1.19 19.00 9.98	40 0.78 12.46 9.13	35 0.68 10.90 11.25	321 6.24
4	64 1.24 19.39 7.52	49 0.95 14.85 8.02	42 0.82 12.73 9.59	40 0.78 12.12 12.86	330 6.41
5	49 0.95 14.41 5.76	23 0.45 6.76 3.76	8 0.16 2.35 1.83	8 0.16 2.35 2.57	340 6.61
6	58 1.13 18.35 6.82	36 0.70 11.39 5.89	44 0.86 13.92 10.05	25 0.49 7.91 8.04	316 6.14
7	55 1.07 15.99 6.46	42 0.82 12.21 6.87	28 0.54 8.14 6.39	22 0.43 6.40 7.07	344 6.68
8	44 0.86 19.38 5.17	47 0.91 20.70 7.69	47 0.91 20.70 10.73	25 0.49 11.01 8.04	227 4.41
9	20 0.39 5.29 2.35	7 0.14 1.85 1.15	3 0.06 0.79 0.68	1 0.02 0.26 0.32	378 7.35

Table 33					
2004 Sem1 Table of Tutorial by Time					
Tutorial	Time				
Frequency Percent Row Pct Col Pct	20.1-30	30.1-40	40.1-50	50.1-61	Total
10	40 0.78 17.94 4.70	43 0.84 19.28 7.04	37 0.72 16.59 8.45	38 0.74 17.04 12.22	223 4.33
11	57 1.11 21.03 6.70	32 0.62 11.81 5.24	31 0.60 11.44 7.08	18 0.35 6.64 5.79	271 5.27
12	50 0.97 18.25 5.88	53 1.03 19.34 8.67	49 0.95 17.88 11.19	24 0.47 8.76 7.72	274 5.32
13	131 2.55 22.02 15.39	55 1.07 9.24 9.00	15 0.29 2.52 3.42	5 0.10 0.84 1.61	595 11.56
14	55 1.07 27.23 6.46	32 0.62 15.84 5.24	22 0.43 10.89 5.02	8 0.16 3.96 2.57	202 3.93
15	4 0.08 0.85 0.47	1 0.02 0.21 0.16	0 0.00 0.00 0.00	1 0.02 0.21 0.32	472 9.17
16	29 0.56 16.20 3.41	27 0.52 15.08 4.42	9 0.17 5.03 2.05	1 0.02 0.56 0.32	179 3.48
Total	851 16.54	611 11.87	438 8.51	311 6.04	5146 100.00

D2_7: CORR PROCEDURE - TIME & SCORE

Table 34	
2004 Sem1 Table of two Variables	
2 Variables:	Time Score

Table 35						
2004 Sem1 Tables Simple Statistics						
Variable	**N**	**Mean**	**Std Dev**	**Median**	**Minimum**	**Maximum**
Time	5146	20.33890	16.24113	17.00000	0	60.00000
Score	5146	72.12456	35.21841	90.00000	0	100.00000

Table 36		
2004 Sem1 Table with Spearman Correlation Coefficient of Time & Score		
Spearman Correlation Coefficients, N = 5146 Prob > |r| under H0: Rho=0		
	Time	**Score**
Time	1.00000	0.20072 <.0001
Score	0.20072 <.0001	1.00000

D2_8: MEANS PROCEDURE - ALL VARIABLES

Table 37									
2004 Sem1 Table of All Variables									
Tutorial	**N Obs**	**Variable**	**Minimum**	**10th Pctl**	**Mean**	**Median**	**75th Pctl**	**90th Pctl**	**Maximum**
1	60	tries	2.0	2.0	2.3	2.0	2.5	3.0	5.0
		max_score	63.0	73.0	91.2	95.5	100.0	100.0	100.0
		improve	0.0	0.0	28.8	27.0	50.0	60.0	100.0
		first_score	0.0	24.0	62.4	62.0	94.5	98.0	100.0
		tries_max	1.0	1.0	2.1	2.0	2.0	3.0	5.0
		post_max_tries	0.0	0.0	0.2	0.0	0.0	1.0	2.0
		first_time	8.0	20.5	38.1	38.0	48.0	55.0	60.0
		total_time	26.0	50.5	80.3	74.0	94.5	117.0	196.0
		best_time	11.0	17.5	33.6	35.0	43.0	47.0	58.0
2	82	tries	2.0	2.0	2.5	2.0	3.0	3.0	6.0
		max_score	25.0	50.0	92.1	100.0	100.0	100.0	100.0
		improve	0.0	0.0	34.5	50.0	50.0	75.0	100.0
		first_score	0.0	25.0	57.6	50.0	75.0	100.0	100.0
		tries_max	1.0	1.0	1.9	2.0	2.0	3.0	4.0
		post_max_tries	0.0	0.0	0.5	0.0	1.0	1.0	5.0
		first_time	1.0	3.0	17.0	14.0	22.0	34.0	56.0
		total_time	3.0	11.0	34.0	30.0	48.0	63.0	110.0
		best_time	1.0	3.0	13.0	11.0	17.0	26.0	52.0
3	52	tries	2.0	2.0	2.7	2.0	3.0	5.0	6.0
		max_score	14.0	71.0	91.2	100.0	100.0	100.0	100.0
		improve	0.0	0.0	48.1	57.0	86.0	86.0	100.0
		first_score	0.0	0.0	43.1	29.0	86.0	100.0	100.0
		tries_max	1.0	1.0	2.3	2.0	3.0	4.0	6.0
		post_max_tries	0.0	0.0	0.4	0.0	1.0	1.0	4.0
		first_time	2.0	10.0	28.2	25.5	39.0	48.0	60.0
		total_time	30.0	40.0	68.7	67.5	87.0	106.0	119.0
		best_time	8.0	16.0	31.3	29.0	44.0	54.0	59.0
4	65	tries	2.0	2.0	2.4	2.0	3.0	3.0	6.0
		max_score	48.0	97.0	96.5	100.0	100.0	100.0	100.0
		improve	0.0	0.0	22.5	7.0	41.0	87.0	100.0
		first_score	0.0	10.0	74.0	93.0	97.0	100.0	100.0
		tries_max	1.0	1.0	2.1	2.0	2.0	3.0	6.0
		post_max_tries	0.0	0.0	0.3	0.0	0.0	1.0	2.0
		first_time	1.0	8.0	27.4	25.0	41.0	48.0	58.0
		total_time	12.0	23.0	58.1	54.0	68.0	85.0	190.0
		best_time	4.0	8.0	22.4	18.0	27.0	50.0	56.0
5	40	tries	2.0	2.0	2.6	2.0	3.0	3.5	7.0
		max_score	60.0	90.0	97.3	100.0	100.0	100.0	100.0
		improve	0.0	0.0	22.3	10.0	30.0	70.0	100.0
		first_score	0.0	30.0	75.0	85.0	100.0	100.0	100.0
		tries_max	1.0	1.0	1.8	2.0	2.0	3.0	5.0
		post_max_tries	0.0	0.0	0.8	1.0	1.0	2.0	3.0
		first_time	1.0	4.5	17.6	15.5	25.0	35.0	45.0
		total_time	15.0	15.5	35.5	37.0	45.5	54.0	77.0
		best_time	2.0	4.5	14.6	14.0	18.0	31.0	36.0
6	55	tries	2.0	2.0	2.3	2.0	3.0	3.0	4.0
		max_score	14.0	50.0	90.9	100.0	100.0	100.0	100.0
		improve	0.0	0.0	27.2	21.0	43.0	64.0	100.0
		first_score	0.0	14.0	63.7	79.0	93.0	100.0	100.0
		tries_max	1.0	1.0	2.0	2.0	2.0	3.0	4.0
		post_max_tries	0.0	0.0	0.3	0.0	1.0	1.0	2.0
		first_time	2.0	7.0	25.8	23.0	43.0	52.0	58.0
		total_time	7.0	14.0	49.9	50.0	69.0	88.0	122.0
		best_time	2.0	5.0	21.3	19.0	28.0	50.0	56.0

Table 37									
2004 Sem1 Table of All Variables									
Tutorial	N Obs	Variable	Minimum	10th Pctl	Mean	Median	75th Pctl	90th Pctl	Maximum
7	64	tries	2.0	2.0	2.4	2.0	3.0	3.0	4.0
		max_score	11.0	89.0	94.1	100.0	100.0	100.0	100.0
		improve	0.0	0.0	28.2	11.0	33.5	89.0	100.0
		first_score	0.0	0.0	65.9	78.0	89.0	89.0	100.0
		tries_max	1.0	1.0	2.1	2.0	2.0	3.0	4.0
		post_max_tries	0.0	0.0	0.3	0.0	0.0	1.0	2.0
		first_time	1.0	5.0	25.6	22.0	41.5	55.0	58.0
		total_time	8.0	23.0	51.0	43.0	72.0	88.0	106.0
		best_time	2.0	6.0	18.8	14.0	28.5	41.0	52.0
8	24	tries	2.0	2.0	2.3	2.0	2.0	3.0	4.0
		max_score	67.0	83.0	96.9	100.0	100.0	100.0	100.0
		improve	0.0	8.0	35.8	29.0	62.5	83.0	92.0
		first_score	0.0	17.0	61.1	71.0	92.0	92.0	100.0
		tries_max	1.0	2.0	2.2	2.0	2.0	3.0	4.0
		post_max_tries	0.0	0.0	0.1	0.0	0.0	1.0	1.0
		first_time	6.0	12.0	30.0	30.0	40.0	44.0	52.0
		total_time	31.0	32.0	63.1	61.5	76.0	93.0	104.0
		best_time	11.0	15.0	26.3	23.0	32.0	44.0	50.0
9	48	tries	2.0	2.0	2.2	2.0	2.0	3.0	4.0
		max_score	57.0	100.0	98.2	100.0	100.0	100.0	100.0
		improve	0.0	0.0	13.1	0.0	14.0	57.0	100.0
		first_score	0.0	43.0	85.2	100.0	100.0	100.0	100.0
		tries_max	1.0	1.0	1.3	1.0	2.0	2.0	3.0
		post_max_tries	0.0	0.0	0.9	1.0	1.0	1.0	2.0
		first_time	1.0	1.0	7.3	3.0	10.0	19.0	52.0
		total_time	2.0	2.0	15.1	8.5	24.5	33.0	75.0
		best_time	1.0	1.0	7.4	3.0	8.5	19.0	52.0
10	33	tries	2.0	2.0	2.4	2.0	2.0	3.0	5.0
		max_score	20.0	60.0	90.6	100.0	100.0	100.0	100.0
		improve	0.0	0.0	38.2	40.0	60.0	80.0	100.0
		first_score	0.0	10.0	52.4	40.0	80.0	100.0	100.0
		tries_max	1.0	1.0	1.9	2.0	2.0	3.0	3.0
		post_max_tries	0.0	0.0	0.5	0.0	1.0	1.0	4.0
		first_time	1.0	4.0	31.9	34.0	52.0	56.0	60.0
		total_time	11.0	30.0	70.1	73.0	94.0	103.0	148.0
		best_time	6.0	11.0	29.8	26.0	42.0	50.0	58.0
11	39	tries	2.0	2.0	2.1	2.0	2.0	3.0	4.0
		max_score	20.0	60.0	73.6	80.0	80.0	80.0	80.0
		improve	0.0	0.0	20.8	20.0	40.0	60.0	80.0
		first_score	0.0	20.0	52.8	60.0	80.0	80.0	80.0
		tries_max	1.0	1.0	1.6	2.0	2.0	2.0	3.0
		post_max_tries	0.0	0.0	0.5	0.0	1.0	1.0	2.0
		first_time	1.0	4.0	22.3	20.0	34.0	46.0	56.0
		total_time	9.0	21.0	47.9	43.0	62.0	85.0	103.0
		best_time	4.0	7.0	26.0	25.0	40.0	47.0	58.0

Table 37									
2004 Sem1 Table of All Variables									
Tutorial	N Obs	Variable	Minimum	10th Pctl	Mean	Median	75th Pctl	90th Pctl	Maximum
12	55	tries	2.0	2.0	2.6	2.0	3.0	4.0	6.0
		max_score	0.0	67.0	81.1	83.0	92.0	100.0	100.0
		improve	0.0	0.0	27.2	25.0	42.0	67.0	100.0
		first_score	0.0	8.0	53.9	58.0	75.0	75.0	92.0
		tries_max	1.0	1.0	2.2	2.0	2.0	4.0	5.0
		post_max_tries	0.0	0.0	0.4	0.0	1.0	1.0	3.0
		first_time	1.0	6.0	28.6	28.0	44.0	51.0	58.0
		total_time	2.0	20.0	72.4	67.0	93.0	138.0	198.0
		best_time	1.0	8.0	28.4	26.0	42.0	53.0	58.0
13	149	tries	2.0	2.0	3.4	3.0	4.0	5.0	12.0
		max_score	0.0	33.0	81.9	83.0	100.0	100.0	100.0
		improve	0.0	0.0	48.7	50.0	67.0	100.0	100.0
		first_score	0.0	0.0	33.2	33.0	50.0	83.0	100.0
		tries_max	1.0	1.0	2.9	2.0	3.0	5.0	12.0
		post_max_tries	0.0	0.0	0.6	0.0	1.0	2.0	5.0
		first_time	2.0	5.0	19.5	18.0	29.0	36.0	56.0
		total_time	9.0	19.0	57.7	51.0	73.0	107.0	251.0
		best_time	2.0	4.0	16.7	16.0	22.0	30.0	44.0
14	20	tries	2.0	2.0	2.1	2.0	2.0	2.0	3.0
		max_score	71.0	83.5	95.5	100.0	100.0	100.0	100.0
		improve	0.0	0.0	26.7	12.0	54.5	90.5	100.0
		first_score	0.0	0.0	68.8	86.0	95.0	100.0	100.0
		tries_max	1.0	1.0	1.7	2.0	2.0	2.0	3.0
		post_max_tries	0.0	0.0	0.4	0.0	1.0	1.0	1.0
		first_time	1.0	3.5	25.7	27.5	39.0	51.0	59.0
		total_time	12.0	19.0	47.9	49.5	59.0	72.0	94.0
		best_time	7.0	9.0	23.9	22.5	33.5	39.5	45.0
15	103	tries	2.0	2.0	3.6	3.0	4.0	6.0	9.0
		max_score	0.0	35.0	79.0	100.0	100.0	100.0	100.0
		improve	0.0	0.0	60.5	53.0	100.0	100.0	100.0
		first_score	0.0	0.0	18.5	0.0	49.0	53.0	100.0
		tries_max	1.0	1.0	3.0	3.0	4.0	5.0	9.0
		post_max_tries	0.0	0.0	0.5	0.0	1.0	2.0	5.0
		first_time	1.0	2.0	5.3	4.0	7.0	11.0	38.0
		total_time	4.0	6.0	19.0	17.0	23.0	34.0	91.0
		best_time	1.0	2.0	5.6	4.0	6.0	9.0	38.0
16	26	tries	2.0	2.0	2.4	2.0	3.0	3.0	4.0
		max_score	48.0	48.0	49.9	48.0	48.0	59.0	72.0
		improve	0.0	0.0	9.7	0.0	13.0	45.0	46.0
		first_score	2.0	3.0	40.3	48.0	48.0	48.0	50.0
		tries_max	1.0	1.0	1.5	1.0	2.0	2.0	3.0
		post_max_tries	0.0	0.0	0.9	1.0	1.0	2.0	3.0
		first_time	1.0	1.0	19.3	14.0	34.0	42.0	50.0
		total_time	8.0	12.0	47.3	39.0	66.0	88.0	121.0
		best_time	3.0	4.0	17.6	13.0	29.0	39.0	46.0

APPENDIX D3: TOTORIAL_TEST IMPROVEMENTS 2004 SEMESTER 2

D3_1: FREQUENCY PROCEDURE - TEST TUTORIALS

Table 1			
2004 Sem2 Table of n_tests by n_tuts			
n_tests	n_tuts		
Frequency Percent Row Pct Col Pct	15	16	Total
3	9 1.32 5.63 25.00	151 22.17 94.38 23.41	160 23.49
4	27 3.96 5.18 75.00	494 72.54 94.82 76.59	521 76.51
Total	36 5.29	645 94.71	681 100.00

Table 2	
2004 Sem2 Table of Variables	
22 With Variables:	tut1_3 tut4_7 tut8_11 tut12_16 tut_total n_tuts tut1 tut2 tut3 tut4 tut5 tut6 tut7 tut8 tut9 tut10 tut11 tut12 tut13 tut14 tut15 tut16
7 Variables:	test1 test2 test3 test4 test_tot4 best3 final

Table 3						
2004 Sem2 Table of Simple Statistics						
Variable	**N**	**Mean**	**Std Dev**	**Median**	**Minimum**	**Maximum**
tut1_3	681	263.08223	66.86685	293.00000	0	300.00000
tut4_7	681	356.84141	85.94236	390.00000	0	400.00000
tut8_11	681	313.64170	98.72772	360.00000	0	400.00000
tut12_16	681	203.13950	96.97246	250.00000	0	300.00000
tut_total	681	1137	276.85542	1230	0	1400
n_tuts	681	15.94714	0.22393	16.00000	15.00000	16.00000
tut1	681	87.08223	22.94935	98.00000	0	100.00000
tut2	681	92.77239	22.68680	100.00000	0	100.00000
tut3	681	83.22761	31.75522	100.00000	0	100.00000
tut4	681	92.17034	19.78250	97.00000	0	100.00000
tut5	681	93.08370	21.89965	100.00000	0	100.00000
tut6	681	87.01028	27.34122	100.00000	0	100.00000
tut7	681	84.57709	29.76101	100.00000	0	100.00000
tut8	645	86.62481	26.60434	100.00000	0	100.00000
tut9	681	84.56241	34.82810	100.00000	0	100.00000
tut10	681	82.40822	32.46832	100.00000	0	100.00000
tut11	681	64.62555	32.34305	80.00000	0	100.00000
tut12	681	61.00587	37.38740	75.00000	0	100.00000
tut13	681	65.96035	40.76796	83.00000	0	100.00000
tut14	681	76.02643	39.96770	100.00000	0	100.00000
tut15	681	0.14684	3.83201	0	0	100.00000
tut16	681	0	0	0	0	0
test1	668	66.73653	16.93473	70.00000	10.00000	100.00000
test2	673	45.27489	18.91295	40.00000	0	100.00000
test3	659	49.87860	21.93491	50.00000	0	100.00000
test4	564	67.69504	23.38205	70.00000	0	100.00000
test_tot4	681	214.53744	59.68396	210.00000	40.00000	370.00000
best3	681	187.45962	44.41292	190.00000	40.00000	300.00000
final	681	72.72333	14.21258	72.73333	26.80667	106.56000

Table 4							
2004 Sem2 Table of the Spearman Correlation Coefficient							
Spearman Correlation Coefficients Prob > |r| under H0: Rho=0 Number of Observations							
	test1	test2	test3	test4	test_tot4	best3	final
tut1_3	0.08313 0.0317 668	0.06835 0.0764 673	0.07573 0.0520 659	0.09435 0.0251 564	0.15753 <.0001 681	0.13883 0.0003 681	0.27373 <.0001 681
tut4_7	0.04527 0.2427 668	0.02766 0.4738 673	0.02865 0.4628 659	0.17123 <.0001 564	0.07505 0.0503 681	0.07788 0.0422 681	0.26645 <.0001 681
tut8_11	0.15683 <.0001 668	0.06655 0.0845 673	0.10357 0.0078 659	0.22184 <.0001 564	0.20153 <.0001 681	0.19469 <.0001 681	0.43111 <.0001 681
tut12_16	0.13922 0.0003 668	0.11782 0.0022 673	0.10418 0.0074 659	0.24889 <.0001 564	0.23062 <.0001 681	0.22459 <.0001 681	0.45235 <.0001 681
tut_total	0.16068 <.0001 668	0.10944 0.0045 673	0.10999 0.0047 659	0.24138 <.0001 564	0.24006 <.0001 681	0.22922 <.0001 681	0.50588 <.0001 681
n_tuts	0.05262 0.1743 668	0.02984 0.4396 673	0.10098 0.0095 659	0.08804 0.0366 564	0.08560 0.0255 681	0.09849 0.0101 681	0.17072 <.0001 681
tut1	0.02085 0.5907 668	0.03876 0.3154 673	0.08204 0.0352 659	0.09094 0.0308 564	0.12645 0.0009 681	0.10355 0.0068 681	0.22210 <.0001 681
tut2	0.06790 0.0795 668	0.04238 0.2722 673	0.03542 0.3639 659	0.05925 0.1600 564	0.12844 0.0008 681	0.10484 0.0062 681	0.24933 <.0001 681
tut3	0.09183 0.0176 668	0.07928 0.0398 673	0.01652 0.6720 659	0.09037 0.0319 564	0.15005 <.0001 681	0.12572 0.0010 681	0.27519 <.0001 681
tut4	0.04472 0.2484 668	-0.03264 0.3978 673	0.03018 0.4393 659	0.14059 0.0008 564	0.04262 0.2667 681	0.05888 0.1248 681	0.20927 <.0001 681
tut5	0.07502 0.0526 668	0.08439 0.0286 673	0.06505 0.0952 659	0.19807 <.0001 564	0.16667 <.0001 681	0.16003 <.0001 681	0.32801 <.0001 681
tut6	0.07171 0.0640 668	0.04022 0.2975 673	0.00430 0.9124 659	0.14813 0.0004 564	0.09412 0.0140 681	0.09278 0.0154 681	0.26433 <.0001 681
tut7	0.00358 0.9264 668	0.03738 0.3330 673	0.03924 0.3145 659	0.15102 0.0003 564	0.08096 0.0347 681	0.07795 0.0420 681	0.25228 <.0001 681

Table 4							
2004 Sem2 Table of the Spearman Correlation Coefficient							
Spearman Correlation Coefficients Prob > |r| under H0: Rho=0 Number of Observations							
	test1	**test2**	**test3**	**test4**	**test_tot4**	**best3**	**final**
tut8	0.04454 0.2628 634	0.02713 0.4943 637	0.01440 0.7197 624	0.14301 0.0009 534	0.09246 0.0188 645	0.08951 0.0230 645	0.24359 <.0001 645
tut9	0.09192 0.0175 668	-0.01148 0.7663 673	0.01386 0.7225 659	0.14885 0.0004 564	0.09251 0.0157 681	0.08786 0.0218 681	0.24766 <.0001 681
tut10	0.11772 0.0023 668	0.02523 0.5135 673	0.03855 0.3231 659	0.12045 0.0042 564	0.12459 0.0011 681	0.11470 0.0027 681	0.32132 <.0001 681
tut11	0.14351 0.0002 668	0.11406 0.0030 673	0.12068 0.0019 659	0.16206 0.0001 564	0.22211 <.0001 681	0.19657 <.0001 681	0.39127 <.0001 681
tut12	0.14337 0.0002 668	0.06308 0.1021 673	0.06463 0.0974 659	0.22461 <.0001 564	0.17666 <.0001 681	0.17692 <.0001 681	0.37059 <.0001 681
tut13	0.14227 0.0002 668	0.09351 0.0152 673	0.11478 0.0032 659	0.20699 <.0001 564	0.21514 <.0001 681	0.21058 <.0001 681	0.39632 <.0001 681
tut14	0.06924 0.0737 668	0.09188 0.0171 673	0.07881 0.0431 659	0.21092 <.0001 564	0.17333 <.0001 681	0.16585 <.0001 681	0.34330 <.0001 681
tut15	. . 668	0.01449 0.7076 673	0.00196 0.9599 659	-0.07158 0.0894 564	-0.06211 0.1054 681	-0.06060 0.1141 681	-0.06320 0.0994 681
tut16	. . 668	. . 673	. . 659	. . 564	. . 681	. . 681	. . 681

D3_2: UNIVARIATE PROCEDURE -TUTORIAL TOTAL

Table 5			
2004 Sem2 Table of Moments			
N	681	**Sum Weights**	681
Mean	1136.70485	**Sum Observations**	774096
Std Deviation	276.855424	**Variance**	76648.926
Skewness	-1.913687	**Kurtosis**	3.8905248
Uncorrected SS	932039944	**Corrected SS**	52121269.7
Coeff Variation	24.3559641	**Std Error Mean**	10.6091229

Table 6			
2004 Sem2 Table of Basic Statistical Measures			
Location		**Variability**	
Mean	1136.705	**Std Deviation**	276.85542
Median	1230.000	**Variance**	76649
Mode	1372.000	**Range**	1400
		Interquartile Range	281.00000

Table 7				
2004 Sem2 Table of Tests for Location: Mu0=0				
Test	**Statistic**		**p Value**	
Student's t	**t**	107.1441	**Pr > |t|**	<.0001
Sign	**M**	337	**Pr >= |M|**	<.0001
Signed Rank	**S**	113737.5	**Pr >= |S|**	<.0001

Table 8	
2004 Sem2 Table of Quantile Estimates	
Quantiles (Definition 5)	
Quantile	Estimate
100% Max	1400
99%	1400
95%	1372
90%	1363
75% Q3	1331
50% Median	1230
25% Q1	1050
10%	757
5%	563
1%	0
0% Min	0

Table 9			
2004 Sem2 Table of Extreme Observations			
Lowest		Highest	
Value	Obs	Value	Obs
0	649	1400	80
0	583	1400	87
0	41	1400	135
0	40	1400	497
0	15	1400	670

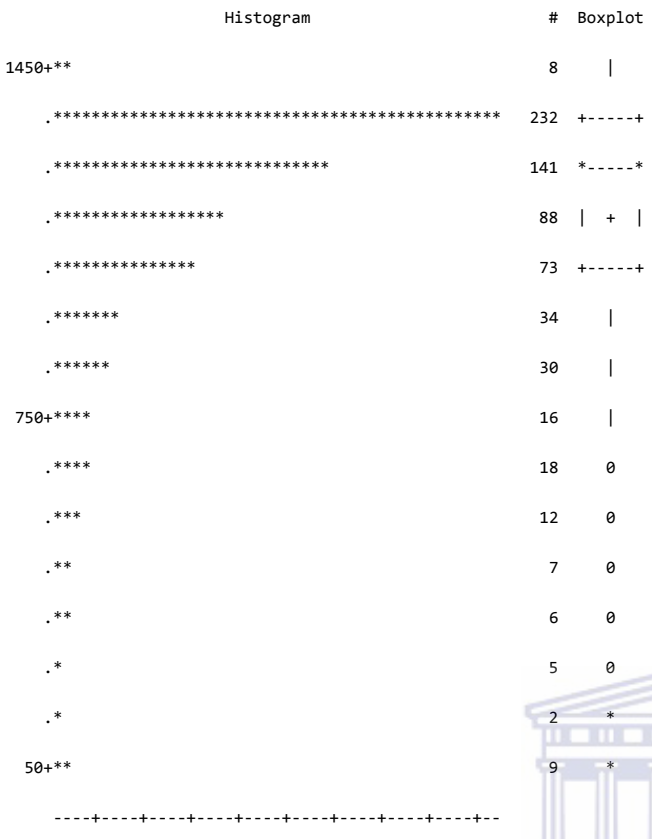
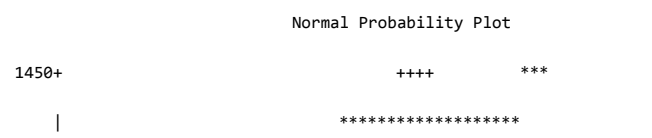


Figure 62: 2004 Second Semester Histogram for Tutorial Total



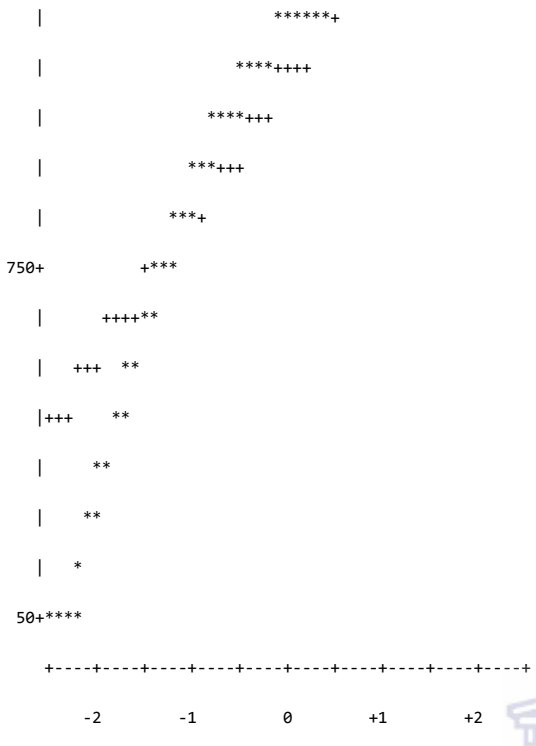


Figure 63: 2004 Second Semester Normal Probability Plot for Tutorial Total

D3_3: UNIVARIATE PROCEDURE – BEST3

Table 10			
2004 Sem2 Table of Moments			
N	681	**Sum Weights**	681
Mean	214.537445	**Sum Observations**	146100
Std Deviation	59.683963	**Variance**	3562.17543
Skewness	0.03543964	**Kurtosis**	-0.5330267
Uncorrected SS	33766200	**Corrected SS**	2422279.3
Coeff Variation	27.8198349	**Std Error Mean**	2.28709443

Table 11			
2004 Sem2 Table of Basic Statistical Measures			
Location		**Variability**	
Mean	214.5374	**Std Deviation**	59.68396
Median	210.0000	**Variance**	3562
Mode	200.0000	**Range**	330.00000
		Interquartile Range	90.00000

Table 12				
2004 Sem2 Table of Tests for Location: Mu0=0				
Test	**Statistic**		**p Value**	
Student's t	**t**	93.80349	**Pr > |t|**	<.0001
Sign	**M**	340.5	**Pr >= |M|**	<.0001
Signed Rank	**S**	116110.5	**Pr >= |S|**	<.0001

Table 13	
2004 Sem2 Table of Quantile Estimates	
Quantiles (Definition 5)	
Quantile	Estimate
100% Max	370
99%	340
95%	310
90%	290
75% Q3	260
50% Median	210
25% Q1	170
10%	140
5%	120
1%	90
0% Min	40

Table 14			
2004 Sem2 Table of Extreme Observations			
Lowest		Highest	
Value	Obs	Value	Obs
40	370	350	127
80	558	350	180
80	344	360	497
80	295	360	516
80	139	370	288


```
                Histogram                       #  Boxplot

370+**                                          3     |
```

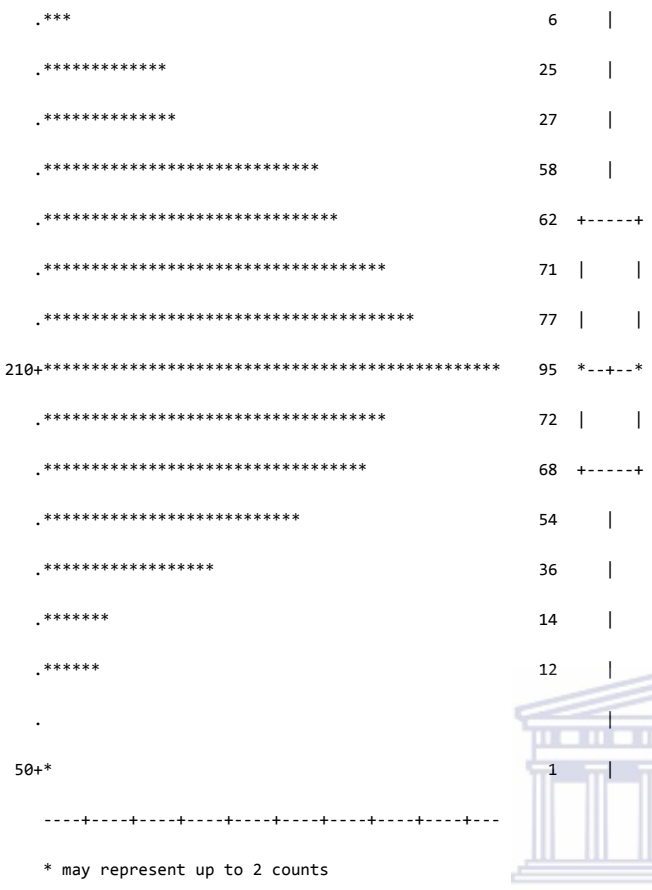


Figure 64: 2004 Second Semester Histogram for Best3

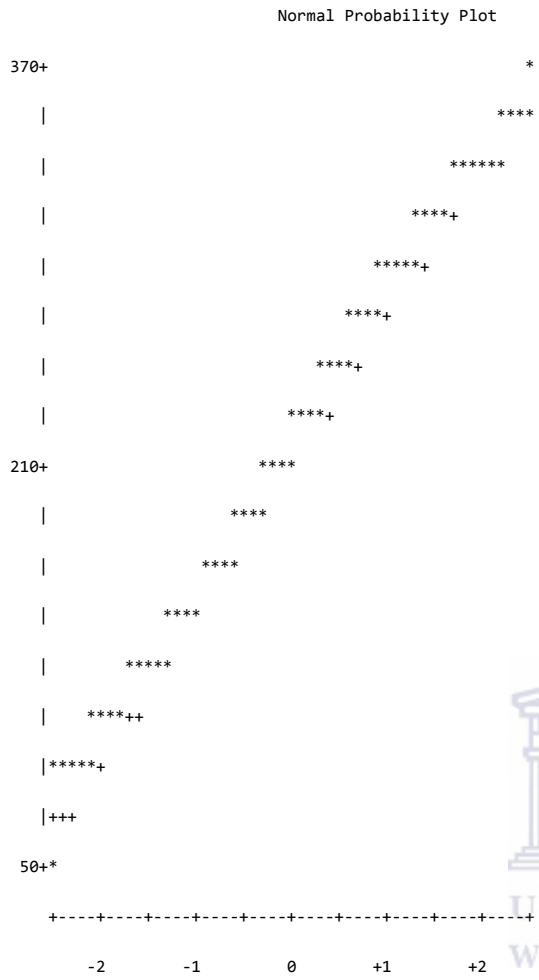


Figure 65: 2004 Second Semester Normal Probability Plot for Best3

D3_4: UNIVARIATE PROCEDURE – FINAL

Table 15			
2004 Sem2 Table of Moments			
N	681	**Sum Weights**	681
Mean	187.459618	**Sum Observations**	127660
Std Deviation	44.4129211	**Variance**	1972.50756
Skewness	-0.1724611	**Kurtosis**	-0.4949001
Uncorrected SS	25272400	**Corrected SS**	1341305.14
Coeff Variation	23.6919938	**Std Error Mean**	1.70190683

Table 16			
2004 Sem2 Table of Basic Statistical Measures			
Location		**Variability**	
Mean	187.4596	**Std Deviation**	44.41292
Median	190.0000	**Variance**	1973
Mode	160.0000	**Range**	260.00000
		Interquartile Range	60.00000

Table 17				
2004 Sem2 Table of Tests for Location: Mu0=0				
Test	**Statistic**		**p Value**	
Student's t	**t**	110.1468	**Pr > |t|**	<.0001
Sign	**M**	340.5	**Pr >= |M|**	<.0001
Signed Rank	**S**	116110.5	**Pr >= |S|**	<.0001

Table 18	
2004 Sem2 Table of Quantile Estimates	
Quantiles (Definition 5)	
Quantile	Estimate
100% Max	300
99%	280
95%	250
90%	240
75% Q3	220
50% Median	190
25% Q1	160
10%	130
5%	110
1%	90
0% Min	40

Table 19			
2004 Sem2 Table of Extreme Observations			
Lowest		Highest	
Value	Obs	Value	Obs
40	370	280	465
80	558	280	472
80	344	280	516
80	295	290	497
80	139	300	288

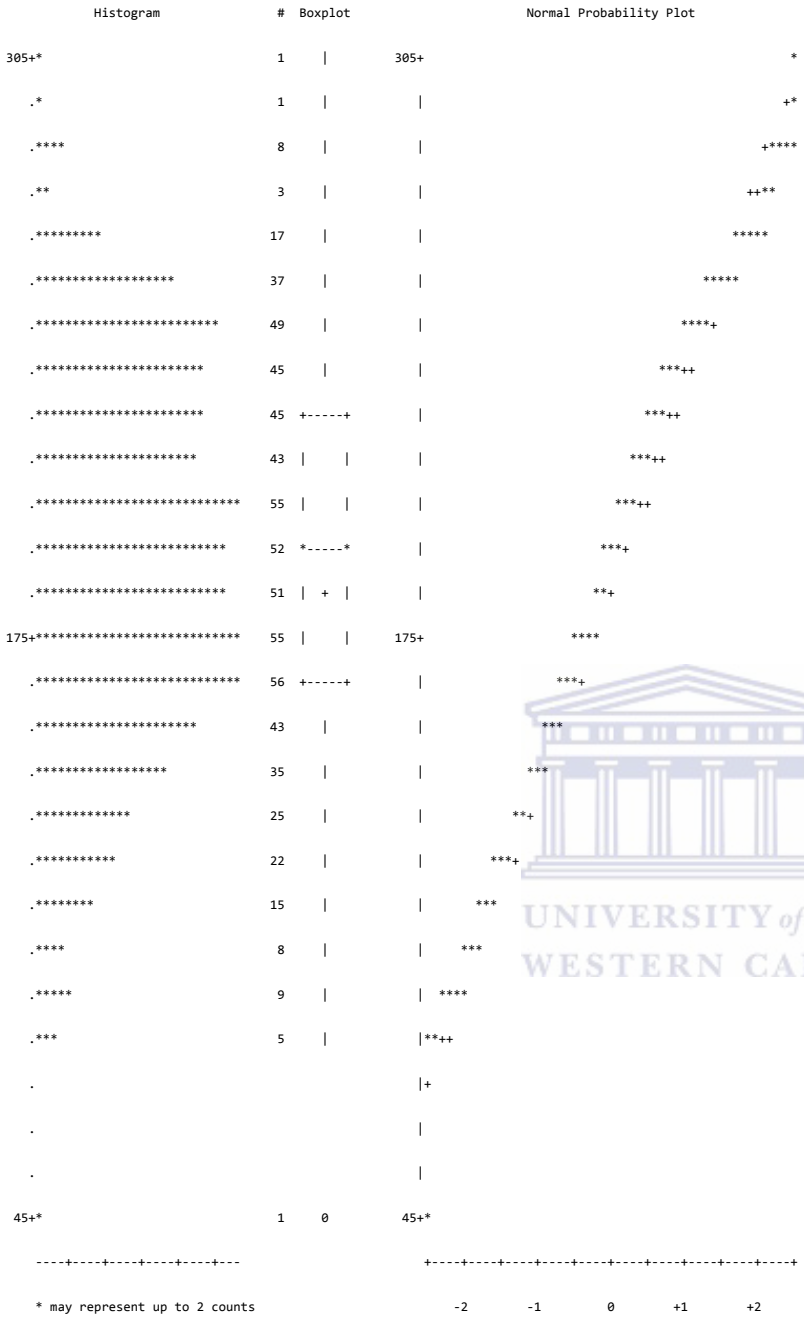


Figure 66: 2004 Second Semester Normal Probability Plots for Final

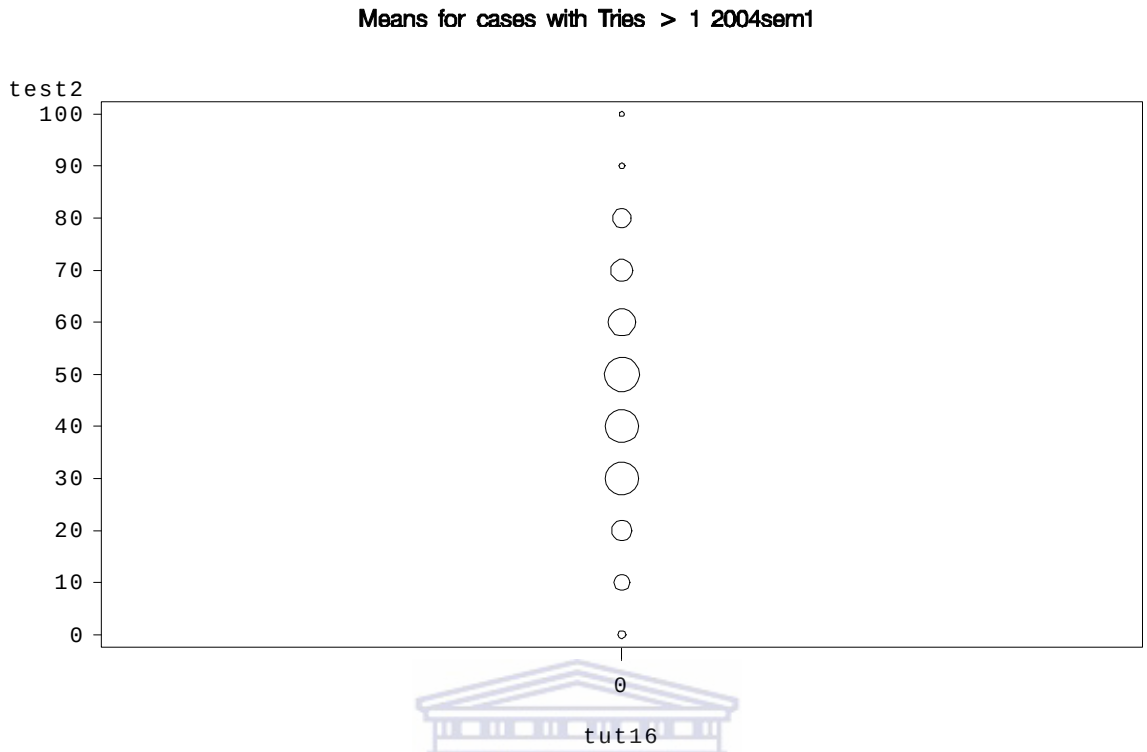


Figure 67: 2004 Second Semester

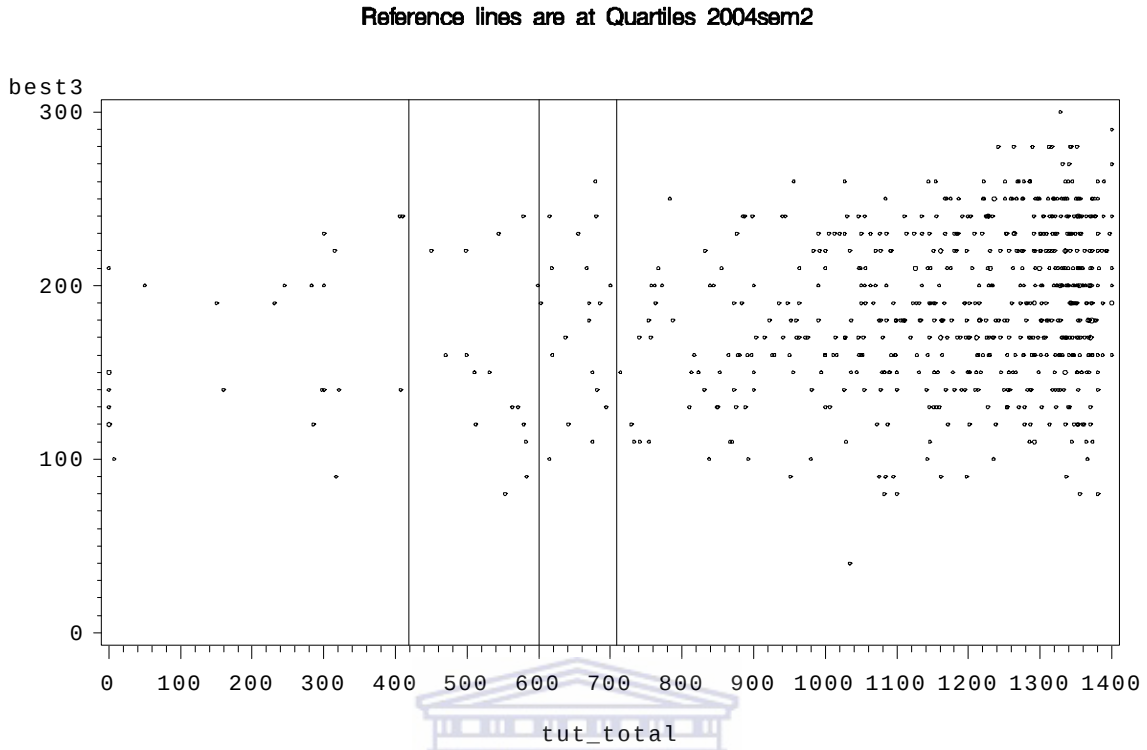


Figure 68: 2004 Second Semester

D3_5: MEANS PROCEDURE – ALL VARIABLES

Table 20					
2004 Sem2 Table of Variable Estimates					
Variable	**N**	**Mean**	**Std Dev**	**Minimum**	**Maximum**
Tutorial	14895	8.6844579	4.7231175	1.0000000	16.0000000
studnum	14895	2445193.98	592627.27	2008384.00	9926144.00
TestDate	0	.	.	.	.
Score	14895	70.9365559	35.8831218	0	100.0000000
Time	14895	17.1199060	15.8379310	0	60.0000000
Semester	14895	2024.00	0	2024.00	2024.00
order	14895	38439.64	4803.15	29842.00	46495.00

D3_6: Univariate Procedure – Score

Table 21			
2004 Sem2 Table of Moments			
N	14895	**Sum Weights**	14895
Mean	70.9365559	**Sum Observations**	1056600
Std Deviation	35.8831218	**Variance**	1287.59843
Skewness	-0.9487904	**Kurtosis**	-0.5890449
Uncorrected SS	94129056	**Corrected SS**	19177491
Coeff Variation	50.5848097	**Std Error Mean**	0.29401532

Table 22			
2004 Sem2 Table of Basic Statistical Measures			
Location		**Variability**	
Mean	70.9366	**Std Deviation**	35.88312
Median	89.0000	**Variance**	1288
Mode	100.0000	**Range**	100.00000
		Interquartile Range	52.00000

Table 23	
2004 Sem2 Table of Quantile Estimates	
Quantiles (Definition 5)	
Quantile	**Estimate**
100% Max	100
99%	100
95%	100
90%	100
75% Q3	100
50% Median	89
25% Q1	48
10%	0
5%	0
1%	0
0% Min	0

Table 24				
2004 Sem2 Table of Tests for Location: Mu0=0				
Test	**Statistic**		**p Value**	
Student's t	**T**	241.2682	**Pr > |t|**	<.0001
Sign	**M**	6565	**Pr >= |M|**	<.0001
Signed Rank	**S**	43102508	**Pr >= |S|**	<.0001

Table 25			
2004 Sem2 Table of Extreme Observations			
Lowest		Highest	
Value	Obs	Value	Obs
0	14893	100	14869
0	14892	100	14870
0	14880	100	14877
0	14840	100	14879
0	14838	100	14891

Histogram # Boxplot

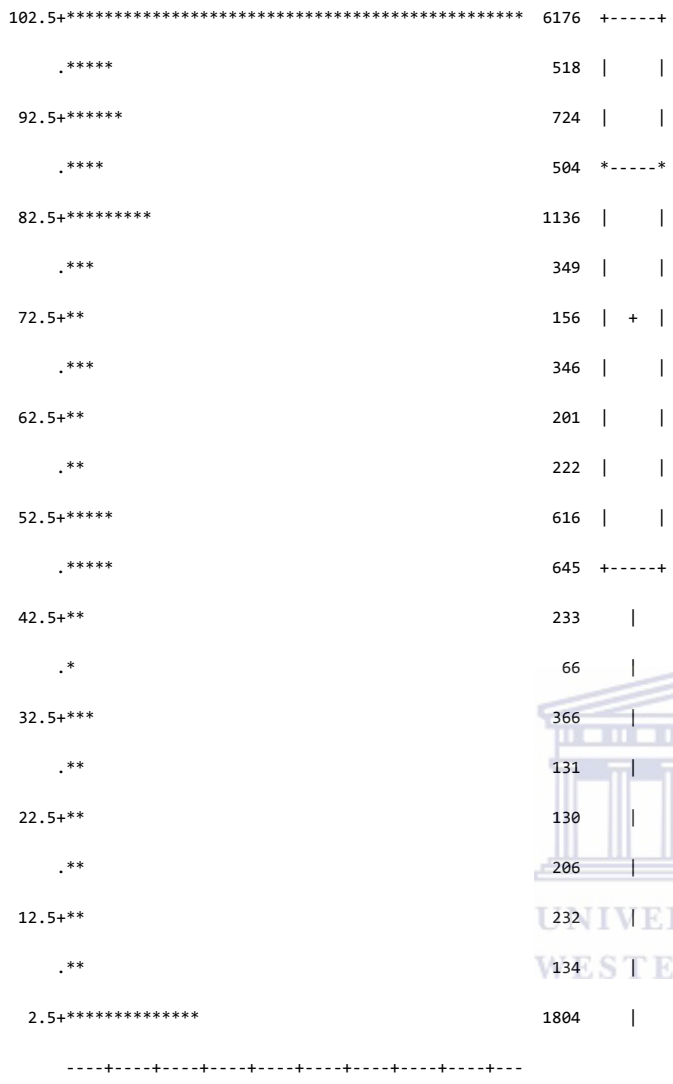
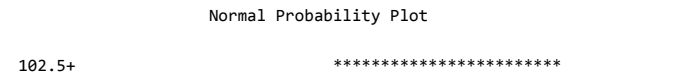


Figure 69: 2004 Second Semester Histogram for Score



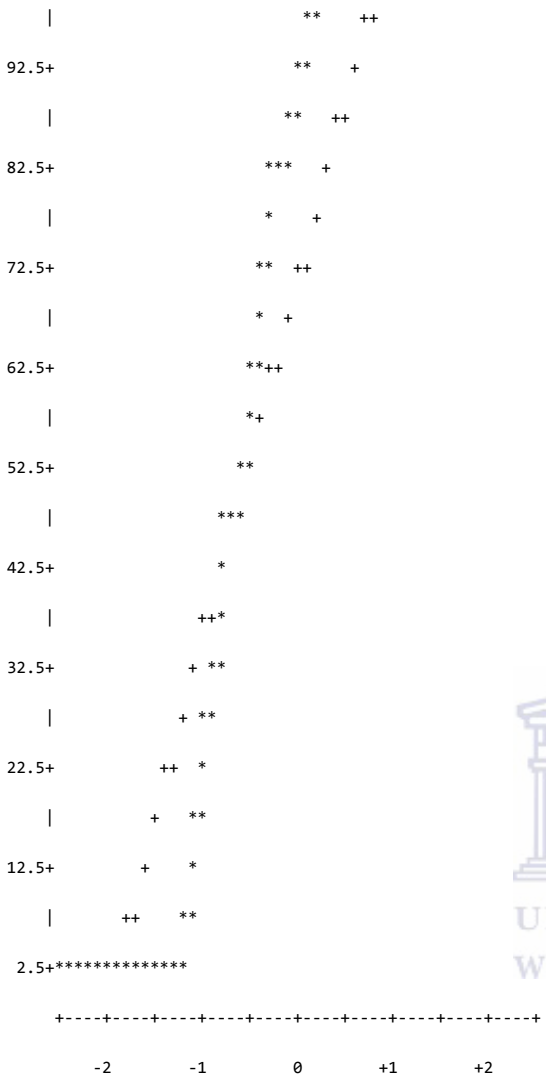


Figure 70: 2004 Second Semester Normal Probability Plot for Score

D3_7: UNIVARIATE PROCEDURE - TIME

Table 26			
2004 Sem2 Table of Moments			
N	14895	**Sum Weights**	14895
Mean	17.119906	**Sum Observations**	255001
Std Deviation	15.837931	**Variance**	250.84006

Table 26			
2004 Sem2 Table of Moments			
Skewness	0.92222182	**Kurtosis**	-0.1577282
Uncorrected SS	8101605	**Corrected SS**	3736011.85
Coeff Variation	92.5117873	**Std Error Mean**	0.12977116

Table 27			
2004 Sem2 Table of Basic Statistical Measures			
Location		**Variability**	
Mean	17.11991	**Std Deviation**	15.83793
Median	12.00000	**Variance**	250.84006
Mode	0.00000	**Range**	60.00000
		Interquartile Range	23.00000

Table 28				
2004 Sem2 Table of Tests for Location: Mu0=0				
Test	**Statistic**		**p Value**	
Student's t	**t**	131.9238	**Pr > |t|**	<.0001
Sign	**M**	6824	**Pr >= |M|**	<.0001
Signed Rank	**S**	46570388	**Pr >= |S|**	<.0001

Table 29	
2004 Sem2 Table of Quantile Estimates	
Quantiles (Definition 5)	
Quantile	Estimate
100% Max	60
99%	58
95%	50
90%	42
75% Q3	27
50% Median	12
25% Q1	4
10%	1
5%	0
1%	0
0% Min	0

Table 30			
2004 Sem2 Table of Extreme Observations			
Lowest		Highest	
Value	Obs	Value	Obs
0	14893	60	12565
0	14892	60	12916
0	14887	60	13686
0	14886	60	13822
0	14883	60	14027

Histogram # Boxplot

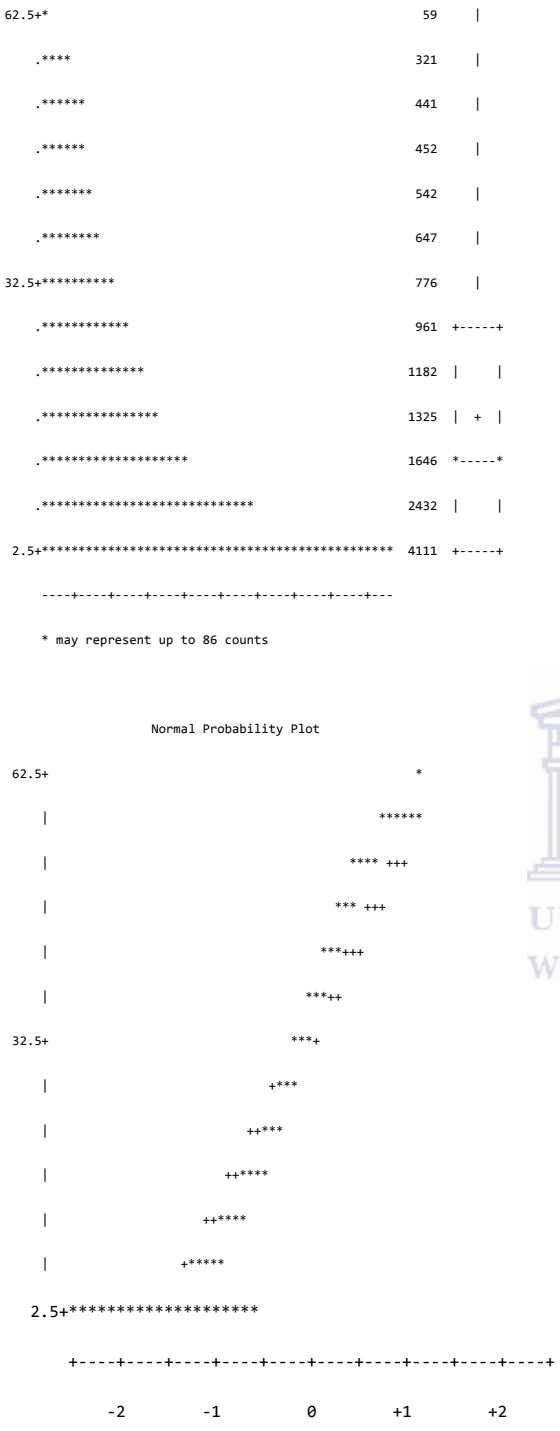


Figure 71: 2004 Second Semester Normal Probability Plots for Time

Table 31													
2004 Sem2 Table of Tutorial by Score													
Tutorial	**Score**												
Frequency **Percent** **Row Pct** **Col Pct**	**0**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11-20**	**20.1-30**	**30.1-40**
1	25 0.17 3.29 1.42	13 0.09 1.71 86.67	0 0.00 0.00 0.00	5 0.03 0.66 100.00	3 0.02 0.39 37.50	0 0.00 0.00 0.00	8 0.05 1.05 27.59	0 0.00 0.00 0.00	5 0.03 0.66 71.43	0 0.00 0.00 0.00	18 0.12 2.37 3.70	6 0.04 0.79 3.09	38 0.26 4.99 7.39
2	97 0.65 8.18 5.50	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	46 0.31 3.88 23.71	0 0.00 0.00 0.00
3	121 0.81 13.05 6.86	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	141 0.95 15.21 28.95	29 0.19 3.13 14.95	0 0.00 0.00 0.00
4	15 0.10 1.70 0.85	0 0.00 0.00 0.00	10 0.07 1.14 52.63	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	5 0.03 0.57 17.24	0 0.00 0.00 0.00	0 0.00 0.00 0.00	14 0.09 1.59 66.67	9 0.06 1.02 1.85	5 0.03 0.57 2.58	7 0.05 0.79 1.36
5	32 0.21 3.45 1.81	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	2 0.01 0.22 9.52	3 0.02 0.32 0.62	2 0.01 0.22 1.03	6 0.04 0.65 1.17
6	33 0.22 3.62 1.87	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	16 0.11 1.75 55.17	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	19 0.13 2.08 3.90	30 0.20 3.29 15.46	20 0.13 2.19 3.89
7	61 0.41 6.52 3.46	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	13 0.09 1.39 2.67	27 0.18 2.88 13.92	17 0.11 1.82 3.31
8	41 0.28 6.02 2.32	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	27 0.18 3.96 47.37	0 0.00 0.00 0.00	0 0.00 0.00 0.00	17 0.11 2.50 3.49	13 0.09 1.91 6.70	10 0.07 1.47 1.95
9	29 0.19 3.09 1.64	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	11 0.07 1.17 2.26	2 0.01 0.21 1.03	0 0.00 0.00 0.00
10	71 0.48 10.84 4.02	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	49 0.33 7.48 10.06	0 0.00 0.00 0.00	33 0.22 5.04 6.42
11	43 0.29 5.91 2.44	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	1 0.01 0.14 4.76	16 0.11 2.20 3.29	1 0.01 0.14 0.52	45 0.30 6.19 8.75

Table 31													
2004 Sem2 Table of Tutorial by Score													
Tutorial	**Score**												
Frequency **Percent** **Row Pct** **Col Pct**	**0**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11-20**	**20.1-30**	**30.1-40**
12	71 0.48 9.11 4.02	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	11 0.07 1.41 19.30	0 0.00 0.00 0.00	0 0.00 0.00 0.00	9 0.06 1.16 1.85	6 0.04 0.77 3.09	48 0.32 6.16 9.34
13	339 2.28 20.94 19.21	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	158 1.06 9.76 32.44	0 0.00 0.00 0.00	259 1.74 16.00 50.39
14	50 0.34 6.94 2.83	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	1 0.01 0.14 12.50	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	4 0.03 0.56 19.05	6 0.04 0.83 1.23	1 0.01 0.14 0.52	4 0.03 0.56 0.78
15	698 4.69 44.60 39.55	0 0.00 0.00 0.00	9 0.06 0.58 47.37	0 0.00 0.00 0.00	3 0.02 0.19 37.50	33 0.22 2.11 100.00	0 0.00 0.00 0.00	19 0.13 1.21 33.33	2 0.01 0.13 28.57	0 0.00 0.00 0.00	16 0.11 1.02 3.29	20 0.13 1.28 10.31	25 0.17 1.60 4.86
16	39 0.26 5.75 2.21	2 0.01 0.29 13.33	0 0.00 0.00 0.00	0 0.00 0.00 0.00	1 0.01 0.15 12.50	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	2 0.01 0.29 0.41	6 0.04 0.88 3.09	2 0.01 0.29 0.39
Total	1765 11.85	15 0.10	19 0.13	5 0.03	8 0.05	33 0.22	29 0.19	57 0.38	7 0.05	21 0.14	487 3.27	194 1.30	514 3.45

Table 32							
2004 Sem2 Table of Tutorial by Score							
Tutorial	Score						
Frequency Percent Row Pct Col Pct	40.1-50	50.1-61	61.1-<70	70-<80	80-<90	90-100	Total
1	79 0.53 10.38 6.61	35 0.23 4.60 5.91	30 0.20 3.94 7.67	49 0.33 6.44 9.70	63 0.42 8.28 3.84	384 2.58 50.46 5.18	761 5.11
2	168 1.13 14.17 14.06	0 0.00 0.00 0.00	0 0.00 0.00 0.00	58 0.39 4.89 11.49	0 0.00 0.00 0.00	817 5.49 68.89 11.01	1186 7.96
3	24 0.16 2.59 2.01	15 0.10 1.62 2.53	0 0.00 0.00 0.00	18 0.12 1.94 3.56	67 0.45 7.23 4.09	512 3.44 55.23 6.90	927 6.22
4	14 0.09 1.59 1.17	12 0.08 1.36 2.03	4 0.03 0.45 1.02	15 0.10 1.70 2.97	56 0.38 6.36 3.41	715 4.80 81.16 9.64	881 5.91
5	18 0.12 1.94 1.51	10 0.07 1.08 1.69	0 0.00 0.00 0.00	23 0.15 2.48 4.55	42 0.28 4.53 2.56	790 5.30 85.13 10.65	928 6.23
6	23 0.15 2.52 1.92	24 0.16 2.63 4.05	24 0.16 2.63 6.14	62 0.42 6.80 12.28	38 0.26 4.17 2.32	623 4.18 68.31 8.40	912 6.12
7	15 0.10 1.60 1.26	13 0.09 1.39 2.20	25 0.17 2.67 6.39	62 0.42 6.62 12.28	205 1.38 21.90 12.50	498 3.34 53.21 6.71	936 6.28
8	24 0.16 3.52 2.01	11 0.07 1.62 1.86	20 0.13 2.94 5.12	32 0.21 4.70 6.34	55 0.37 8.08 3.35	431 2.89 63.29 5.81	681 4.57
9	15 0.10 1.60 1.26	49 0.33 5.21 8.28	0 0.00 0.00 0.00	20 0.13 2.13 3.96	45 0.30 4.79 2.74	769 5.16 81.81 10.37	940 6.31

Table 32							
2004 Sem2 Table of Tutorial by Score							
Tutorial	**Score**						
Frequency **Percent** **Row Pct** **Col Pct**	**40.1-50**	**50.1-61**	**61.1-<70**	**70-<80**	**80-<90**	**90-100**	**Total**
10	3 0.02 0.46 0.25	46 0.31 7.02 7.77	0 0.00 0.00 0.00	2 0.01 0.31 0.40	59 0.40 9.01 3.60	392 2.63 59.85 5.28	655 4.40
11	3 0.02 0.41 0.25	91 0.61 12.52 15.37	0 0.00 0.00 0.00	6 0.04 0.83 1.19	521 3.50 71.66 31.77	0 0.00 0.00 0.00	727 4.88
12	57 0.38 7.32 4.77	57 0.38 7.32 9.63	101 0.68 12.97 25.83	120 0.81 15.40 23.76	117 0.79 15.02 7.13	182 1.22 23.36 2.45	779 5.23
13	91 0.61 5.62 7.62	0 0.00 0.00 0.00	160 1.07 9.88 40.92	0 0.00 0.00 0.00	257 1.73 15.87 15.67	355 2.38 21.93 4.79	1619 10.87
14	3 0.02 0.42 0.25	0 0.00 0.00 0.00	3 0.02 0.42 0.77	13 0.09 1.81 2.57	71 0.48 9.86 4.33	564 3.79 78.33 7.60	720 4.83
15	79 0.53 5.05 6.61	196 1.32 12.52 33.11	13 0.09 0.83 3.32	22 0.15 1.41 4.36	44 0.30 2.81 2.68	386 2.59 24.66 5.20	1565 10.51
16	579 3.89 85.40 48.45	33 0.22 4.87 5.57	11 0.07 1.62 2.81	3 0.02 0.44 0.59	0 0.00 0.00 0.00	0 0.00 0.00 0.00	678 4.55
Total	1195 8.02	592 3.97	391 2.63	505 3.39	1640 11.01	7418 49.80	14895 100.00

Table 33												
2004 Sem2 Table of Tutorial by Time												
Tutorial	**Time**											
Frequency **Percent** **Row Pct** **Col Pct**	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11-20**
1	25 0.17 3.29 2.00	11 0.07 1.45 1.91	4 0.03 0.53 0.49	5 0.03 0.66 0.63	4 0.03 0.53 0.60	4 0.03 0.53 0.64	8 0.05 1.05 1.56	8 0.05 1.05 1.65	9 0.06 1.18 2.14	8 0.05 1.05 2.05	11 0.07 1.45 3.16	130 0.87 17.08 4.49
2	85 0.57 7.17 6.82	49 0.33 4.13 8.51	89 0.60 7.50 10.85	73 0.49 6.16 9.15	68 0.46 5.73 10.15	88 0.59 7.42 14.08	74 0.50 6.24 14.45	58 0.39 4.89 11.98	53 0.36 4.47 12.59	47 0.32 3.96 12.05	35 0.23 2.95 10.06	252 1.69 21.25 8.71
3	77 0.52 8.31 6.17	10 0.07 1.08 1.74	5 0.03 0.54 0.61	19 0.13 2.05 2.38	35 0.23 3.78 5.22	38 0.26 4.10 6.08	24 0.16 2.59 4.69	32 0.21 3.45 6.61	23 0.15 2.48 5.46	16 0.11 1.73 4.10	17 0.11 1.83 4.89	195 1.31 21.04 6.74
4	12 0.08 1.36 0.96	12 0.08 1.36 2.08	16 0.11 1.82 1.95	37 0.25 4.20 4.64	42 0.28 4.77 6.27	28 0.19 3.18 4.48	21 0.14 2.38 4.10	33 0.22 3.75 6.82	19 0.13 2.16 4.51	21 0.14 2.38 5.38	11 0.07 1.25 3.16	191 1.28 21.68 6.60
5	26 0.17 2.80 2.09	88 0.59 9.48 15.28	56 0.38 6.03 6.83	52 0.35 5.60 6.52	44 0.30 4.74 6.57	42 0.28 4.53 6.72	33 0.22 3.56 6.45	39 0.26 4.20 8.06	35 0.23 3.77 8.31	41 0.28 4.42 10.51	35 0.23 3.77 10.06	258 1.73 27.80 8.91
6	20 0.13 2.19 1.60	44 0.30 4.82 7.64	76 0.51 8.33 9.27	32 0.21 3.51 4.01	28 0.19 3.07 4.18	27 0.18 2.96 4.32	20 0.13 2.19 3.91	24 0.16 2.63 4.96	28 0.19 3.07 6.65	25 0.17 2.74 6.41	10 0.07 1.10 2.87	190 1.28 20.83 6.57
7	38 0.26 4.06 3.05	58 0.39 6.20 10.07	87 0.58 9.29 10.61	50 0.34 5.34 6.27	34 0.23 3.63 5.07	32 0.21 3.42 5.12	32 0.21 3.42 6.25	19 0.13 2.03 3.93	32 0.21 3.42 7.60	23 0.15 2.46 5.90	22 0.15 2.35 6.32	207 1.39 22.12 7.15
8	37 0.25 5.43 2.97	5 0.03 0.73 0.87	6 0.04 0.88 0.73	9 0.06 1.32 1.13	5 0.03 0.73 0.75	11 0.07 1.62 1.76	9 0.06 1.32 1.76	21 0.14 3.08 4.34	11 0.07 1.62 2.61	14 0.09 2.06 3.59	12 0.08 1.76 3.45	158 1.06 23.20 5.46
9	430 2.89 45.74 34.48	132 0.89 14.04 22.92	62 0.42 6.60 7.56	44 0.30 4.68 5.51	16 0.11 1.70 2.39	16 0.11 1.70 2.56	23 0.15 2.45 4.49	16 0.11 1.70 3.31	18 0.12 1.91 4.28	9 0.06 0.96 2.31	7 0.05 0.74 2.01	81 0.54 8.62 2.80

Table 33												
2004 Sem2 Table of Tutorial by Time												
Tutorial	**Time**											
Frequency **Percent** **Row Pct** **Col Pct**	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11-20**
10	20 0.13 3.05 1.60	5 0.03 0.76 0.87	12 0.08 1.83 1.46	21 0.14 3.21 2.63	40 0.27 6.11 5.97	42 0.28 6.41 6.72	15 0.10 2.29 2.93	22 0.15 3.36 4.55	20 0.13 3.05 4.75	16 0.11 2.44 4.10	17 0.11 2.60 4.89	109 0.73 16.64 3.77
11	23 0.15 3.16 1.84	6 0.04 0.83 1.04	34 0.23 4.68 4.15	55 0.37 7.57 6.89	38 0.26 5.23 5.67	28 0.19 3.85 4.48	21 0.14 2.89 4.10	16 0.11 2.20 3.31	9 0.06 1.24 2.14	17 0.11 2.34 4.36	19 0.13 2.61 5.46	116 0.78 15.96 4.01
12	51 0.34 6.55 4.09	18 0.12 2.31 3.13	40 0.27 5.13 4.88	62 0.42 7.96 7.77	48 0.32 6.16 7.16	33 0.22 4.24 5.28	35 0.23 4.49 6.84	18 0.12 2.31 3.72	22 0.15 2.82 5.23	14 0.09 1.80 3.59	20 0.13 2.57 5.75	130 0.87 16.69 4.49
13	78 0.52 4.82 6.26	47 0.32 2.90 8.16	72 0.48 4.45 8.78	76 0.51 4.69 9.52	66 0.44 4.08 9.85	42 0.28 2.59 6.72	44 0.30 2.72 8.59	48 0.32 2.96 9.92	49 0.33 3.03 11.64	54 0.36 3.34 13.85	62 0.42 3.83 17.82	448 3.01 27.67 15.48
14	32 0.21 4.44 2.57	3 0.02 0.42 0.52	4 0.03 0.56 0.49	7 0.05 0.97 0.88	22 0.15 3.06 3.28	32 0.21 4.44 5.12	22 0.15 3.06 4.30	14 0.09 1.94 2.89	16 0.11 2.22 3.80	20 0.13 2.78 5.13	13 0.09 1.81 3.74	145 0.97 20.14 5.01
15	260 1.75 16.61 20.85	65 0.44 4.15 11.28	171 1.15 10.93 20.85	204 1.37 13.04 25.56	153 1.03 9.78 22.84	137 0.92 8.75 21.92	113 0.76 7.22 22.07	97 0.65 6.20 20.04	67 0.45 4.28 15.91	54 0.36 3.45 13.85	41 0.28 2.62 11.78	168 1.13 10.73 5.81
16	33 0.22 4.87 2.65	23 0.15 3.39 3.99	86 0.58 12.68 10.49	52 0.35 7.67 6.52	27 0.18 3.98 4.03	25 0.17 3.69 4.00	18 0.12 2.65 3.52	19 0.13 2.80 3.93	10 0.07 1.47 2.38	11 0.07 1.62 2.82	16 0.11 2.36 4.60	116 0.78 17.11 4.01
Total	1247 8.37	576 3.87	820 5.51	798 5.36	670 4.50	625 4.20	512 3.44	484 3.25	421 2.83	390 2.62	348 2.34	2894 19.43

Table 34					
2004 Sem2 Table of Tutorial by Time					
Tutorial	Time				
Frequency Percent Row Pct Col Pct	20.1-30	30.1-40	40.1-50	50.1-61	Total
1	163 1.09 21.42 8.03	132 0.89 17.35 9.50	129 0.87 16.95 13.40	110 0.74 14.45 15.11	761 5.11
2	126 0.85 10.62 6.21	52 0.35 4.38 3.74	22 0.15 1.85 2.28	15 0.10 1.26 2.06	1186 7.96
3	147 0.99 15.86 7.24	112 0.75 12.08 8.06	107 0.72 11.54 11.11	70 0.47 7.55 9.62	927 6.22
4	180 1.21 20.43 8.87	101 0.68 11.46 7.27	95 0.64 10.78 9.87	62 0.42 7.04 8.52	881 5.91
5	97 0.65 10.45 4.78	50 0.34 5.39 3.60	21 0.14 2.26 2.18	11 0.07 1.19 1.51	928 6.23
6	144 0.97 15.79 7.09	98 0.66 10.75 7.06	80 0.54 8.77 8.31	66 0.44 7.24 9.07	912 6.12
7	115 0.77 12.29 5.67	79 0.53 8.44 5.69	64 0.43 6.84 6.65	44 0.30 4.70 6.04	936 6.28
8	136 0.91 19.97 6.70	97 0.65 14.24 6.98	82 0.55 12.04 8.52	68 0.46 9.99 9.34	681 4.57
9	52 0.35 5.53 2.56	20 0.13 2.13 1.44	10 0.07 1.06 1.04	4 0.03 0.43 0.55	940 6.31

Table 34					
2004 Sem2 Table of Tutorial by Time					
Tutorial	Time				
Frequency Percent Row Pct Col Pct	20.1-30	30.1-40	40.1-50	50.1-61	Total
10	89 0.60 13.59 4.38	98 0.66 14.96 7.06	59 0.40 9.01 6.13	70 0.47 10.69 9.62	655 4.40
11	122 0.82 16.78 6.01	104 0.70 14.31 7.49	55 0.37 7.57 5.71	64 0.43 8.80 8.79	727 4.88
12	87 0.58 11.17 4.29	81 0.54 10.40 5.83	71 0.48 9.11 7.37	49 0.33 6.29 6.73	779 5.23
13	289 1.94 17.85 14.24	150 1.01 9.26 10.80	60 0.40 3.71 6.23	34 0.23 2.10 4.67	1619 10.87
14	162 1.09 22.50 7.98	133 0.89 18.47 9.58	63 0.42 8.75 6.54	32 0.21 4.44 4.40	720 4.83
15	28 0.19 1.79 1.38	5 0.03 0.32 0.36	2 0.01 0.13 0.21	0 0.00 0.00 0.00	1565 10.51
16	93 0.62 13.72 4.58	77 0.52 11.36 5.54	43 0.29 6.34 4.47	29 0.19 4.28 3.98	678 4.55
Total	2030 13.63	1389 9.33	963 6.47	728 4.89	14895 100.00

D3_8: CORR PROCEDURE - TIME & SCORE

Table 35	
2004 Sem2 Table of two Variables	
2 Variables:	Time Score

Table 36						
2004 Sem2 Table of Simple Statistics						
Variable	**N**	**Mean**	**Std Dev**	**Median**	**Minimum**	**Maximum**
Time	14895	17.11991	15.83793	12.00000	0	60.00000
Score	14895	70.93656	35.88312	89.00000	0	100.00000

Table 37		
2004 Sem2 Table of Spearman Correlation Coeffiecient of Time & Score		
Spearman Correlation Coefficients, N = 14895 Prob > |r| under H0: Rho=0		
	Time	**Score**
Time	1.00000	0.11521 <.0001
Score	0.11521 <.0001	1.00000

D3_9: MEANS PROCEDURE - ALL VARIABLES

Table 38									
2004 Sem2 Table of All Variables									
Tutorial	**N Obs**	**Variable**	**Minimum**	**10th Pctl**	**Mean**	**Median**	**75th Pctl**	**90th Pctl**	**Maximum**
1	138	tries	2.0	2.0	2.7	2.0	3.0	4.0	8.0
		max_score	7.0	48.0	85.8	96.0	100.0	100.0	100.0
		improve	0.0	0.0	30.9	24.0	52.0	81.0	98.0
		first_score	2.0	11.0	54.9	50.0	85.0	96.0	100.0
		tries_max	1.0	1.0	2.3	2.0	3.0	3.0	6.0
		post_max_tries	0.0	0.0	0.4	0.0	1.0	1.0	4.0
		first_time	1.0	9.0	32.4	32.0	46.0	55.0	60.0
		total_time	11.0	37.0	82.1	79.5	103.0	134.0	191.0
		best_time	5.0	13.0	32.7	31.5	44.0	54.0	60.0
2	190	tries	2.0	2.0	2.7	2.0	3.0	4.0	17.0
		max_score	25.0	75.0	95.4	100.0	100.0	100.0	100.0
		improve	0.0	0.0	31.7	37.5	50.0	75.0	100.0
		first_score	0.0	25.0	63.7	50.0	100.0	100.0	100.0
		tries_max	1.0	1.0	1.9	2.0	2.0	3.0	17.0
		post_max_tries	0.0	0.0	0.8	1.0	1.0	2.0	7.0
		first_time	1.0	2.0	13.3	10.0	18.0	30.0	51.0
		total_time	3.0	9.5	30.8	24.0	40.0	59.0	135.0
		best_time	1.0	2.5	11.8	8.0	16.0	26.5	57.0
3	116	tries	2.0	2.0	3.0	2.0	3.0	5.0	9.0
		max_score	0.0	14.0	79.9	100.0	100.0	100.0	100.0
		improve	0.0	0.0	42.5	29.0	86.0	100.0	100.0
		first_score	0.0	0.0	37.4	14.0	86.0	100.0	100.0
		tries_max	1.0	1.0	2.2	2.0	3.0	4.0	9.0
		post_max_tries	0.0	0.0	0.8	0.0	1.0	2.0	4.0
		first_time	1.0	3.0	23.7	21.5	37.5	47.0	59.0
		total_time	9.0	28.0	66.3	64.0	84.5	110.0	167.0
		best_time	3.0	8.0	28.1	26.0	40.5	51.0	59.0
4	140	tries	2.0	2.0	2.5	2.0	3.0	4.0	5.0
		max_score	3.0	86.0	93.3	97.0	100.0	100.0	100.0
		improve	0.0	0.0	22.3	7.0	38.0	83.0	100.0
		first_score	0.0	10.0	71.0	91.5	97.0	97.0	100.0
		tries_max	1.0	1.0	1.9	2.0	2.0	3.0	5.0
		post_max_tries	0.0	0.0	0.5	0.0	1.0	1.0	3.0
		first_time	1.0	4.5	25.3	24.0	36.0	47.0	60.0
		total_time	7.0	22.0	53.5	49.5	70.0	94.0	146.0
		best_time	1.0	7.0	23.5	21.0	31.5	46.0	59.0
5	110	tries	2.0	2.0	2.3	2.0	2.0	3.0	5.0
		max_score	0.0	90.0	95.3	100.0	100.0	100.0	100.0
		improve	0.0	0.0	16.2	0.0	20.0	50.0	100.0
		first_score	0.0	40.0	79.1	90.0	100.0	100.0	100.0
		tries_max	1.0	1.0	1.6	1.0	2.0	2.0	4.0
		post_max_tries	0.0	0.0	0.7	1.0	1.0	1.0	3.0
		first_time	1.0	2.0	16.1	13.0	23.0	36.0	60.0
		total_time	2.0	10.0	30.9	27.0	42.0	58.0	91.0
		best_time	1.0	2.0	14.4	10.0	20.0	32.0	60.0
6	140	tries	2.0	2.0	2.4	2.0	3.0	4.0	7.0
		max_score	14.0	71.0	93.2	100.0	100.0	100.0	100.0
		improve	0.0	0.0	31.0	21.0	50.0	86.0	100.0
		first_score	0.0	7.0	62.2	71.0	93.0	100.0	100.0
		tries_max	1.0	1.0	2.0	2.0	2.0	3.0	7.0
		post_max_tries	0.0	0.0	0.4	0.0	1.0	1.0	5.0
		first_time	1.0	5.0	25.1	22.0	40.0	48.5	60.0
		total_time	4.0	15.5	54.2	52.0	73.5	89.0	162.0
		best_time	1.0	4.5	20.7	18.0	29.0	42.0	58.0

Table 38									
2004 Sem2 Table of All Variables									
Tutorial	**N Obs**	**Variable**	**Minimum**	**10th Pctl**	**Mean**	**Median**	**75th Pctl**	**90th Pctl**	**Maximum**
7	140	tries	2.0	2.0	2.4	2.0	2.5	3.0	6.0
		max_score	0.0	78.0	92.2	100.0	100.0	100.0	100.0
		improve	0.0	0.0	28.4	11.0	56.0	78.0	100.0
		first_score	0.0	11.0	63.8	78.0	89.0	100.0	100.0
		tries_max	1.0	1.0	2.0	2.0	2.0	3.0	6.0
		post_max_tries	0.0	0.0	0.4	0.0	1.0	1.0	3.0
		first_time	1.0	3.0	18.7	15.5	28.0	40.0	58.0
		total_time	2.0	8.0	38.2	33.0	52.5	74.0	152.0
		best_time	1.0	2.0	15.5	13.0	21.0	35.5	59.0
8	68	tries	2.0	2.0	2.3	2.0	2.0	3.0	4.0
		max_score	0.0	42.0	86.1	100.0	100.0	100.0	100.0
		improve	0.0	0.0	37.3	33.0	67.0	84.0	100.0
		first_score	0.0	0.0	48.8	54.0	83.0	92.0	100.0
		tries_max	1.0	1.0	2.0	2.0	2.0	3.0	4.0
		post_max_tries	0.0	0.0	0.3	0.0	0.0	1.0	2.0
		first_time	1.0	3.0	22.4	20.0	36.0	50.0	57.0
		total_time	8.0	22.0	56.9	58.0	71.0	92.0	134.0
		best_time	5.0	7.0	30.3	32.0	42.0	50.0	55.0
9	75	tries	2.0	2.0	2.3	2.0	2.0	3.0	5.0
		max_score	14.0	86.0	94.9	100.0	100.0	100.0	100.0
		improve	0.0	0.0	20.4	0.0	43.0	57.0	100.0
		first_score	0.0	14.0	74.5	86.0	100.0	100.0	100.0
		tries_max	1.0	1.0	1.6	1.0	2.0	2.0	5.0
		post_max_tries	0.0	0.0	0.7	1.0	1.0	1.0	3.0
		first_time	1.0	1.0	9.2	3.0	14.0	22.0	60.0
		total_time	2.0	2.0	19.6	11.0	27.0	45.0	121.0
		best_time	1.0	1.0	9.2	5.0	11.0	23.0	60.0
10	89	tries	2.0	2.0	2.6	2.0	3.0	4.0	11.0
		max_score	0.0	40.0	85.1	100.0	100.0	100.0	100.0
		improve	0.0	0.0	42.0	40.0	80.0	100.0	100.0
		first_score	0.0	0.0	43.0	40.0	80.0	100.0	100.0
		tries_max	1.0	1.0	2.1	2.0	2.0	3.0	10.0
		post_max_tries	0.0	0.0	0.5	0.0	1.0	2.0	3.0
		first_time	1.0	4.0	25.9	24.0	39.0	52.0	60.0
		total_time	4.0	18.0	65.5	63.0	87.0	113.0	168.0
		best_time	2.0	8.0	30.3	31.0	41.0	56.0	60.0
11	84	tries	2.0	2.0	2.3	2.0	2.0	3.0	6.0
		max_score	20.0	60.0	74.2	80.0	80.0	80.0	80.0
		improve	0.0	0.0	18.2	20.0	20.0	40.0	80.0
		first_score	0.0	0.0	56.0	60.0	80.0	80.0	80.0
		tries_max	1.0	1.0	1.8	2.0	2.0	3.0	6.0
		post_max_tries	0.0	0.0	0.5	0.0	1.0	1.0	3.0
		first_time	1.0	3.0	24.6	25.0	35.0	48.0	59.0
		total_time	5.0	15.0	53.0	51.0	71.0	90.0	132.0
		best_time	2.0	5.0	26.5	24.5	39.5	51.0	60.0

Table 38									
2004 Sem2 Table of All Variables									
Tutorial	**N Obs**	**Variable**	**Minimum**	**10th Pctl**	**Mean**	**Median**	**75th Pctl**	**90th Pctl**	**Maximum**
12	132	tries	2.0	2.0	2.4	2.0	2.5	3.0	12.0
		max_score	0.0	50.0	75.2	75.0	92.0	92.0	100.0
		improve	0.0	0.0	23.1	17.0	33.0	58.0	92.0
		first_score	0.0	8.0	52.1	58.0	75.0	83.0	100.0
		tries_max	1.0	1.0	2.0	2.0	2.0	3.0	12.0
		post_max_tries	0.0	0.0	0.4	0.0	1.0	1.0	3.0
		first_time	1.0	3.0	21.6	19.0	34.0	47.0	58.0
		total_time	3.0	10.0	50.9	45.0	70.0	96.0	165.0
		best_time	1.0	4.0	21.9	16.5	34.0	47.0	58.0
13	355	tries	2.0	2.0	3.6	3.0	4.0	6.0	16.0
		max_score	0.0	33.0	82.2	83.0	100.0	100.0	100.0
		improve	0.0	0.0	51.3	50.0	83.0	100.0	100.0
		first_score	0.0	0.0	31.0	33.0	50.0	83.0	100.0
		tries_max	1.0	1.0	3.1	2.0	4.0	5.0	13.0
		post_max_tries	0.0	0.0	0.5	0.0	1.0	2.0	11.0
		first_time	1.0	5.0	23.1	21.0	33.0	45.0	60.0
		total_time	2.0	18.0	64.5	57.0	82.0	120.0	251.0
		best_time	1.0	4.0	17.7	15.0	25.0	36.0	55.0
14	78	tries	2.0	2.0	2.2	2.0	2.0	3.0	4.0
		max_score	71.0	86.0	97.0	100.0	100.0	100.0	100.0
		improve	0.0	0.0	26.9	10.0	38.0	90.0	100.0
		first_score	0.0	0.0	70.1	86.0	95.0	100.0	100.0
		tries_max	1.0	1.0	1.8	2.0	2.0	3.0	4.0
		post_max_tries	0.0	0.0	0.4	0.0	1.0	1.0	2.0
		first_time	1.0	6.0	24.6	24.0	35.0	42.0	52.0
		total_time	15.0	23.0	52.4	50.5	67.0	82.0	109.0
		best_time	4.0	9.0	26.6	26.5	36.0	45.0	54.0
15	301	tries	2.0	2.0	3.5	3.0	4.0	6.0	15.0
		max_score	0.0	51.0	84.3	100.0	100.0	100.0	100.0
		improve	0.0	6.0	63.5	62.0	100.0	100.0	100.0
		first_score	0.0	0.0	20.8	0.0	49.0	53.0	100.0
		tries_max	1.0	2.0	3.1	2.0	4.0	6.0	12.0
		post_max_tries	0.0	0.0	0.4	0.0	0.0	1.0	9.0
		first_time	1.0	2.0	7.3	5.0	10.0	15.0	40.0
		total_time	2.0	7.0	22.8	19.0	29.0	45.0	146.0
		best_time	1.0	2.0	6.4	5.0	8.0	13.0	27.0
16	101	tries	2.0	2.0	2.2	2.0	2.0	3.0	4.0
		max_score	47.0	48.0	50.3	48.0	48.0	58.0	72.0
		improve	0.0	0.0	6.3	0.0	3.0	25.0	50.0
		first_score	0.0	23.0	44.0	48.0	48.0	48.0	66.0
		tries_max	1.0	1.0	1.5	1.0	2.0	2.0	3.0
		post_max_tries	0.0	0.0	0.8	1.0	1.0	1.0	3.0
		first_time	1.0	2.0	19.4	17.0	32.0	41.0	60.0
		total_time	4.0	10.0	44.9	43.0	66.0	80.0	134.0
		best_time	2.0	3.0	21.9	18.0	34.0	44.0	60.0

APPENDIX D4: TUTORIAL_TEST IMPROVEMENT 2005 SEMESTER 1

D4_1: FREQUENCY PROCEDURE - TEST TUTORIALS

Table 1			
2005 Sem1 Table of n_tests by n_tuts			
n_tests	n_tuts		
Frequency Percent Row Pct Col Pct	15	16	Total
3	1 0.68 7.69 16.67	12 8.11 92.31 8.45	13 8.78
4	5 3.38 3.70 83.33	130 87.84 96.30 91.55	135 91.22
Total	6 4.05	142 95.95	148 100.00

Table 2	
2005 Sem1 Table of Variables	
22 With Variables:	tut1_3 tut4_7 tut8_11 tut12_16 tut_total n_tuts tut1 tut2 tut3 tut4 tut5 tut6 tut7 tut8 tut9 tut10 tut11 tut12 tut13 tut14 tut15 tut16
7 Variables:	Test1 test2 test3 test4 test_tot4 best3 final

Table 3						
2005 Sem1 Table of Simple Statistics						
Variable	N	Mean	Std Dev	Median	Minimum	Maximum
tut1_3	148	260.45946	61.53572	291.00000	0	300.00000
tut4_7	148	335.16892	101.16830	379.00000	0	400.00000
tut8_11	148	246.77027	83.51993	280.00000	0	300.00000
tut12_16	148	212.37838	91.22033	246.50000	0	300.00000
tut_total	148	1055	270.63234	1156	61.00000	1300
n_tuts	148	15.95946	0.19789	16.00000	15.00000	16.00000
tut1	148	87.70270	20.38088	96.00000	0	100.00000
tut2	148	90.03378	23.82259	100.00000	0	100.00000
tut3	148	82.72297	30.67025	100.00000	0	100.00000
tut4	148	87.58784	26.63840	97.00000	0	100.00000
tut5	148	86.41892	29.02052	100.00000	0	100.00000
tut6	148	82.87838	29.32875	93.00000	0	100.00000
tut7	148	78.28378	33.58147	100.00000	0	100.00000
tut8	142	87.20423	22.20936	100.00000	0	100.00000
tut9	148	86.73649	31.17808	100.00000	0	100.00000
tut10	148	76.36486	34.07558	100.00000	0	100.00000
tut11	148	0	0	0	0	0
tut12	148	64.25000	33.38802	79.00000	0	100.00000
tut13	148	0	0	0	0	0
tut14	148	82.57432	34.87940	100.00000	0	100.00000
tut15	148	65.55405	39.46294	89.50000	0	100.00000
tut16	148	0	0	0	0	0
test1	144	54.93056	20.06969	60.00000	10.00000	100.00000
test2	148	40.40541	18.17819	40.00000	0	90.00000
test3	144	49.23611	19.25464	50.00000	0	100.00000
test4	143	52.16783	21.59616	50.00000	10.00000	100.00000
test_tot4	148	192.16216	51.80472	190.00000	40.00000	330.00000
best3	148	165.33784	41.14708	160.00000	40.00000	260.00000
final	148	65.18563	13.59382	66.09667	29.12667	95.33333

Table 4							
2005 Sem1 Table of Spearman Correlation Coefficients							
Spearman Correlation Coefficients Prob > |r| under H0: Rho=0 Number of Observations							
	test1	**test2**	**test3**	**test4**	**test_tot4**	**best3**	**final**
tut1_3	0.11714 0.1620 144	0.01143 0.8904 148	0.10421 0.2139 144	0.13077 0.1195 143	0.14574 0.0772 148	0.12017 0.1457 148	0.31025 0.0001 148
tut4_7	0.10093 0.2287 144	-0.05182 0.5316 148	0.13543 0.1056 144	0.06893 0.4134 143	0.12133 0.1418 148	0.11373 0.1687 148	0.32274 <.0001 148
tut8_11	0.10706 0.2015 144	-0.04814 0.5612 148	0.28045 0.0007 144	0.19721 0.0182 143	0.24407 0.0028 148	0.23326 0.0043 148	0.45710 <.0001 148
tut12_16	0.27964 0.0007 144	0.13131 0.1116 148	0.22074 0.0078 144	0.29162 0.0004 143	0.40561 <.0001 148	0.41409 <.0001 148	0.58898 <.0001 148
tut_total	0.28317 0.0006 144	0.03550 0.6684 148	0.31716 0.0001 144	0.25737 0.0019 143	0.39438 <.0001 148	0.38367 <.0001 148	0.62802 <.0001 148
n_tuts	0.09726 0.2462 144	0.05100 0.5382 148	0.05669 0.4997 144	0.16641 0.0470 143	0.17679 0.0316 148	0.16093 0.0507 148	0.24779 0.0024 148
tut1	0.01915 0.8197 144	-0.05977 0.4706 148	0.08653 0.3024 144	0.11390 0.1756 143	0.04144 0.6170 148	0.02429 0.7695 148	0.17184 0.0368 148
tut2	0.11035 0.1880 144	-0.11187 0.1758 148	0.20458 0.0139 144	0.14265 0.0892 143	0.16252 0.0484 148	0.11178 0.1762 148	0.28096 0.0005 148
tut3	0.17551 0.0354 144	0.04563 0.5818 148	0.10155 0.2259 144	0.14731 0.0791 143	0.22883 0.0051 148	0.19707 0.0164 148	0.36179 <.0001 148
tut4	0.01726 0.8373 144	0.02880 0.7282 148	0.13481 0.1072 144	0.14606 0.0817 143	0.15215 0.0649 148	0.13517 0.1014 148	0.29207 0.0003 148
tut5	0.13588 0.1044 144	-0.01033 0.9008 148	0.09177 0.2740 144	0.08027 0.3406 143	0.15315 0.0631 148	0.14394 0.0809 148	0.34118 <.0001 148
tut6	0.06125 0.4658 144	-0.10459 0.2059 148	0.11877 0.1562 144	0.06401 0.4476 143	0.06013 0.4679 148	0.06917 0.4035 148	0.26359 0.0012 148

Table 4							
2005 Sem1 Table of Spearman Correlation Coefficients							
Spearman Correlation Coefficients Prob > |r| under H0: Rho=0 Number of Observations							
	test1	**test2**	**test3**	**test4**	**test_tot4**	**best3**	**final**
tut7	0.05327 0.5260 144	-0.11812 0.1528 148	0.07908 0.3461 144	0.01896 0.8221 143	0.03399 0.6817 148	0.03488 0.6739 148	0.24028 0.0033 148
tut8	0.01276 0.8819 138	0.01013 0.9048 142	0.26192 0.0018 139	0.16797 0.0498 137	0.18188 0.0303 142	0.16788 0.0458 142	0.34199 <.0001 142
tut9	0.11661 0.1640 144	-0.00936 0.9101 148	0.11106 0.1851 144	0.22646 0.0065 143	0.22599 0.0057 148	0.21263 0.0095 148	0.43627 <.0001 148
tut10	0.08901 0.2887 144	-0.07432 0.3693 148	0.25103 0.0024 144	0.14213 0.0904 143	0.20415 0.0128 148	0.19946 0.0151 148	0.41799 <.0001 148
tut11	. . 144	. . 148	. . 144	. . 143	. . 148	. . 148	. . 148
tut12	0.22303 0.0072 144	0.05307 0.5218 148	0.28461 0.0005 144	0.21382 0.0103 143	0.32501 <.0001 148	0.31856 <.0001 148	0.48765 <.0001 148
tut13	. . 144	. . 148	. . 144	. . 143	. . 148	. . 148	. . 148
tut14	0.13900 0.0966 144	0.17915 0.0294 148	0.12864 0.1244 144	0.29336 0.0004 143	0.35728 <.0001 148	0.35036 <.0001 148	0.51568 <.0001 148
tut15	0.25086 0.0024 144	0.17438 0.0340 148	0.13318 0.1115 144	0.20524 0.0139 143	0.32001 <.0001 148	0.34989 <.0001 148	0.46819 <.0001 148
tut16	. . 144	. . 148	. . 144	. . 143	. . 148	. . 148	. . 148

D4_2: UNIVARIATE PROCEDURE -TUTORIAL TOTAL

Table 5			
2005 Sem1 Table of Moments			
N	148	**Sum Weights**	148
Mean	1054.77703	**Sum Observations**	156107
Std Deviation	270.632336	**Variance**	73241.8615
Skewness	-1.8776001	**Kurtosis**	3.12769797
Uncorrected SS	175424631	**Corrected SS**	10766553.6
Coeff Variation	25.6577769	**Std Error Mean**	22.245841

Table 6			
2005 Sem1 Table of Basic Statistical Measures			
Location		**Variability**	
Mean	1054.777	**Std Deviation**	270.63234
Median	1156.000	**Variance**	73242
Mode	1275.000	**Range**	1239
		Interquartile Range	240.50000

Table 7				
2005 Sem1 Table of Tests for Location: Mu0=0				
Test	**Statistic**		**p Value**	
Student's t	**T**	47.41457	**Pr > |t|**	<.0001
Sign	**M**	74	**Pr >= |M|**	<.0001
Signed Rank	**S**	5513	**Pr >= |S|**	<.0001

Table 8	
2005 Sem1 Table of Quantile Estimates	
Quantiles (Definition 5)	
Quantile	Estimate
100% Max	1300.0
99%	1292.0
95%	1275.0
90%	1269.0
75% Q3	1233.5
50% Median	1156.0
25% Q1	993.0
10%	700.0
5%	367.0
1%	76.0
0% Min	61.0

Table 9			
2005 Sem1 Table of Extreme Observations			
Lowest		Highest	
Value	Obs	Value	Obs
61	13	1280	127
76	44	1289	24
200	38	1292	49
283	136	1292	133
294	17	1300	30

Figure 72: 2005 First Semester Normal Probability Plots for Tutorial Total

D4_3: UNIVARIATE PROCEDURE – BEST3

Table 10			
2005 Sem1 Table of Basic Statistical Measures			
Location		Variability	
Mean	192.1622	Std Deviation	51.80472
Median	190.0000	Variance	2684
Mode	190.0000	Range	290.00000
		Interquartile Range	70.00000

Table 11				
2005 Sem1 Table of Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	T	45.12627	Pr > |t|	<.0001
Sign	M	74	Pr >= |M|	<.0001
Signed Rank	S	5513	Pr >= |S|	<.0001

Table 12	
2005 Sem1 Table of Quantile Estimates	
Quantiles (Definition 5)	
Quantile	Estimate
100% Max	330
99%	330
95%	290
90%	250
75% Q3	230
50% Median	190
25% Q1	160
10%	130
5%	110
1%	90
0% Min	40

Table 13			
2005 Sem1 Table of Extreme Observations			
Lowest		Highest	
Value	Obs	Value	Obs
40	1	300	19
90	32	310	29
90	14	320	133
100	134	330	30
110	124	330	127

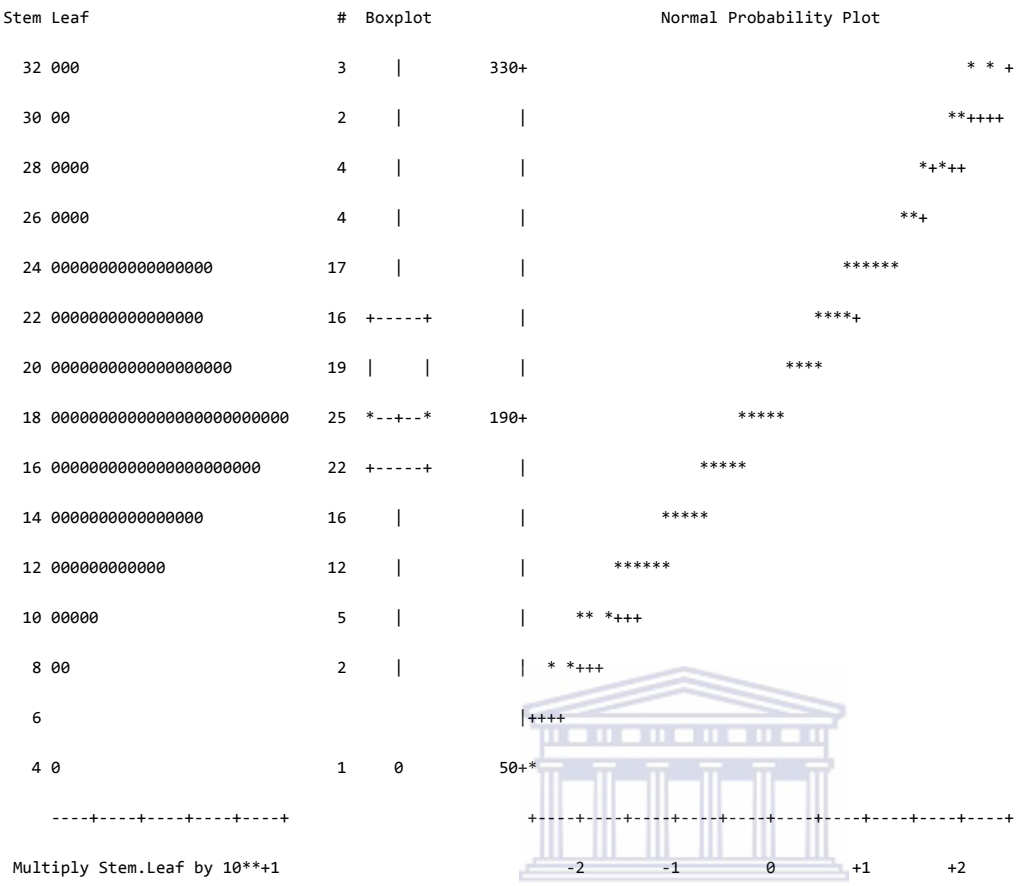


Figure 73: 2005 First Semester Normal Probability Plots for Best3

D4_4: UNIVARIATE PROCEDURE - FINAL

Table 14			
2005 Sem1 Table of Moments			
N	148	**Sum Weights**	148
Mean	165.337838	**Sum Observations**	24470
Std Deviation	41.1470821	**Variance**	1693.08237
Skewness	0.17946167	**Kurtosis**	-0.1990765
Uncorrected SS	4294700	**Corrected SS**	248883.108
Coeff Variation	24.88667	**Std Error Mean**	3.38226932

Table 15			
2005 Sem1 Table of Basic Statistical Measures			
Location		**Variability**	
Mean	165.3378	**Std Deviation**	41.14708
Median	160.0000	**Variance**	1693
Mode	130.0000	**Range**	220.00000
		Interquartile Range	60.00000

Table 16				
2005 Sem1 Table of Tests for Location: Mu0=0				
Test	**Statistic**		**p Value**	
Student's t	**t**	48.8837	**Pr > |t|**	<.0001
Sign	**M**	74	**Pr >= |M|**	<.0001
Signed Rank	**S**	5513	**Pr >= |S|**	<.0001

Table 17	
2005 Sem1 Table of Quantile Estimates	
Quantiles (Definition 5)	
Quantile	Estimate
100% Max	260
99%	260
95%	240
90%	220
75% Q3	190
50% Median	160
25% Q1	130
10%	120
5%	110
1%	90
0% Min	40

Table 18			
2005 Sem1 Table of Extreme Observations			
Lowest		Highest	
Value	Obs	Value	Obs
40	1	240	138
90	124	260	19
90	32	260	30
90	14	260	127
100	134	260	133

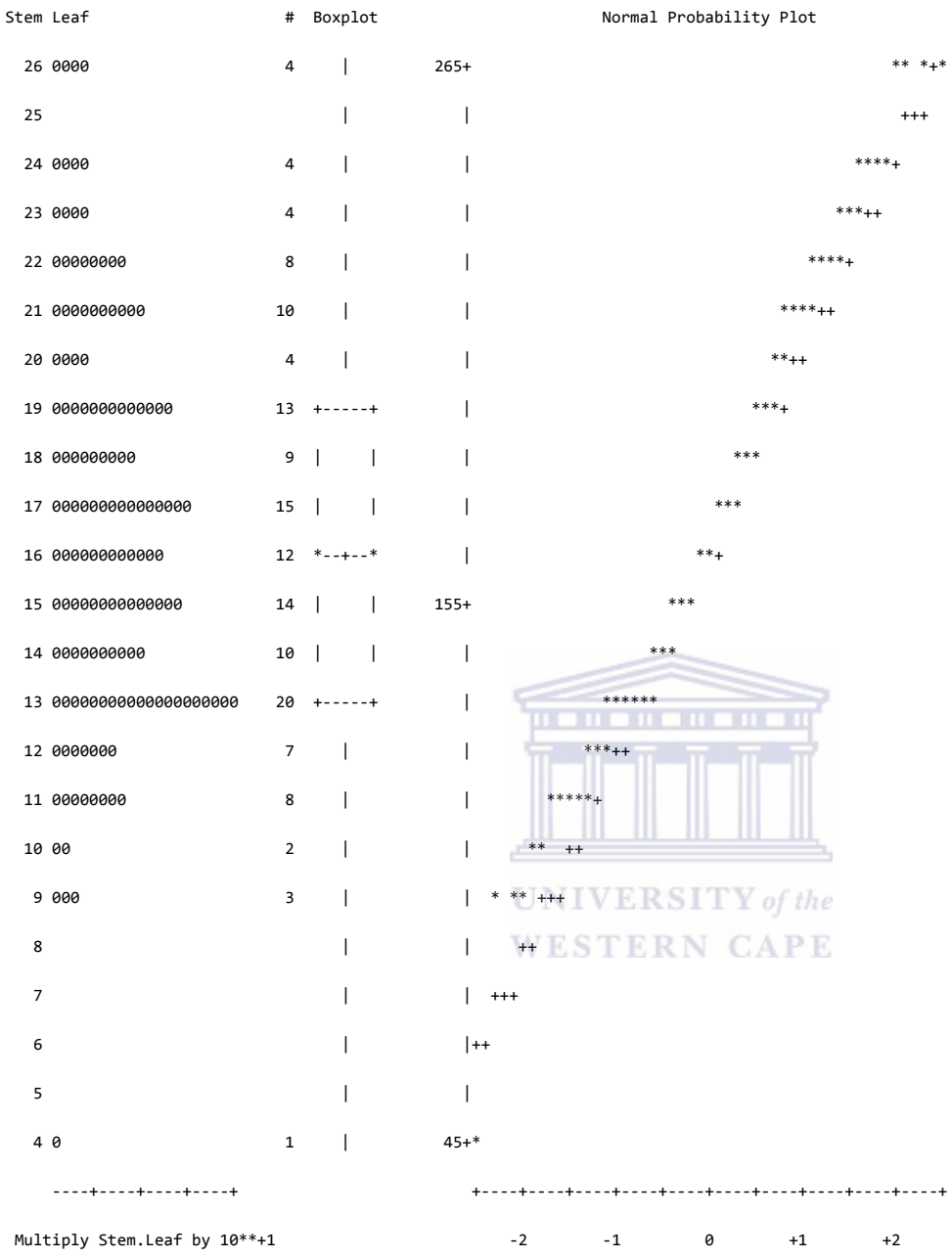


Figure 74: 2005 First Semester Normal Probability Plots for Final

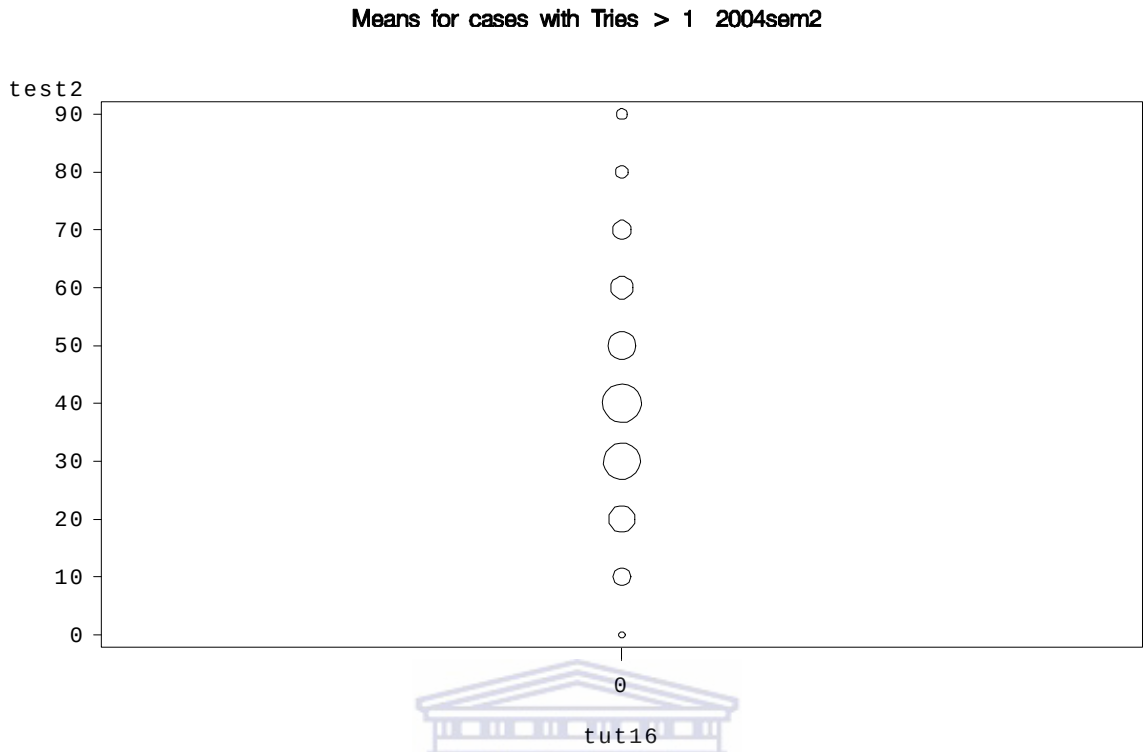


Figure 75: 2005 First Semester

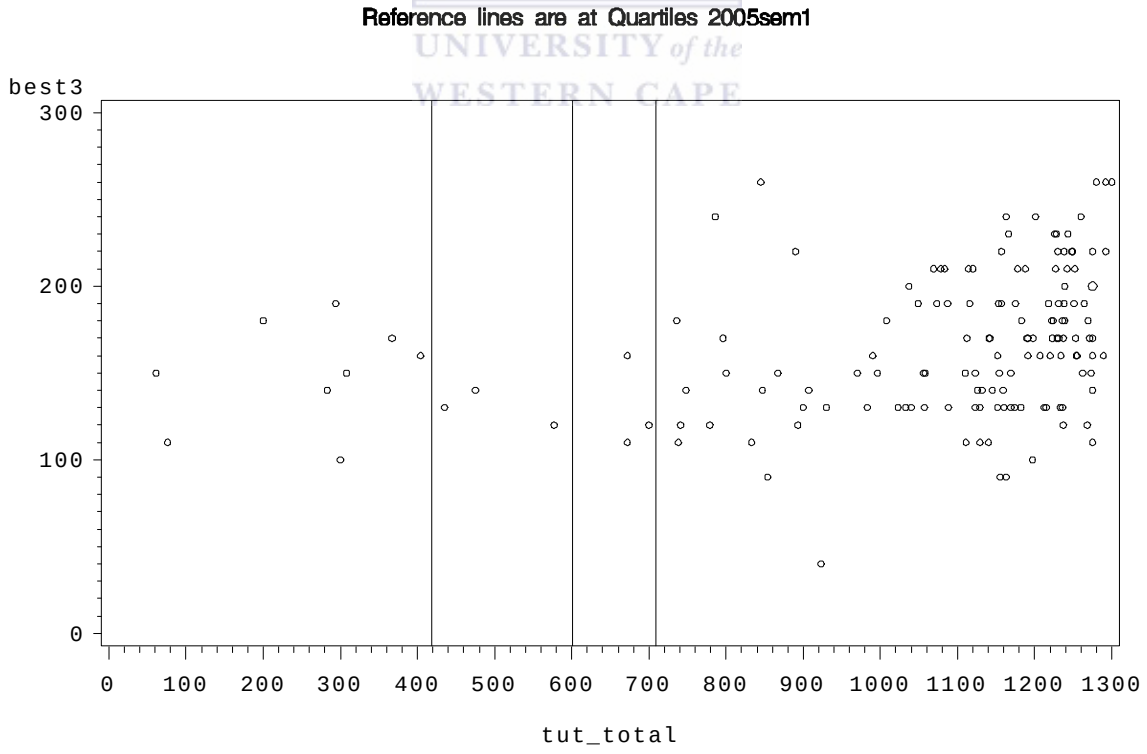


Figure 76: 2005 First Semester

D4_5: MEANS PROCEDURE – ALL VARIABLES

Table 19					
2005 Sem1 Table of Variable Estimates					
Variable	**N**	**Mean**	**Std Dev**	**Minimum**	**Maximum**
Tutorial	4315	8.9191194	4.7851564	1.0000000	16.0000000
studnum	4315	2523830.66	500014.02	2028829.00	9927288.00
TestDate	4315	16543.84	31.1912351	16477.00	16580.00
Score	4315	68.8090382	33.7650691	0	100.0000000
Time	4315	21.4762457	16.0877888	0	60.0000000
Semester	4315	2015.00	0	2015.00	2015.00
order	4315	48927.87	1366.51	46496.00	51225.00

D4_6: UNIVARIATE PROCEDURE – SCORE

Table 20			
2005 Sem1 Table of Moments			
N	4315	**Sum Weights**	4315
Mean	68.8090382	**Sum Observations**	296911
Std Deviation	33.7650691	**Variance**	1140.07989
Skewness	-0.8130706	**Kurtosis**	-0.6321657
Uncorrected SS	25348465	**Corrected SS**	4918304.65
Coeff Variation	49.0706889	**Std Error Mean**	0.51401672

Table 21			
2005 Sem1 Table of Basic Statistical Measures			
Location		**Variability**	
Mean	68.8090	**Std Deviation**	33.76507
Median	83.0000	**Variance**	1140
Mode	100.0000	**Range**	100.00000
		Interquartile Range	52.00000

Table 22				
2005 Sem1 Table of Tests for Location: Mu0=0				
Test	**Statistic**		**p Value**	
Student's t	**t**	133.8654	**Pr > |t|**	<.0001
Sign	**M**	1955	**Pr >= |M|**	<.0001
Signed Rank	**S**	3823003	**Pr >= |S|**	<.0001

Table 23	
2005 Sem1 Table of Quantile Estimates	
Quantiles (Definition 5)	
Quantile	Estimate
100% Max	100
99%	100
95%	100
90%	100
75% Q3	100
50% Median	83
25% Q1	48
10%	6
5%	0
1%	0
0% Min	0

Table 24			
2005 Sem1 Table of Extreme Observations			
Lowest		Highest	
Value	Obs	Value	Obs
0	4313	100	4306
0	4285	100	4307
0	4247	100	4308
0	4246	100	4311
0	4245	100	4312

Histogram # Boxplot

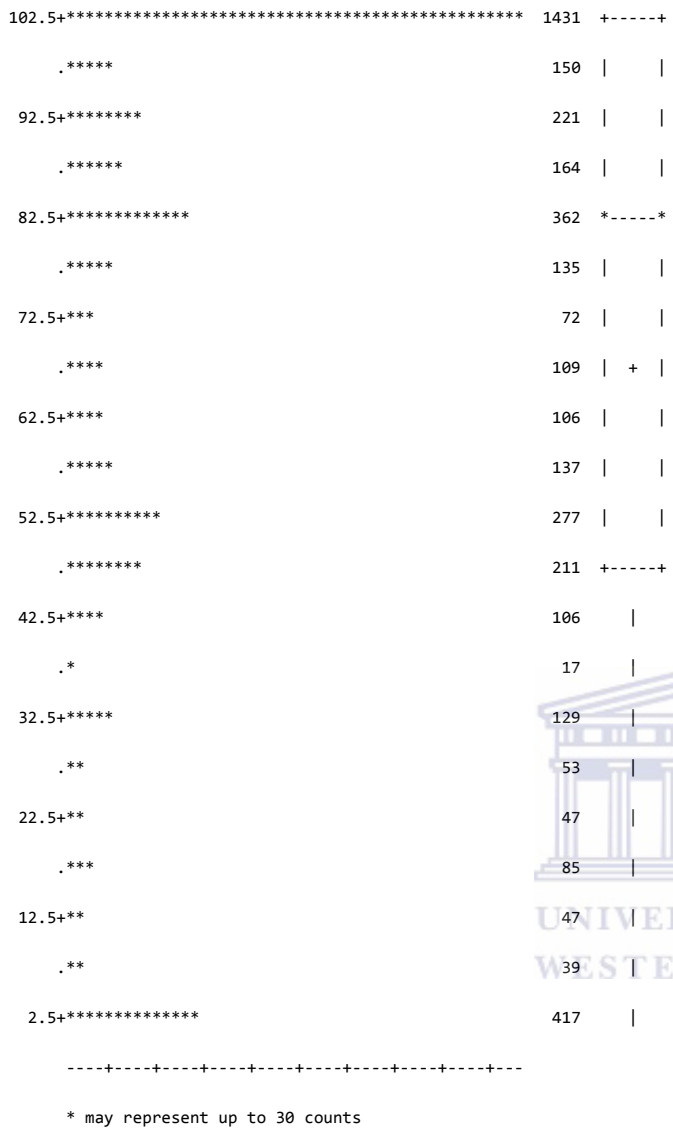
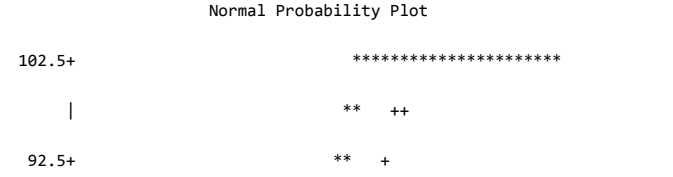


Figure 77: 2005 First Semester Histogram for Score



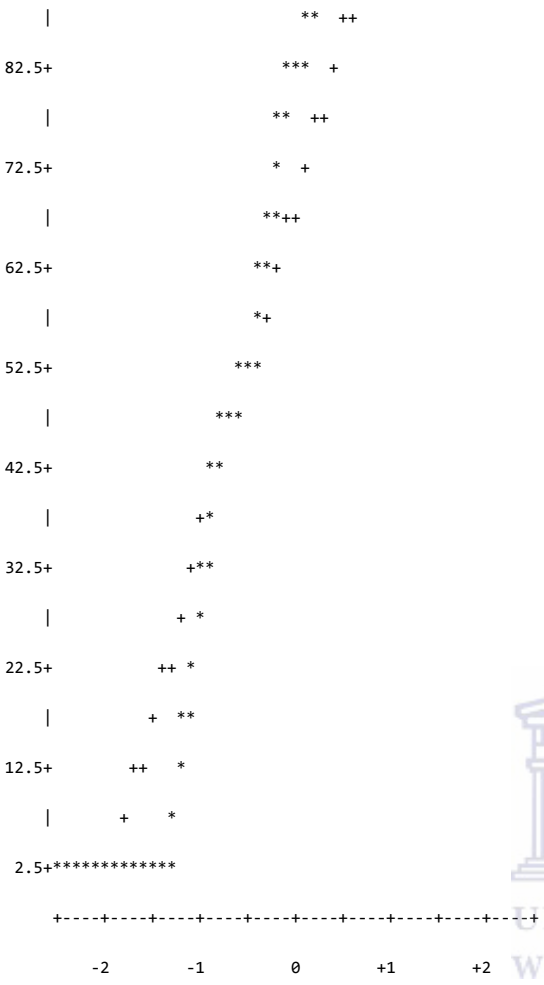


Figure 78: 2005 First Semester Normal Probability Plots for Score

D4_7: UNIVARIATE PROCEDURE - TIME

Table 25			
2005 Sem1 Table of Moments			
N	4315	**Sum Weights**	4315
Mean	21.4762457	**Sum Observations**	92670
Std Deviation	16.0877888	**Variance**	258.816948

Table 25			
2005 Sem1 Table of Moments			
Skewness	0.62210233	**Kurtosis**	-0.6465054
Uncorrected SS	3106740	**Corrected SS**	1116536.32
Coeff Variation	74.9096888	**Std Error Mean**	0.24490968

Table 26			
2005 Sem1 Table of Basic Statistical Measures			
Location		**Variability**	
Mean	21.47625	**Std Deviation**	16.08779
Median	18.00000	**Variance**	258.81695
Mode	3.00000	**Range**	60.00000
		Interquartile Range	25.00000

Table 27				
2005 Sem1 Table of Tests for Location: Mu0=0				
Test	**Statistic**		**p Value**	
Student's t	**T**	87.69047	**Pr > |t|**	<.0001
Sign	**M**	2082.5	**Pr >= |M|**	<.0001
Signed Rank	**S**	4337848	**Pr >= |S|**	<.0001

Table 28	
2005 Sem1 Table of Quantile Estimates	
Quantiles (Definition 5)	
Quantile	Estimate
100% Max	60
99%	59
95%	53
90%	46
75% Q3	33
50% Median	18
25% Q1	8
10%	3
5%	2
1%	0
0% Min	0

Table 29			
2005 Sem1 Table of Extreme Observations			
Lowest		Highest	
Value	Obs	Value	Obs
0	4313	60	2982
0	4307	60	3230
0	4269	60	3269
0	4268	60	4038
0	4176	60	4076

Histogram # Boxplot

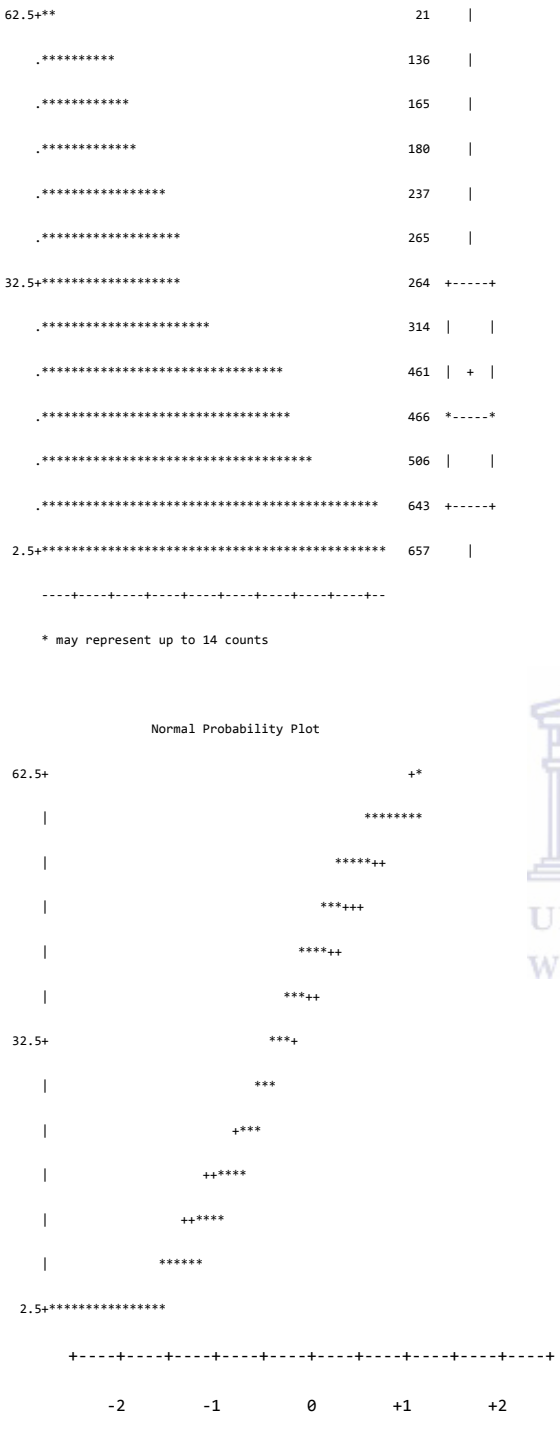


Figure 79: 2005 First Semester Normal Probability Plots for Time

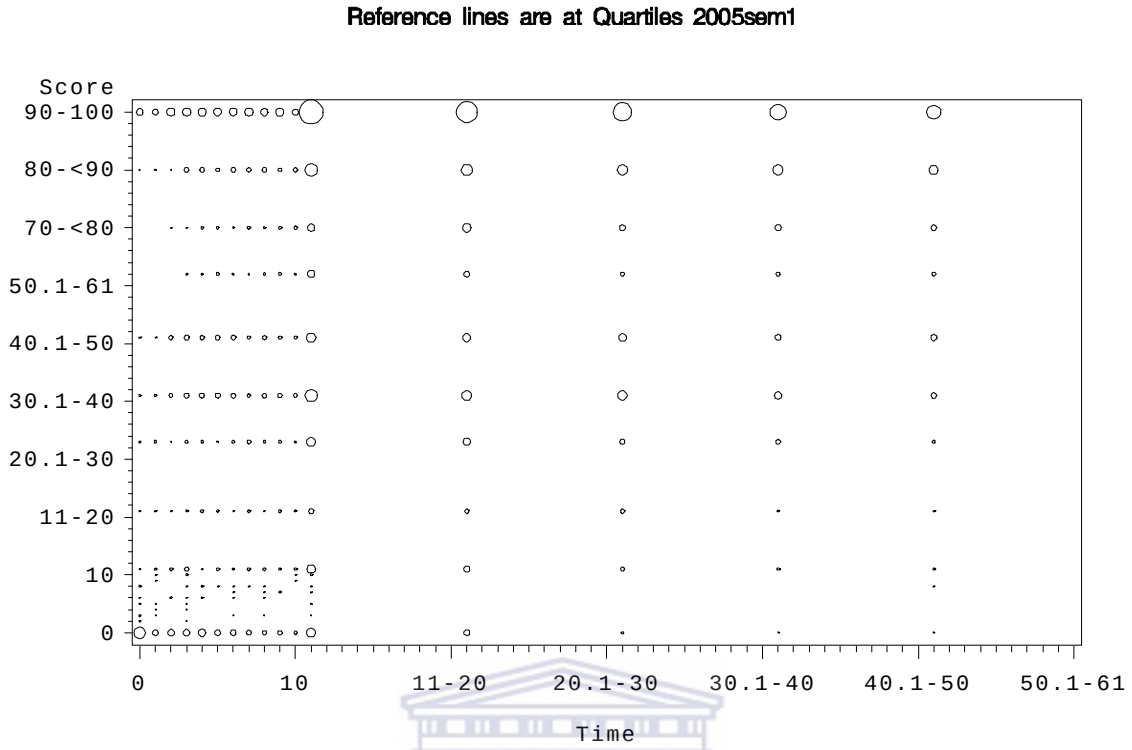


Figure 80: 2005 First Semester

Table 30													
2005 Sem1 Table of Tutorial by Score													
Tutorial	**Score**												
Frequency **Percent** **Row Pct** **Col Pct**	**0**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11-20**	**20.1-30**	**30.1-40**
1	6 0.14 2.33 1.48	1 0.02 0.39 33.33	0 0.00 0.00 0.00	2 0.05 0.78 100.00	1 0.02 0.39 16.67	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	1 0.02 0.39 50.00	0 0.00 0.00 0.00	1 0.02 0.39 0.68	1 0.02 0.39 1.27	11 0.25 4.26 5.67
2	14 0.32 4.58 3.46	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	16 0.37 5.23 20.25	0 0.00 0.00 0.00
3	27 0.63 10.89 6.67	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	22 0.51 8.87 14.86	18 0.42 7.26 22.78	0 0.00 0.00 0.00
4	3 0.07 1.35 0.74	0 0.00 0.00 0.00	5 0.12 2.24 71.43	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	1 0.02 0.45 14.29	0 0.00 0.00 0.00	0 0.00 0.00 0.00	6 0.14 2.69 75.00	1 0.02 0.45 0.68	2 0.05 0.90 2.53	0 0.00 0.00 0.00
5	4 0.09 1.62 0.99	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	2 0.05 0.81 25.00	2 0.05 0.81 1.35	1 0.02 0.40 1.27	7 0.16 2.83 3.61
6	8 0.19 3.23 1.98	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	6 0.14 2.42 85.71	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	4 0.09 1.61 2.70	11 0.25 4.44 13.92	5 0.12 2.02 2.58
7	6 0.14 2.35 1.48	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	5 0.12 1.96 3.38	15 0.35 5.88 18.99	12 0.28 4.71 6.19
8	5 0.12 2.38 1.23	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	5 0.12 2.38 38.46	0 0.00 0.00 0.00	0 0.00 0.00 0.00	4 0.09 1.90 2.70	3 0.07 1.43 3.80	4 0.09 1.90 2.06
9	8 0.19 3.05 1.98	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	3 0.07 1.15 2.03	0 0.00 0.00 0.00	0 0.00 0.00 0.00
10	15 0.35 7.54 3.70	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	15 0.35 7.54 10.14	0 0.00 0.00 0.00	25 0.58 12.56 12.89
11	9 0.21 4.43 2.22	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	7 0.16 3.45 4.73	2 0.05 0.99 2.53	18 0.42 8.87 9.28
12	5 0.12 2.65 1.23	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	1 0.02 0.53 0.68	0 0.00 0.00 0.00	14 0.32 7.41 7.22

Table 30													
2005 Sem1 Table of Tutorial by Score													
Tutorial	**Score**												
Frequency **Percent** **Row Pct** **Col Pct**	**0**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11-20**	**20.1-30**	**30.1-40**
13	123 2.85 22.65 30.37	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	75 1.74 13.81 50.68	0 0.00 0.00 0.00	92 2.13 16.94 47.42
14	5 0.12 2.44 1.23	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	1 0.02 0.49 16.67	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	1 0.02 0.49 0.68	0 0.00 0.00 0.00	0 0.00 0.00 0.00
15	163 3.78 33.27 40.25	0 0.00 0.00 0.00	2 0.05 0.41 28.57	0 0.00 0.00 0.00	3 0.07 0.61 50.00	11 0.25 2.24 100.00	0 0.00 0.00 0.00	8 0.19 1.63 61.54	1 0.02 0.20 50.00	0 0.00 0.00 0.00	7 0.16 1.43 4.73	10 0.23 2.04 12.66	6 0.14 1.22 3.09
16	4 0.09 1.75 0.99	2 0.05 0.87 66.67	0 0.00 0.00 0.00	0 0.00 0.00 0.00	1 0.02 0.44 16.67	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00
Total	405 9.39	3 0.07	7 0.16	2 0.05	6 0.14	11 0.25	7 0.16	13 0.30	2 0.05	8 0.19	148 3.43	79 1.83	194 4.50

Table 31							
2005 Sem1 Table of Tutorial by Score							
Tutorial	Score						
Frequency Percent Row Pct Col Pct	40.1-50	50.1-61	61.1-<70	70-<80	80-<90	90-100	Total
1	43 1.00 16.67 9.77	16 0.37 6.20 4.95	10 0.23 3.88 7.58	14 0.32 5.43 6.76	36 0.83 13.95 6.84	115 2.67 44.57 6.38	258 5.98
2	65 1.51 21.24 14.77	0 0.00 0.00 0.00	0 0.00 0.00 0.00	27 0.63 8.82 13.04	0 0.00 0.00 0.00	184 4.26 60.13 10.21	306 7.09
3	8 0.19 3.23 1.82	17 0.39 6.85 5.26	0 0.00 0.00 0.00	6 0.14 2.42 2.90	18 0.42 7.26 3.42	132 3.06 53.23 7.33	248 5.75
4	2 0.05 0.90 0.45	5 0.12 2.24 1.55	2 0.05 0.90 1.52	4 0.09 1.79 1.93	11 0.25 4.93 2.09	181 4.19 81.17 10.04	223 5.17
5	5 0.12 2.02 1.14	4 0.09 1.62 1.24	0 0.00 0.00 0.00	14 0.32 5.67 6.76	14 0.32 5.67 2.66	194 4.50 78.54 10.77	247 5.72
6	10 0.23 4.03 2.27	10 0.23 4.03 3.10	3 0.07 1.21 2.27	30 0.70 12.10 14.49	29 0.67 11.69 5.51	132 3.06 53.23 7.33	248 5.75
7	10 0.23 3.92 2.27	10 0.23 3.92 3.10	15 0.35 5.88 11.36	20 0.46 7.84 9.66	52 1.21 20.39 9.89	110 2.55 43.14 6.10	255 5.91
8	13 0.30 6.19 2.95	13 0.30 6.19 4.02	9 0.21 4.29 6.82	22 0.51 10.48 10.63	21 0.49 10.00 3.99	111 2.57 52.86 6.16	210 4.87
9	5 0.12 1.91 1.14	31 0.72 11.83 9.60	0 0.00 0.00 0.00	5 0.12 1.91 2.42	19 0.44 7.25 3.61	191 4.43 72.90 10.60	262 6.07

Table 31							
2005 Sem1 Table of Tutorial by Score							
Tutorial	**Score**						
Frequency **Percent** **Row Pct** **Col Pct**	**40.1-50**	**50.1-61**	**61.1-<70**	**70-<80**	**80-<90**	**90-100**	**Total**
10	2 0.05 1.01 0.45	24 0.56 12.06 7.43	0 0.00 0.00 0.00	0 0.00 0.00 0.00	27 0.63 13.57 5.13	91 2.11 45.73 5.05	199 4.61
11	3 0.07 1.48 0.68	52 1.21 25.62 16.10	0 0.00 0.00 0.00	2 0.05 0.99 0.97	110 2.55 54.19 20.91	0 0.00 0.00 0.00	203 4.70
12	10 0.23 5.29 2.27	17 0.39 8.99 5.26	16 0.37 8.47 12.12	38 0.88 20.11 18.36	51 1.18 26.98 9.70	37 0.86 19.58 2.05	189 4.38
13	49 1.14 9.02 11.14	0 0.00 0.00 0.00	49 1.14 9.02 37.12	0 0.00 0.00 0.00	109 2.53 20.07 20.72	46 1.07 8.47 2.55	543 12.58
14	1 0.02 0.49 0.23	3 0.07 1.46 0.93	5 0.12 2.44 3.79	2 0.05 0.98 0.97	20 0.46 9.76 3.80	167 3.87 81.46 9.27	205 4.75
15	54 1.25 11.02 12.27	85 1.97 17.35 26.32	11 0.25 2.24 8.33	10 0.23 2.04 4.83	9 0.21 1.84 1.71	110 2.55 22.45 6.10	490 11.36
16	160 3.71 69.87 36.36	36 0.83 15.72 11.15	12 0.28 5.24 9.09	13 0.30 5.68 6.28	0 0.00 0.00 0.00	1 0.02 0.44 0.06	229 5.31
Total	440 10.20	323 7.49	132 3.06	207 4.80	526 12.19	1802 41.76	4315 100.00

Table 32												
2005 Sem1 Table of Tutorial by Time												
Tutorial	**Time**											
Frequency **Percent** **Row Pct** **Col Pct**	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11-20**
1	4 0.09 1.55 2.67	1 0.02 0.39 1.54	0 0.00 0.00 0.00	2 0.05 0.78 1.23	0 0.00 0.00 0.00	0 0.00 0.00 0.00	1 0.02 0.39 0.75	4 0.09 1.55 3.20	2 0.05 0.78 1.68	4 0.09 1.55 3.13	2 0.05 0.78 2.27	30 0.70 11.63 3.02
2	8 0.19 2.61 5.33	6 0.14 1.96 9.23	11 0.25 3.59 9.24	12 0.28 3.92 7.41	9 0.21 2.94 5.59	16 0.37 5.23 11.68	13 0.30 4.25 9.70	15 0.35 4.90 12.00	14 0.32 4.58 11.76	20 0.46 6.54 15.63	13 0.30 4.25 14.77	103 2.39 33.66 10.37
3	16 0.37 6.45 10.67	2 0.05 0.81 3.08	2 0.05 0.81 1.68	2 0.05 0.81 1.23	4 0.09 1.61 2.48	1 0.02 0.40 0.73	1 0.02 0.40 0.75	0 0.00 0.00 0.00	2 0.05 0.81 1.68	5 0.12 2.02 3.91	5 0.12 2.02 5.68	52 1.21 20.97 5.24
4	4 0.09 1.79 2.67	2 0.05 0.90 3.08	2 0.05 0.90 1.68	4 0.09 1.79 2.47	2 0.05 0.90 1.24	1 0.02 0.45 0.73	4 0.09 1.79 2.99	3 0.07 1.35 2.40	4 0.09 1.79 3.36	5 0.12 2.24 3.91	2 0.05 0.90 2.27	52 1.21 23.32 5.24
5	3 0.07 1.21 2.00	2 0.05 0.81 3.08	3 0.07 1.21 2.52	8 0.19 3.24 4.94	9 0.21 3.64 5.59	7 0.16 2.83 5.11	10 0.23 4.05 7.46	11 0.25 4.45 8.80	11 0.25 4.45 9.24	11 0.25 4.45 8.59	5 0.12 2.02 5.68	90 2.09 36.44 9.06
6	6 0.14 2.42 4.00	1 0.02 0.40 1.54	3 0.07 1.21 2.52	3 0.07 1.21 1.85	4 0.09 1.61 2.48	5 0.12 2.02 3.65	7 0.16 2.82 5.22	6 0.14 2.42 4.80	8 0.19 3.23 6.72	9 0.21 3.63 7.03	5 0.12 2.02 5.68	38 0.88 15.32 3.83
7	2 0.05 0.78 1.33	4 0.09 1.57 6.15	8 0.19 3.14 6.72	8 0.19 3.14 4.94	9 0.21 3.53 5.59	6 0.14 2.35 4.38	10 0.23 3.92 7.46	8 0.19 3.14 6.40	7 0.16 2.75 5.88	4 0.09 1.57 3.13	5 0.12 1.96 5.68	51 1.18 20.00 5.14
8	7 0.16 3.33 4.67	0 0.00 0.00 0.00	1 0.02 0.48 0.84	2 0.05 0.95 1.23	0 0.00 0.00 0.00	1 0.02 0.48 0.73	1 0.02 0.48 0.75	1 0.02 0.48 0.80	2 0.05 0.95 1.68	2 0.05 0.95 1.56	0 0.00 0.00 0.00	19 0.44 9.05 1.91
9	39 0.90 14.89 26.00	20 0.46 7.63 30.77	14 0.32 5.34 11.76	15 0.35 5.73 9.26	12 0.28 4.58 7.45	13 0.30 4.96 9.49	9 0.21 3.44 6.72	15 0.35 5.73 12.00	10 0.23 3.82 8.40	9 0.21 3.44 7.03	8 0.19 3.05 9.09	29 0.67 11.07 2.92

Table 32												
2005 Sem1 Table of Tutorial by Time												
Tutorial	**Time**											
Frequency **Percent** **Row Pct** **Col Pct**	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11-20**
10	7 0.16 3.52 4.67	1 0.02 0.50 1.54	2 0.05 1.01 1.68	1 0.02 0.50 0.62	3 0.07 1.51 1.86	0 0.00 0.00 0.00	4 0.09 2.01 2.99	2 0.05 1.01 1.60	0 0.00 0.00 0.00	2 0.05 1.01 1.56	0 0.00 0.00 0.00	31 0.72 15.58 3.12
11	4 0.09 1.97 2.67	1 0.02 0.49 1.54	1 0.02 0.49 0.84	3 0.07 1.48 1.85	2 0.05 0.99 1.24	4 0.09 1.97 2.92	6 0.14 2.96 4.48	6 0.14 2.96 4.80	5 0.12 2.46 4.20	2 0.05 0.99 1.56	4 0.09 1.97 4.55	43 1.00 21.18 4.33
12	5 0.12 2.65 3.33	5 0.12 2.65 7.69	0 0.00 0.00 0.00	0 0.00 0.00 0.00	3 0.07 1.59 1.86	2 0.05 1.06 1.46	2 0.05 1.06 1.49	1 0.02 0.53 0.80	1 0.02 0.53 0.84	2 0.05 1.06 1.56	6 0.14 3.17 6.82	39 0.90 20.63 3.93
13	14 0.32 2.58 9.33	14 0.32 2.58 21.54	19 0.44 3.50 15.97	22 0.51 4.05 13.58	24 0.56 4.42 14.91	18 0.42 3.31 13.14	18 0.42 3.31 13.43	24 0.56 4.42 19.20	23 0.53 4.24 19.33	25 0.58 4.60 19.53	17 0.39 3.13 19.32	198 4.59 36.46 19.94
14	3 0.07 1.46 2.00	0 0.00 0.00 0.00	1 0.02 0.49 0.84	1 0.02 0.49 0.62	2 0.05 0.98 1.24	1 0.02 0.49 0.73	1 0.02 0.49 0.75	2 0.05 0.98 1.60	2 0.05 0.98 1.68	5 0.12 2.44 3.91	3 0.07 1.46 3.41	79 1.83 38.54 7.96
15	22 0.51 4.49 14.67	6 0.14 1.22 9.23	49 1.14 10.00 41.18	75 1.74 15.31 46.30	72 1.67 14.69 44.72	57 1.32 11.63 41.61	41 0.95 8.37 30.60	27 0.63 5.51 21.60	24 0.56 4.90 20.17	20 0.46 4.08 15.63	9 0.21 1.84 10.23	72 1.67 14.69 7.25
16	6 0.14 2.62 4.00	0 0.00 0.00 0.00	3 0.07 1.31 2.52	4 0.09 1.75 2.47	6 0.14 2.62 3.73	5 0.12 2.18 3.65	6 0.14 2.62 4.48	0 0.00 0.00 0.00	4 0.09 1.75 3.36	3 0.07 1.31 2.34	4 0.09 1.75 4.55	67 1.55 29.26 6.75
Total	150 3.48	65 1.51	119 2.76	162 3.75	161 3.73	137 3.17	134 3.11	125 2.90	119 2.76	128 2.97	88 2.04	993 23.01

Table 33					
2005 Sem1 Table of Tutorial by Time					
Tutorial	Time				
Frequency Percent Row Pct Col Pct	20.1-30	30.1-40	40.1-50	50.1-61	Total
1	45 1.04 17.44 6.22	55 1.27 21.32 10.48	62 1.44 24.03 15.94	46 1.07 17.83 15.49	258 5.98
2	46 1.07 15.03 6.36	10 0.23 3.27 1.90	6 0.14 1.96 1.54	4 0.09 1.31 1.35	306 7.09
3	56 1.30 22.58 7.75	46 1.07 18.55 8.76	33 0.76 13.31 8.48	21 0.49 8.47 7.07	248 5.75
4	34 0.79 15.25 4.70	38 0.88 17.04 7.24	37 0.86 16.59 9.51	29 0.67 13.00 9.76	223 5.17
5	41 0.95 16.60 5.67	21 0.49 8.50 4.00	7 0.16 2.83 1.80	8 0.19 3.24 2.69	247 5.72
6	52 1.21 20.97 7.19	53 1.23 21.37 10.10	21 0.49 8.47 5.40	27 0.63 10.89 9.09	248 5.75
7	56 1.30 21.96 7.75	29 0.67 11.37 5.52	27 0.63 10.59 6.94	21 0.49 8.24 7.07	255 5.91
8	41 0.95 19.52 5.67	55 1.27 26.19 10.48	39 0.90 18.57 10.03	39 0.90 18.57 13.13	210 4.87
9	36 0.83 13.74 4.98	15 0.35 5.73 2.86	10 0.23 3.82 2.57	8 0.19 3.05 2.69	262 6.07

Table 33					
2005 Sem1 Table of Tutorial by Time					
Tutorial	Time				
Frequency Percent Row Pct Col Pct	20.1-30	30.1-40	40.1-50	50.1-61	Total
10	40 0.93 20.10 5.53	40 0.93 20.10 7.62	35 0.81 17.59 9.00	31 0.72 15.58 10.44	199 4.61
11	40 0.93 19.70 5.53	36 0.83 17.73 6.86	30 0.70 14.78 7.71	16 0.37 7.88 5.39	203 4.70
12	30 0.70 15.87 4.15	30 0.70 15.87 5.71	38 0.88 20.11 9.77	25 0.58 13.23 8.42	189 4.38
13	83 1.92 15.29 11.48	27 0.63 4.97 5.14	11 0.25 2.03 2.83	6 0.14 1.10 2.02	543 12.58
14	63 1.46 30.73 8.71	28 0.65 13.66 5.33	10 0.23 4.88 2.57	4 0.09 1.95 1.35	205 4.75
15	12 0.28 2.45 1.66	2 0.05 0.41 0.38	0 0.00 0.00 0.00	2 0.05 0.41 0.67	490 11.36
16	48 1.11 20.96 6.64	40 0.93 17.47 7.62	23 0.53 10.04 5.91	10 0.23 4.37 3.37	229 5.31
Total	723 16.76	525 12.17	389 9.02	297 6.88	4315 100.00

D4_8: CORR PROCEDURE - TIME & SCORE

Table 34	
2005 Sem1 Table of two Variables	
2 Variables:	Time Score

Table 35						
2005 Sem1 Table of Simple Statistics						
Variable	**N**	**Mean**	**Std Dev**	**Median**	**Minimum**	**Maximum**
Time	4315	21.47625	16.08779	18.00000	0	60.00000
Score	4315	68.80904	33.76507	83.00000	0	100.00000

Table 36		
2005 Sem1 Table with Spearman Correlation Coefficient of Time & Score		
Spearman Correlation Coefficients, N = 4315 Prob > |r| under H0: Rho=0		
	Time	**Score**
Time	1.00000	0.24513 <.0001
Score	0.24513 <.0001	1.00000

D4_9: MEANS PROCEDURE - ALL VARIABLES

Table 37									
2005 Sem1 Table of all Variables									
Tutorial	N Obs	Variable	Minimum	10th Pctl	Mean	Median	75th Pctl	90th Pctl	Maximum
1	47	tries	2.0	2.0	3.0	3.0	4.0	5.0	6.0
		max_score	43.0	50.0	87.6	96.0	100.0	100.0	100.0
		improve	0.0	0.0	28.8	34.0	50.0	54.0	67.0
		first_score	0.0	36.0	58.9	50.0	89.0	98.0	100.0
		tries_max	1.0	1.0	2.6	2.0	3.0	4.0	6.0
		post_max_tries	0.0	0.0	0.4	0.0	1.0	2.0	3.0
		first_time	7.0	14.0	36.7	37.0	50.0	54.0	60.0
		total_time	21.0	43.0	96.5	87.0	123.0	160.0	192.0
		best_time	7.0	10.0	32.1	36.0	42.0	50.0	58.0
2	46	tries	2.0	2.0	2.7	2.0	3.0	4.0	8.0
		max_score	25.0	50.0	84.2	100.0	100.0	100.0	100.0
		improve	0.0	0.0	31.0	25.0	50.0	75.0	100.0
		first_score	0.0	0.0	53.3	50.0	75.0	100.0	100.0
		tries_max	1.0	1.0	2.0	2.0	2.0	3.0	8.0
		post_max_tries	0.0	0.0	0.7	1.0	1.0	2.0	4.0
		first_time	2.0	4.0	13.5	12.5	17.0	23.0	36.0
		total_time	10.0	15.0	31.5	30.5	38.0	50.0	71.0
		best_time	1.0	5.0	13.2	11.0	17.0	26.0	36.0
3	36	tries	2.0	2.0	2.4	2.0	2.5	3.0	8.0
		max_score	14.0	14.0	78.2	100.0	100.0	100.0	100.0
		improve	0.0	0.0	32.1	28.5	43.0	86.0	100.0
		first_score	0.0	14.0	46.0	43.0	71.5	100.0	100.0
		tries_max	1.0	1.0	2.0	2.0	2.0	3.0	8.0
		post_max_tries	0.0	0.0	0.4	0.0	1.0	1.0	1.0
		first_time	2.0	10.0	27.2	28.5	35.0	43.0	60.0
		total_time	14.0	20.0	57.1	54.0	78.5	90.0	110.0
		best_time	3.0	10.0	25.9	21.5	33.0	47.0	60.0
4	33	tries	2.0	2.0	2.3	2.0	3.0	3.0	4.0
		max_score	14.0	83.0	90.8	97.0	100.0	100.0	100.0
		improve	0.0	0.0	18.1	4.0	28.0	73.0	87.0
		first_score	0.0	10.0	72.7	93.0	97.0	97.0	100.0
		tries_max	1.0	1.0	2.1	2.0	2.0	3.0	3.0
		post_max_tries	0.0	0.0	0.3	0.0	0.0	1.0	2.0
		first_time	2.0	7.0	23.6	19.0	31.0	50.0	60.0
		total_time	9.0	22.0	50.2	49.0	68.0	79.0	107.0
		best_time	4.0	8.0	23.2	19.0	33.0	43.0	55.0
5	29	tries	2.0	2.0	2.4	2.0	3.0	4.0	5.0
		max_score	40.0	70.0	92.4	100.0	100.0	100.0	100.0
		improve	0.0	0.0	22.1	20.0	30.0	60.0	100.0
		first_score	0.0	30.0	70.3	80.0	90.0	100.0	100.0
		tries_max	1.0	1.0	1.9	2.0	2.0	3.0	4.0
		post_max_tries	0.0	0.0	0.6	0.0	1.0	1.0	2.0
		first_time	3.0	6.0	19.3	16.0	28.0	34.0	55.0
		total_time	12.0	17.0	38.7	36.0	47.0	59.0	111.0
		best_time	3.0	4.0	15.7	13.0	20.0	31.0	57.0
6	46	tries	2.0	2.0	2.3	2.0	2.0	3.0	5.0
		max_score	50.0	64.0	89.2	93.0	100.0	100.0	100.0
		improve	0.0	0.0	30.3	21.5	43.0	79.0	100.0
		first_score	0.0	7.0	58.8	71.0	79.0	93.0	100.0
		tries_max	1.0	1.0	2.2	2.0	2.0	3.0	5.0
		post_max_tries	0.0	0.0	0.2	0.0	0.0	1.0	1.0
		first_time	1.0	8.0	26.9	26.5	37.0	48.0	60.0
		total_time	6.0	23.0	57.7	56.0	71.0	90.0	155.0
		best_time	2.0	5.0	23.3	18.5	37.0	48.0	60.0

Table 37									
2005 Sem1 Table of all Variables									
Tutorial	N Obs	Variable	Minimum	10th Pctl	Mean	Median	75th Pctl	90th Pctl	Maximum
7	45	tries	2.0	2.0	2.6	2.0	3.0	4.0	10.0
		max_score	11.0	67.0	91.9	100.0	100.0	100.0	100.0
		improve	0.0	0.0	32.9	23.0	56.0	67.0	100.0
		first_score	0.0	22.0	59.0	67.0	89.0	89.0	100.0
		tries_max	1.0	1.0	2.4	2.0	2.0	4.0	10.0
		post_max_tries	0.0	0.0	0.2	0.0	0.0	1.0	1.0
		first_time	1.0	5.0	26.2	23.0	43.0	54.0	60.0
		total_time	3.0	18.0	52.4	51.0	73.0	93.0	127.0
		best_time	2.0	4.0	19.9	17.0	28.0	47.0	58.0
8	31	tries	2.0	2.0	2.3	2.0	2.0	3.0	4.0
		max_score	17.0	67.0	87.9	100.0	100.0	100.0	100.0
		improve	0.0	0.0	31.4	33.0	50.0	67.0	75.0
		first_score	0.0	25.0	56.5	58.0	75.0	92.0	100.0
		tries_max	1.0	1.0	1.9	2.0	2.0	3.0	4.0
		post_max_tries	0.0	0.0	0.3	0.0	1.0	1.0	1.0
		first_time	3.0	15.0	30.4	30.0	40.0	51.0	59.0
		total_time	12.0	39.0	69.4	68.0	92.0	105.0	121.0
		best_time	3.0	17.0	31.3	30.0	39.0	54.0	60.0
9	28	tries	2.0	2.0	2.6	2.0	3.0	3.0	7.0
		max_score	14.0	57.0	86.2	100.0	100.0	100.0	100.0
		improve	0.0	0.0	25.0	14.0	43.0	57.0	100.0
		first_score	0.0	14.0	61.2	57.0	86.0	100.0	100.0
		tries_max	1.0	1.0	2.0	2.0	2.0	3.0	6.0
		post_max_tries	0.0	0.0	0.6	0.0	1.0	2.0	2.0
		first_time	1.0	2.0	16.1	11.0	28.5	34.0	40.0
		total_time	5.0	7.0	30.6	30.5	38.5	54.0	103.0
		best_time	1.0	2.0	12.3	9.0	20.5	29.0	35.0
10	33	tries	2.0	2.0	2.4	2.0	3.0	3.0	4.0
		max_score	0.0	60.0	85.5	100.0	100.0	100.0	100.0
		improve	0.0	20.0	45.5	40.0	60.0	80.0	100.0
		first_score	0.0	0.0	40.0	40.0	60.0	80.0	100.0
		tries_max	1.0	2.0	2.1	2.0	2.0	3.0	4.0
		post_max_tries	0.0	0.0	0.2	0.0	0.0	1.0	2.0
		first_time	2.0	6.0	29.1	29.0	39.0	53.0	56.0
		total_time	3.0	32.0	72.8	65.0	101.0	108.0	161.0
		best_time	2.0	9.0	33.8	39.0	45.0	53.0	59.0
11	31	tries	2.0	2.0	2.3	2.0	2.0	3.0	4.0
		max_score	40.0	60.0	72.3	80.0	80.0	80.0	80.0
		improve	0.0	0.0	25.2	20.0	40.0	60.0	60.0
		first_score	0.0	20.0	47.1	50.0	60.0	80.0	80.0
		tries_max	1.0	1.0	2.0	2.0	2.0	3.0	4.0
		post_max_tries	0.0	0.0	0.3	0.0	1.0	1.0	1.0
		first_time	5.0	9.0	24.9	17.0	38.0	46.0	60.0
		total_time	11.0	24.0	56.3	52.0	78.0	95.0	116.0
		best_time	3.0	8.0	28.5	28.0	40.0	49.0	60.0
12	31	tries	2.0	2.0	2.3	2.0	2.0	3.0	6.0
		max_score	33.0	67.0	80.1	83.0	92.0	92.0	100.0
		improve	0.0	0.0	24.5	17.0	41.0	50.0	75.0
		first_score	0.0	33.0	55.6	58.0	75.0	75.0	83.0
		tries_max	1.0	1.0	2.1	2.0	2.0	3.0	5.0
		post_max_tries	0.0	0.0	0.2	0.0	0.0	1.0	2.0
		first_time	1.0	8.0	26.5	24.0	38.0	45.0	57.0
		total_time	16.0	31.0	64.1	65.0	87.0	97.0	115.0
		best_time	10.0	14.0	31.9	30.0	47.0	50.0	58.0

Table 37									
2005 Sem1 Table of all Variables									
Tutorial	N Obs	Variable	Minimum	10th Pctl	Mean	Median	75th Pctl	90th Pctl	Maximum
13	126	tries	2.0	2.0	3.7	3.0	4.0	6.0	17.0
		max_score	0.0	33.0	75.1	83.0	83.0	100.0	100.0
		improve	0.0	0.0	50.7	50.0	83.0	83.0	100.0
		first_score	0.0	0.0	24.5	17.0	33.0	67.0	83.0
		tries_max	1.0	1.0	3.1	2.0	4.0	6.0	11.0
		post_max_tries	0.0	0.0	0.6	0.0	0.0	2.0	9.0
		first_time	1.0	5.0	19.2	17.0	24.0	37.0	54.0
		total_time	3.0	21.0	53.7	48.5	63.0	95.0	187.0
		best_time	1.0	6.0	15.8	14.0	20.0	30.0	48.0
14	21	tries	2.0	2.0	2.1	2.0	2.0	2.0	3.0
		max_score	81.0	95.0	98.0	100.0	100.0	100.0	100.0
		improve	0.0	0.0	32.0	19.0	48.0	95.0	100.0
		first_score	0.0	5.0	65.9	81.0	90.0	95.0	100.0
		tries_max	1.0	1.0	2.0	2.0	2.0	2.0	3.0
		post_max_tries	0.0	0.0	0.1	0.0	0.0	1.0	1.0
		first_time	2.0	7.0	24.8	24.0	31.0	42.0	59.0
		total_time	18.0	25.0	46.1	42.0	55.0	71.0	86.0
		best_time	8.0	13.0	20.0	20.0	26.0	28.0	39.0
15	102	tries	2.0	2.0	4.0	3.0	4.0	7.0	18.0
		max_score	0.0	51.0	82.1	92.0	100.0	100.0	100.0
		improve	0.0	8.0	58.4	53.0	92.0	100.0	100.0
		first_score	0.0	0.0	23.7	4.5	51.0	53.0	100.0
		tries_max	1.0	2.0	3.4	3.0	4.0	7.0	12.0
		post_max_tries	0.0	0.0	0.6	0.0	0.0	1.0	11.0
		first_time	1.0	3.0	7.6	6.0	10.0	14.0	21.0
		total_time	6.0	10.0	26.1	20.0	32.0	47.0	108.0
		best_time	2.0	3.0	6.5	5.0	8.0	13.0	30.0
16	48	tries	2.0	2.0	2.4	2.0	3.0	3.0	6.0
		max_score	47.0	48.0	55.2	50.0	61.0	70.0	100.0
		improve	0.0	0.0	7.3	2.0	11.0	24.0	52.0
		first_score	5.0	47.0	47.9	48.0	48.0	48.0	67.0
		tries_max	1.0	1.0	1.8	2.0	2.0	3.0	3.0
		post_max_tries	0.0	0.0	0.7	0.5	1.0	2.0	5.0
		first_time	3.0	5.0	24.6	23.5	35.0	44.0	51.0
		total_time	7.0	22.0	57.7	59.0	68.0	88.0	182.0
		best_time	2.0	6.0	21.6	20.0	30.5	36.0	47.0

APPENDIX D5: TUTORIAL_TEST IMPROVEMENT 2005 SEMESTER 2

D5_1: FREQUENCY PROCEDURE - TEST TUTORIALS

Table 1			
2005 Sem2 Table of n_tests by n_tuts			
n_tests	n_tuts		
Frequency Percent Row Pct Col Pct	15	16	Total
3	5 1.39 13.51 17.86	32 8.91 86.49 9.67	37 10.31
4	23 6.41 7.14 82.14	299 83.29 92.86 90.33	322 89.69
Total	28 7.80	331 92.20	359 100.00

Table 2	
2005 Sem2 Table of Variables	
22 With Variables:	tut1_3 tut4_7 tut8_11 tut12_16 tut_total n_tuts tut1 tut2 tut3 tut4 tut5 tut6 tut7 tut8 tut9 tut10 tut11 tut12 tut13 tut14 tut15 tut16
7 Variables:	test1 test2 test3 test4 test_tot4 best3 final

Table 3						
2005 Sem2 Table of Simple Statistics						
Variable	**N**	**Mean**	**Std Dev**	**Median**	**Minimum**	**Maximum**
tut1_3	359	269.36212	50.04816	295.00000	0	300.00000
tut4_7	359	352.75766	87.33042	390.00000	0	400.00000
tut8_11	359	247.38719	77.74096	280.00000	0	300.00000
tut12_16	359	81.79666	34.85020	100.00000	0	100.00000
tut_total	359	951.30362	169.65212	1024	355.00000	1100
n_tuts	359	15.92201	0.26854	16.00000	15.00000	16.00000
tut1	359	88.15042	20.80207	98.00000	0	100.00000
tut2	359	93.87187	18.51831	100.00000	0	100.00000
tut3	359	87.33983	26.58729	100.00000	0	100.00000
tut4	359	91.93593	18.15587	97.00000	0	100.00000
tut5	359	91.64345	22.06709	100.00000	0	100.00000
tut6	359	86.48468	27.52843	100.00000	0	100.00000
tut7	359	82.69359	32.90439	100.00000	0	100.00000
tut8	331	90.32326	17.78017	100.00000	0	100.00000
tut9	359	88.76045	28.76214	100.00000	0	100.00000
tut10	359	75.34819	36.09158	100.00000	0	100.00000
tut11	359	0	0	0	0	0
tut12	359	0	0	0	0	0
tut13	359	0	0	0	0	0
tut14	359	81.79666	34.85020	100.00000	0	100.00000
tut15	359	0	0	0	0	0
tut16	359	0	0	0	0	0
test1	348	57.52874	19.88981	60.00000	10.00000	100.00000
test2	353	33.54108	17.79569	30.00000	0	90.00000
test3	352	54.37500	20.42724	50.00000	10.00000	100.00000
test4	346	45.54913	22.25971	40.00000	0	100.00000
test_tot4	359	185.96100	57.10041	180.00000	70.00000	360.00000
best3	359	162.06128	45.57132	160.00000	70.00000	290.00000
Final	359	62.24241	13.50333	60.48000	34.32667	99.33333

Table 4							
2005 Sem2 Table of Spearman Correlation Coefficient							
Spearman Correlation Coefficients Prob > |r| under H0: Rho=0 Number of Observations							
	test1	test2	test3	test4	test_tot4	best3	final
tut1_3	0.11139 0.0378 348	-0.00885 0.8685 353	0.17114 0.0013 352	0.15712 0.0034 346	0.14445 0.0061 359	0.16089 0.0022 359	0.28102 <.0001 359
tut4_7	0.05512 0.3052 348	-0.04440 0.4056 353	0.08038 0.1323 352	0.06539 0.2251 346	0.07514 0.1554 359	0.08188 0.1215 359	0.23722 <.0001 359
tut8_11	0.12772 0.0171 348	0.09802 0.0658 353	0.16670 0.0017 352	0.19599 0.0002 346	0.21268 <.0001 359	0.20807 <.0001 359	0.36894 <.0001 359
tut12_16	0.27327 <.0001 348	0.11410 0.0321 353	0.21458 <.0001 352	0.27075 <.0001 346	0.34047 <.0001 359	0.34900 <.0001 359	0.45103 <.0001 359
tut_total	0.21217 <.0001 348	0.07533 0.1578 353	0.23730 <.0001 352	0.23332 <.0001 346	0.30684 <.0001 359	0.30685 <.0001 359	0.51208 <.0001 359
n_tuts	0.01341 0.8031 348	0.09531 0.0737 353	0.15792 0.0030 352	0.16073 0.0027 346	0.16701 0.0015 359	0.15930 0.0025 359	0.22076 <.0001 359
tut1	0.09125 0.0892 348	-0.00736 0.8903 353	0.13667 0.0103 352	0.10804 0.0446 346	0.09413 0.0749 359	0.11011 0.0370 359	0.19999 0.0001 359
tut2	0.07149 0.1834 348	-0.01117 0.8344 353	0.14696 0.0057 352	0.08597 0.1104 346	0.12030 0.0226 359	0.12972 0.0139 359	0.22634 <.0001 359
tut3	0.08411 0.1173 348	0.00564 0.9159 353	0.10011 0.0606 352	0.14963 0.0053 346	0.12726 0.0158 359	0.13344 0.0114 359	0.25256 <.0001 359
tut4	0.02607 0.6279 348	-0.05930 0.2665 353	0.12617 0.0179 352	0.07275 0.1770 346	0.06632 0.2100 359	0.08639 0.1022 359	0.21275 <.0001 359
tut5	0.10654 0.0470 348	-0.03819 0.4744 353	0.06879 0.1979 352	0.08398 0.1189 346	0.09168 0.0828 359	0.09667 0.0673 359	0.24274 <.0001 359
tut6	0.07649 0.1545 348	-0.02149 0.6873 353	0.04043 0.4495 352	0.04793 0.3741 346	0.07247 0.1707 359	0.06466 0.2217 359	0.21522 <.0001 359
tut7	0.03547 0.5096 348	-0.01152 0.8292 353	0.03721 0.4865 352	0.04185 0.4378 346	0.07372 0.1634 359	0.07451 0.1589 359	0.21746 <.0001 359

Table 4							
2005 Sem2 Table of Spearman Correlation Coefficient							
Spearman Correlation Coefficients Prob > |r| under H0: Rho=0 Number of Observations							
	test1	**test2**	**test3**	**test4**	**test_tot4**	**best3**	**final**
tut8	0.09781 0.0797 322	0.08185 0.1403 326	0.06712 0.2268 326	0.13056 0.0199 318	0.12548 0.0224 331	0.11617 0.0346 331	0.22840 <.0001 331
tut9	0.03703 0.4912 348	0.10044 0.0594 353	0.15842 0.0029 352	0.14510 0.0069 346	0.19525 0.0002 359	0.19498 0.0002 359	0.32102 <.0001 359
tut10	0.13919 0.0093 348	0.06487 0.2241 353	0.08260 0.1219 352	0.12846 0.0168 346	0.14332 0.0065 359	0.14492 0.0059 359	0.29526 <.0001 359
tut11	. . 348	. . 353	. . 352	. . 346	. . 359	. . 359	. . 359
tut12	. . 348	. . 353	. . 352	. . 346	. . 359	. . 359	. . 359
tut13	. . 348	. . 353	. . 352	. . 346	. . 359	. . 359	. . 359
tut14	0.27327 <.0001 348	0.11410 0.0321 353	0.21458 <.0001 352	0.27075 <.0001 346	0.34047 <.0001 359	0.34900 <.0001 359	0.45103 <.0001 359
tut15	. . 348	. . 353	. . 352	. . 346	. . 359	. . 359	. . 359
tut16	. . 348	. . 353	. . 352	. . 346	. . 359	. . 359	. . 359

D5_2: UNIVARIATE PROCEDURE -TUTORIAL TOTAL

Table 5			
2005 Sem2 Table of Moments			
N	359	**Sum Weights**	359
Mean	951.303621	**Sum Observations**	341518
Std Deviation	169.652124	**Variance**	28781.8433
Skewness	-1.3852705	**Kurtosis**	1.31352318
Uncorrected SS	335191210	**Corrected SS**	10303899.9
Coeff Variation	17.8336464	**Std Error Mean**	8.95389667

Table 6			
2005 Sem2 Table Basic Statistical Measures			
Location		**Variability**	
Mean	951.304	**Std Deviation**	169.65212
Median	1024.000	**Variance**	28782
Mode	1100.000	**Range**	745.00000
		Interquartile Range	220.00000

Table 7				
2005 Sem2 Table of Tests for Location: Mu0=0				
Test	**Statistic**		**p Value**	
Student's t	**t**	106.2447	**Pr > |t|**	<.0001
Sign	**M**	179.5	**Pr >= |M|**	<.0001
Signed Rank	**S**	32310	**Pr >= |S|**	<.0001

Table 8	
2005 Sem2 Table of Quantile Estimates	
Quantiles (Definition 5)	
Quantile	Estimate
100% Max	1100
99%	1100
95%	1100
90%	1098
75% Q3	1080
50% Median	1024
25% Q1	860
10%	697
5%	611
1%	419
0% Min	355

Table 9			
2005 Sem2 Table of Extreme Observations			
Lowest		Highest	
Value	Obs	Value	Obs
355	18	1100	275
358	194	1100	278
400	190	1100	330
419	41	1100	345
422	90	1100	346


```
                 Histogram                       #  Boxplot                    Normal Probability Plot

1125+**********                                 29     |         1125+                                +++  ************
```

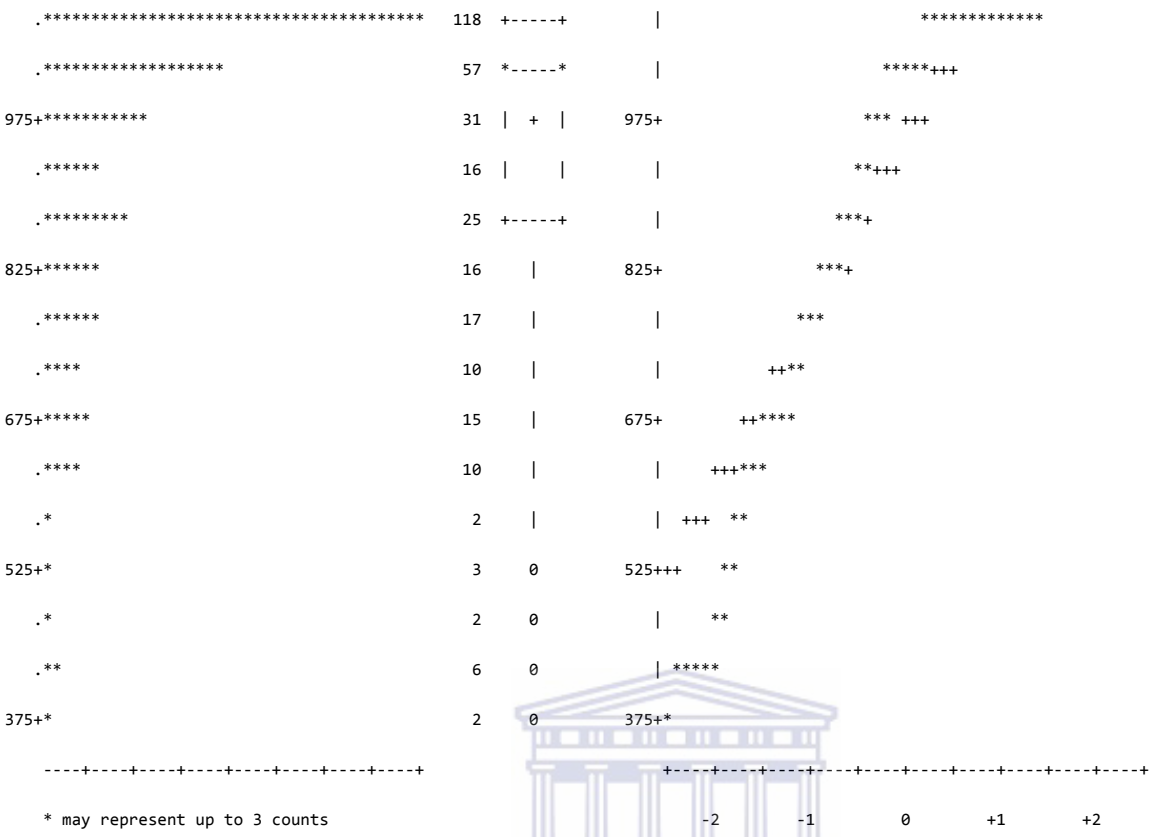


Figure 81: 2005 Second Semester Normal Probability Plots for Tutorial Total

D5_3: UNIVARIATE PROCEDURE – BEST3

Table 10			
2005 Sem2 Table of Moments			
N	359	**Sum Weights**	359
Mean	185.961003	**Sum Observations**	66760
Std Deviation	57.1004078	**Variance**	3260.45658
Skewness	0.61775641	**Kurtosis**	0.29494556
Uncorrected SS	13582000	**Corrected SS**	1167243.45
Coeff Variation	30.7055818	**Std Error Mean**	3.01364426

Table 11			
2005 Sem2 Table of Basic Statistical Measures			
Location		**Variability**	
Mean	185.9610	**Std Deviation**	57.10041
Median	180.0000	**Variance**	3260
Mode	160.0000	**Range**	290.00000
		Interquartile Range	70.00000

Table 12				
2005 Sem2 Table of Tests for Location: Mu0=0				
Test	**Statistic**		**p Value**	
Student's t	**t**	61.70636	**Pr > |t|**	<.0001
Sign	**M**	179.5	**Pr >= |M|**	<.0001
Signed Rank	**S**	32310	**Pr >= |S|**	<.0001

Table 13	
2005 Sem2 Table of Quantile Estimates	
Quantiles (Definition 5)	
Quantile	Estimate
100% Max	360
99%	350
95%	300
90%	260
75% Q3	220
50% Median	180
25% Q1	150
10%	120
5%	100
1%	70
0% Min	70

Table 14			
2005 Sem2 Table of Extreme Observations			
Lowest		Highest	
Value	Obs	Value	Obs
70	344	340	246
70	316	350	201
70	290	350	204
70	130	360	305
70	59	360	345

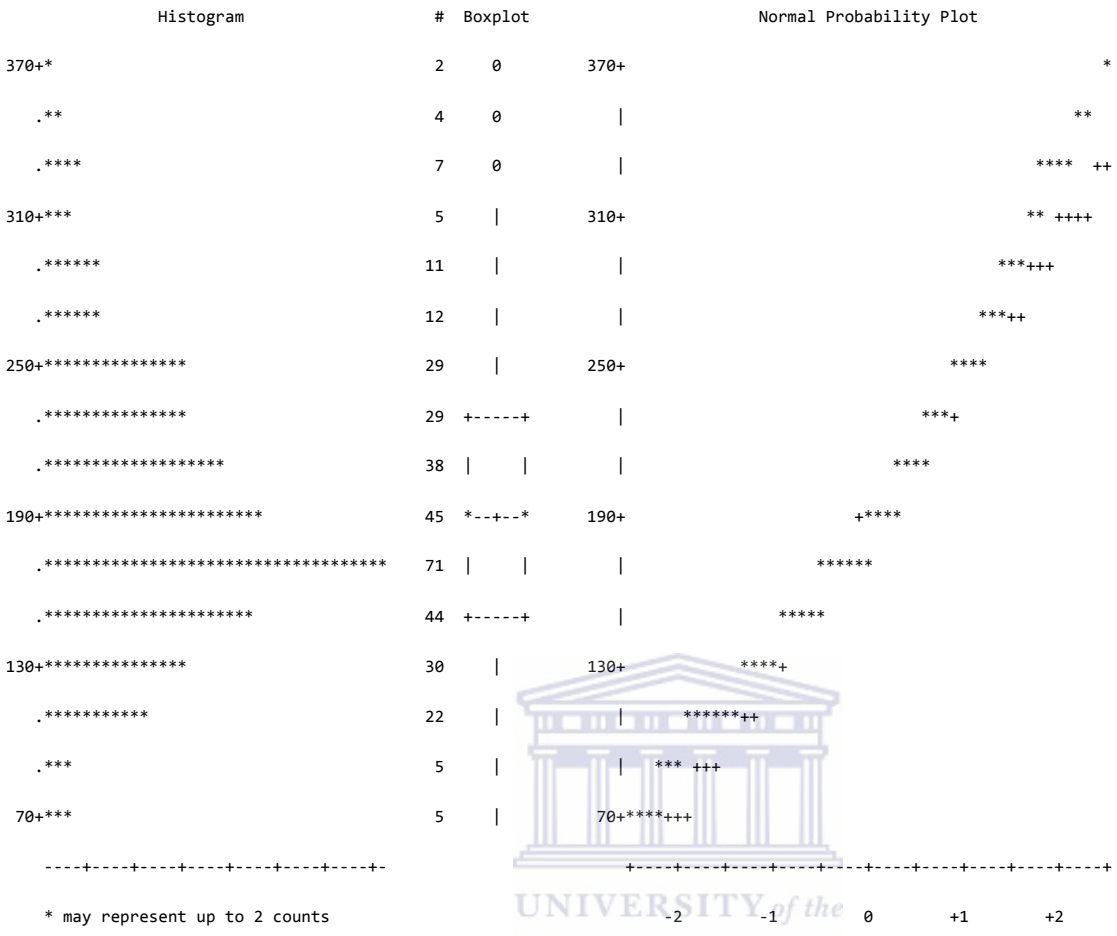


Figure 82: 2005 Second Semester Normal Probability Plots for Best3

D5_4: UNIVARIATE PROCEDURE – FINAL

Table 15			
2005 Sem2 Table of Moments			
N	359	Sum Weights	359
Mean	162.061281	Sum Observations	58180
Std Deviation	45.571316	Variance	2076.74484
Skewness	0.5464539	Kurtosis	-0.0123298
Uncorrected SS	10172200	Corrected SS	743474.652
Coeff Variation	28.1198048	Std Error Mean	2.40516207

Table 16			
2005 Sem2 Table of Basic Statistical Measures			
Location		Variability	
Mean	162.0613	Std Deviation	45.57132
Median	160.0000	Variance	2077
Mode	150.0000	Range	220.00000
		Interquartile Range	60.00000

Table 17				
2002 Sem2 Table of Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	T	67.38061	Pr > |t|	<.0001
Sign	M	179.5	Pr >= |M|	<.0001
Signed Rank	S	32310	Pr >= |S|	<.0001

Table 18	
2005 Sem2 Table of Quantile Estimates	
Quantiles (Definition 5)	
Quantile	Estimate
100% Max	290
99%	280
95%	250
90%	230
75% Q3	190
50% Median	160
25% Q1	130
10%	110
5%	90
1%	70
0% Min	70

Table 19			
2005 Sem2 Table of Extreme Observations			
Lowest		Highest	
Value	Obs	Value	Obs
70	344	280	205
70	316	280	246
70	290	280	305
70	130	290	239
70	59	290	345

Stem Leaf # Boxplot Normal Probability Plot

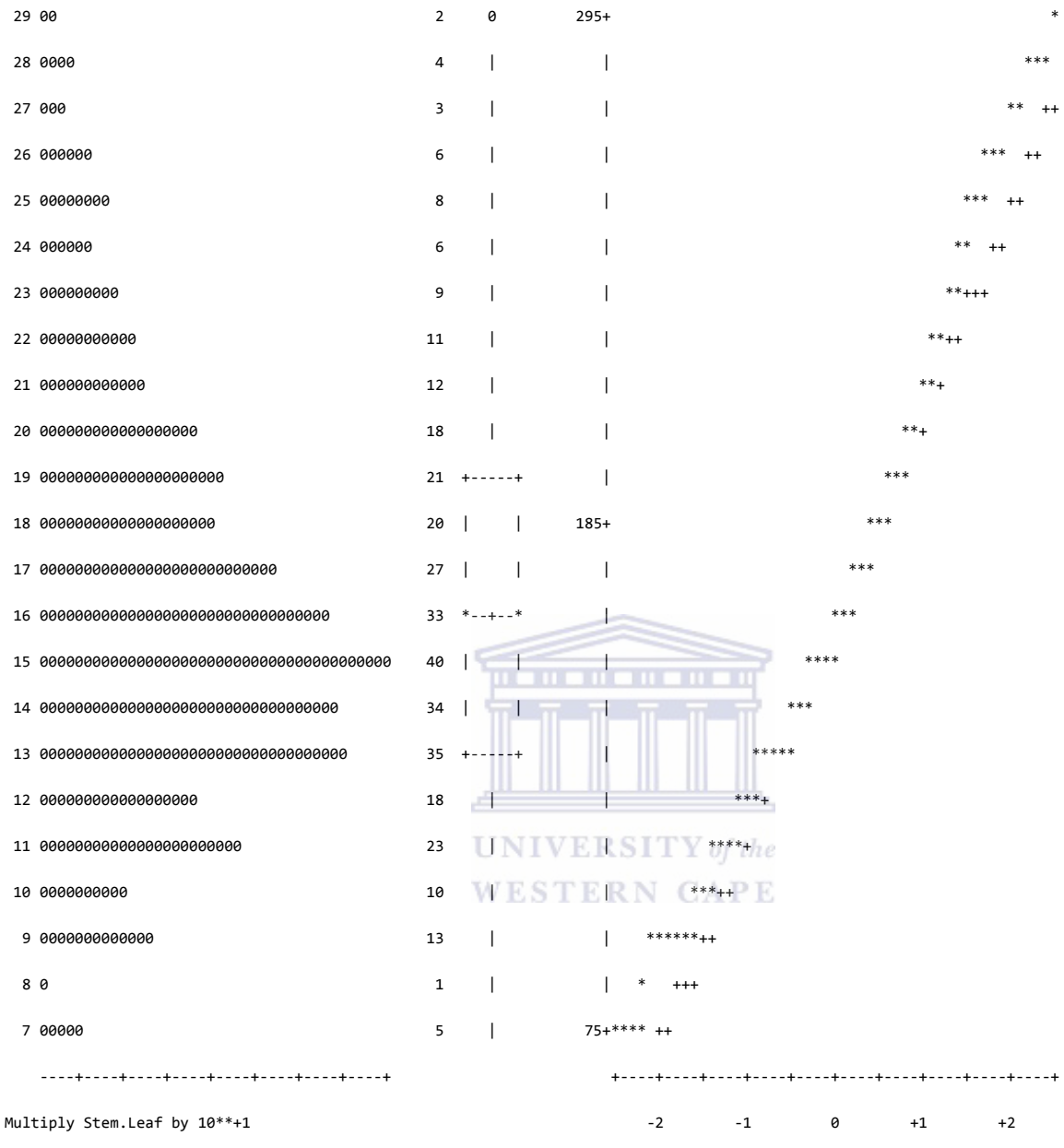


Figure 83: 2005 Second Semester Normal Probability Plots for Final

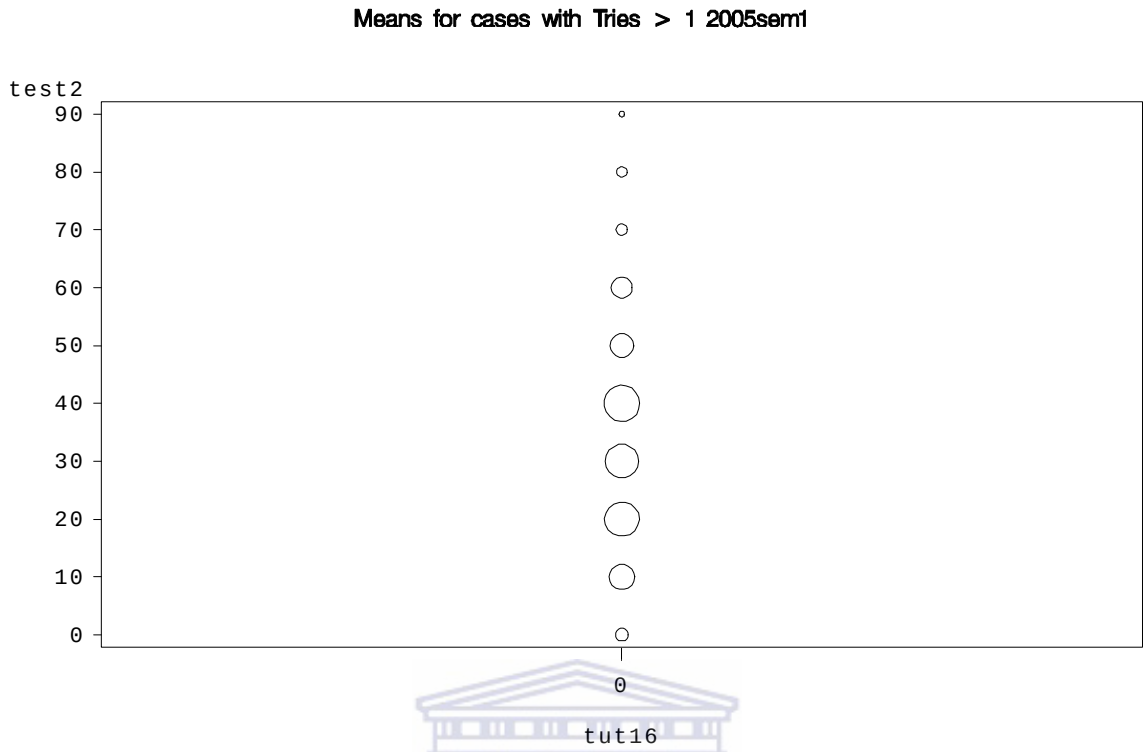


Figure 84: 2005 Second Semester

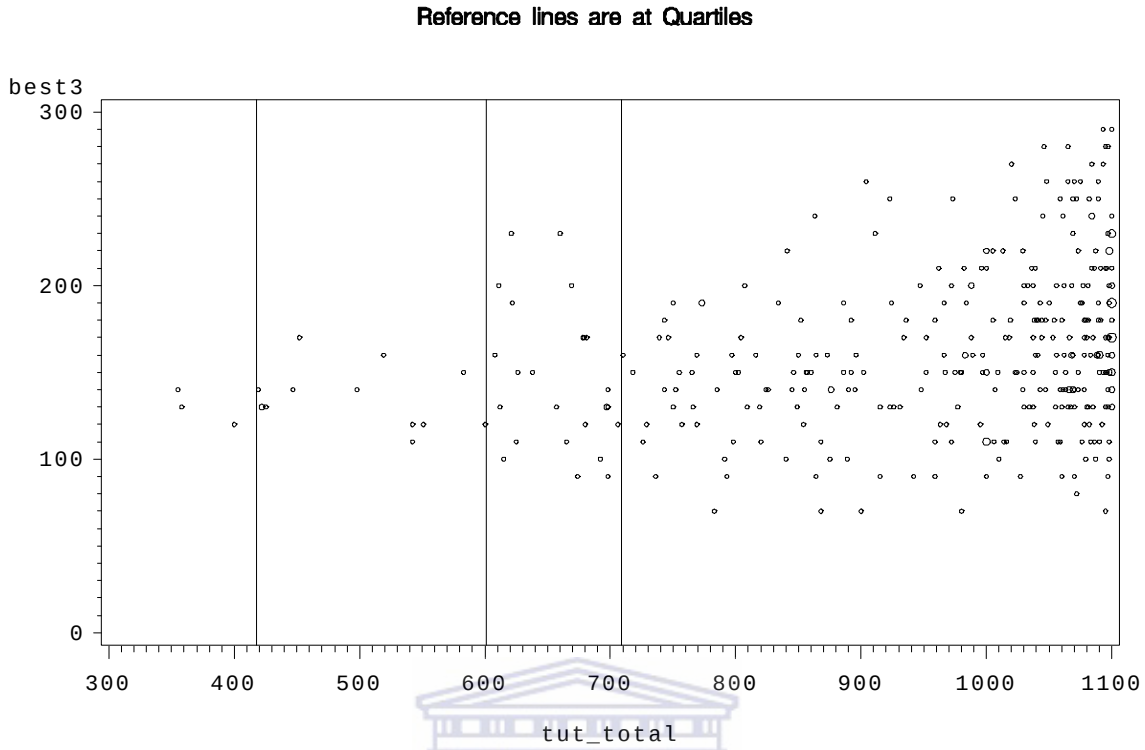


Figure 85: 2005 Second Semester

D5_5: MEANS PROCEDURE – ALL VARIABLES

Table 20					
2005 Sem2 Table of Variables Estimates					
Variable	**N**	**Mean**	**Std Dev**	**Minimum**	**Maximum**
Tutorial	11030	8.7157752	4.7584881	1.0000000	16.0000000
studnum	11030	2547497.50	664382.50	2001505.00	9927288.00
TestDate	0	.	.	.	.
Score	11030	70.8493200	35.1155723	0	100.0000000
Time	11030	19.3533998	16.1922007	0	60.0000000
Semester	11030	2025.00	0	2025.00	2025.00
order	11030	57588.73	3578.26	51229.00	63611.00

D5_6: UNIVARIATE PROCEDURE – SCORE

Table 21			
2005 Sem2 Table of Moments			
N	11030	**Sum Weights**	11030
Mean	70.84932	**Sum Observations**	781468
Std Deviation	35.1155723	**Variance**	1233.10342
Skewness	-0.9383871	**Kurtosis**	-0.5490359
Uncorrected SS	68966374	**Corrected SS**	13599897.6
Coeff Variation	49.5637393	**Std Error Mean**	0.33435821

Table 22			
2005 Sem2 Table of Basic Statistical Measures			
Location		**Variability**	
Mean	70.8493	**Std Deviation**	35.11557
Median	86.0000	**Variance**	1233
Mode	100.0000	**Range**	100.00000
		Interquartile Range	52.00000

Table 23				
2005 sem2 Table of Tests for Location: Mu0=0				
Test	**Statistic**		**p Value**	
Student's t	**t**	211.8965	**Pr > |t|**	<.0001
Sign	**M**	4916.5	**Pr >= |M|**	<.0001
Signed Rank	**S**	24174431	**Pr >= |S|**	<.0001

Table 24	
2005 Sem2 Table of Quantile Estimates	
Quantiles (Definition 5)	
Quantile	Estimate
100% Max	100
99%	100
95%	100
90%	100
75% Q3	100
50% Median	86
25% Q1	48
10%	0
5%	0
1%	0
0% Min	0

Table 25			
2005 Sem2 Table of Extreme Observations			
Lowest		Highest	
Value	Obs	Value	Obs
0	11012	100	11022
0	11011	100	11023
0	10957	100	11026
0	10936	100	11029
0	10914	100	11030

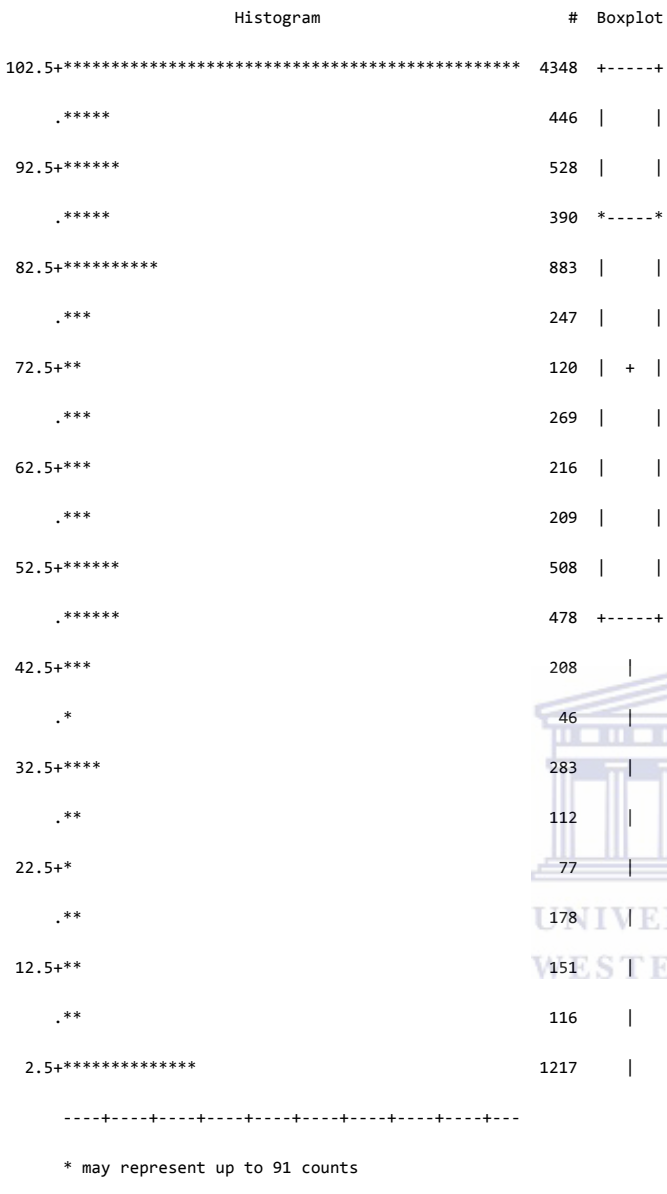
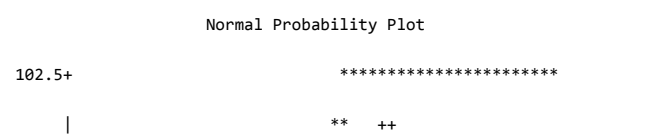


Figure 86: 2005 Second Semester Histogram for Score



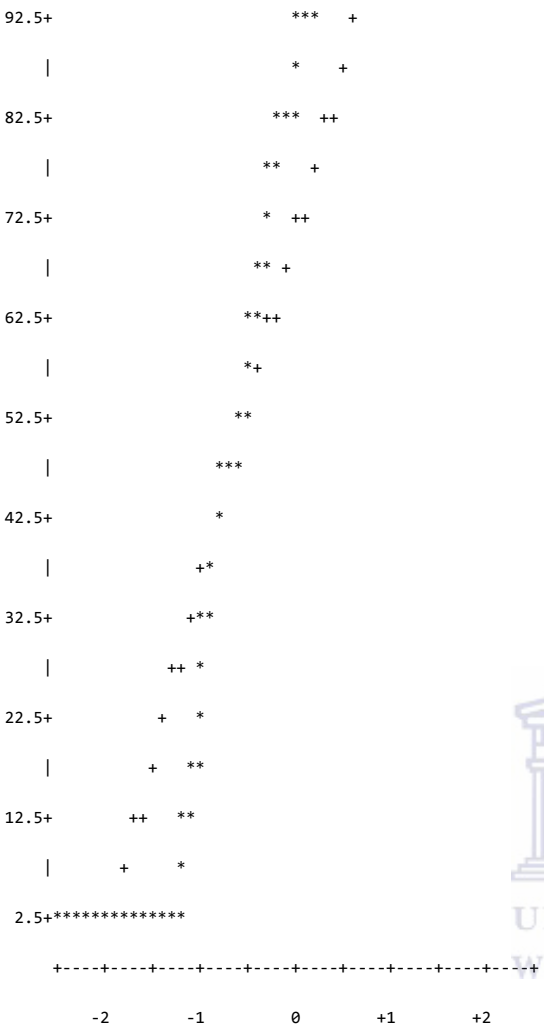


Figure 87: 2005 Second Semester Normal Probability Plots for Score

D5_7: UNIVARIATE PROCEDURE – TIME

Table 26			
2005 Sem2 Table of Moments			
N	11030	**Sum Weights**	11030
Mean	19.3533998	**Sum Observations**	213468
Std Deviation	16.1922007	**Variance**	262.187365
Skewness	0.73330132	**Kurtosis**	-0.5104588
Uncorrected SS	7022996	**Corrected SS**	2891664.45
Coeff Variation	83.6659238	**Std Error Mean**	0.15417648

Table 27			
2005 Sem2 Table of Basic Statistical Measures			
Location		**Variability**	
Mean	19.35340	**Std Deviation**	16.19220
Median	15.00000	**Variance**	262.18736
Mode	0.00000	**Range**	60.00000
		Interquartile Range	25.00000

Table 28				
2005 Sem2 Table of Tests for Location: Mu0=0				
Test	**Statistic**		**p Value**	
Student's t	**t**	125.5276	**Pr > |t|**	<.0001
Sign	**M**	5157.5	**Pr >= |M|**	<.0001
Signed Rank	**S**	26602385	**Pr >= |S|**	<.0001

Table 29	
2005 Sem2 Table of Quantile Estimates	
Quantiles (Definition 5)	
Quantile	Estimate
100% Max	60
99%	58
95%	51
90%	45
75% Q3	30
50% Median	15
25% Q1	5
10%	2
5%	0
1%	0
0% Min	0

Table 30			
Extreme Observations			
Lowest		Highest	
Value	Obs	Value	Obs
0	11030	60	9986
0	11029	60	9988
0	11027	60	10430
0	11004	60	10451
0	10992	60	10838

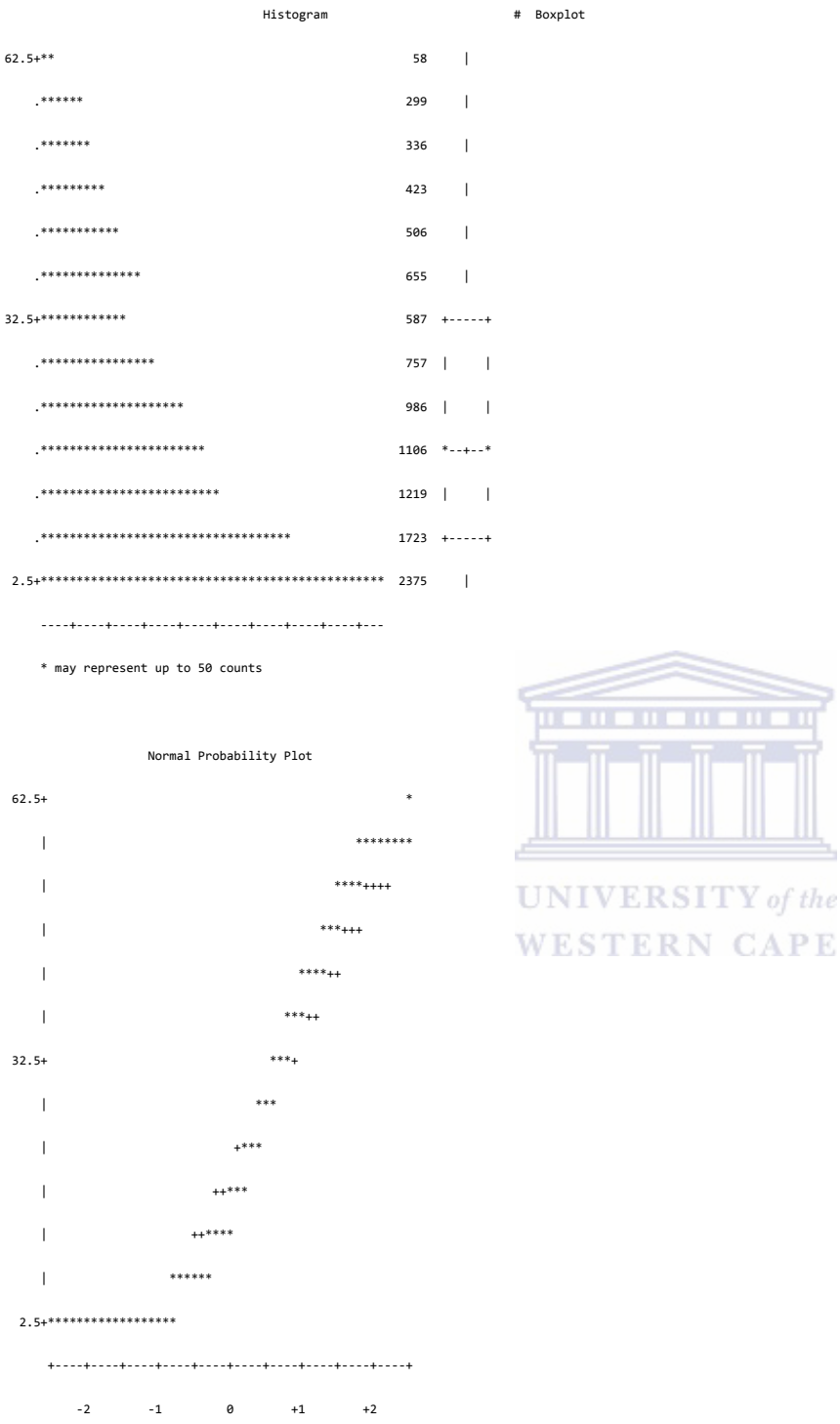


Figure 88: 2005 Second Semester Normal Probability Plots for Time

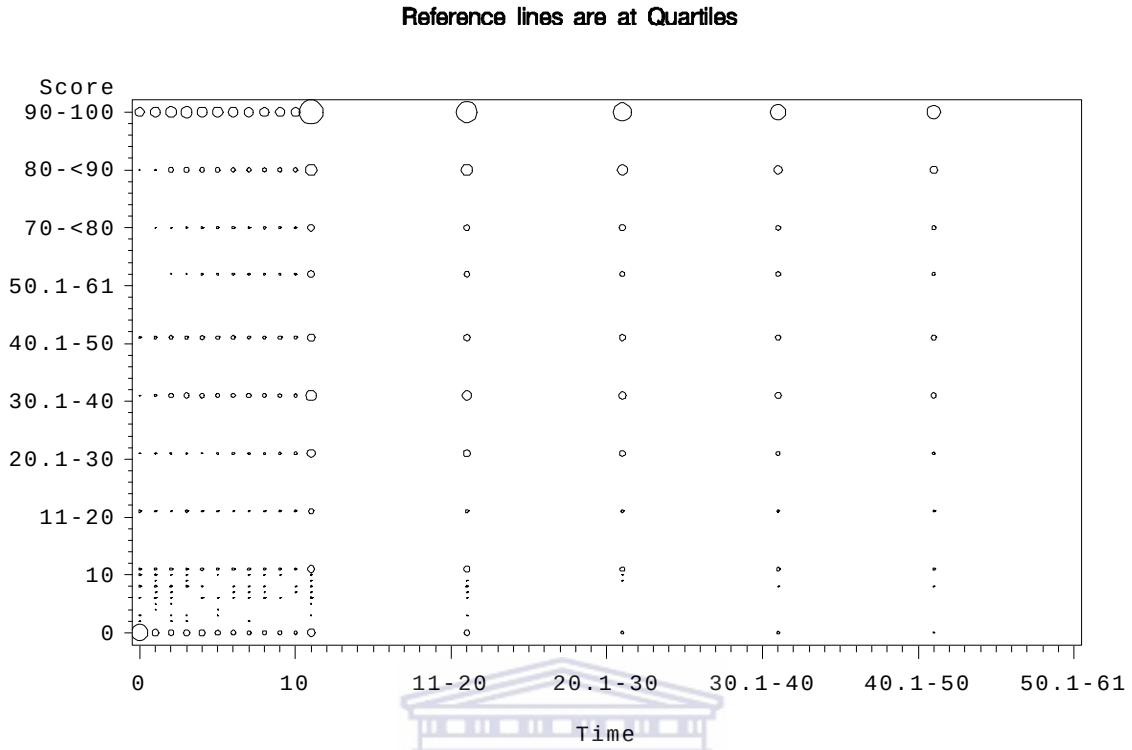


Figure 89: 2005 Second Semester

Table 31													
2005 Sem2 Table of Tutorial by Score													
Tutorial	Score												
Frequency Percent Row Pct Col Pct	0	2	3	4	5	6	7	8	9	10	11-20	20.1-30	30.1-40
1	7 0.06 1.16 0.58	1 0.01 0.17 25.00	0 0.00 0.00 0.00	3 0.03 0.50 100.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	3 0.03 0.50 20.00	0 0.00 0.00 0.00	5 0.05 0.83 71.43	0 0.00 0.00 0.00	7 0.06 1.16 2.06	3 0.03 0.50 1.85	18 0.16 2.99 4.43
2	27 0.24 3.15 2.26	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	27 0.24 3.15 16.67	0 0.00 0.00 0.00
3	16 0.15 2.47 1.34	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	85 0.77 13.10 25.07	32 0.29 4.93 19.75	0 0.00 0.00 0.00
4	14 0.13 2.08 1.17	0 0.00 0.00 0.00	6 0.05 0.89 46.15	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	2 0.02 0.30 13.33	0 0.00 0.00 0.00	0 0.00 0.00 0.00	17 0.15 2.52 70.83	6 0.05 0.89 1.77	9 0.08 1.34 5.56	9 0.08 1.34 2.22
5	12 0.11 1.71 1.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	5 0.05 0.71 20.83	4 0.04 0.57 1.18	6 0.05 0.85 3.70	3 0.03 0.43 0.74
6	21 0.19 3.24 1.75	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	10 0.09 1.54 66.67	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	11 0.10 1.70 3.24	17 0.15 2.62 10.49	16 0.15 2.47 3.94
7	31 0.28 4.51 2.59	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	10 0.09 1.45 2.95	15 0.14 2.18 9.26	5 0.05 0.73 1.23
8	18 0.16 3.50 1.50	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	18 0.16 3.50 34.62	0 0.00 0.00 0.00	0 0.00 0.00 0.00	7 0.06 1.36 2.06	7 0.06 1.36 4.32	12 0.11 2.33 2.96

Table 31													
2005 Sem2 Table of Tutorial by Score													
Tutorial	**Score**												
Frequency Percent Row Pct Col Pct	**0**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11-20**	**20.1-30**	**30.1-40**
9	19 0.17 2.72 1.59	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	3 0.03 0.43 0.88	7 0.06 1.00 4.32	0 0.00 0.00 0.00
10	38 0.34 7.76 3.17	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	1 0.01 0.20 4.17	21 0.19 4.29 6.19	0 0.00 0.00 0.00	46 0.42 9.39 11.33
11	20 0.18 3.99 1.67	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	8 0.07 1.60 2.36	0 0.00 0.00 0.00	34 0.31 6.79 8.37
12	58 0.53 11.69 4.85	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	7 0.06 1.41 13.46	0 0.00 0.00 0.00	0 0.00 0.00 0.00	7 0.06 1.41 2.06	3 0.03 0.60 1.85	16 0.15 3.23 3.94
13	253 2.29 21.19 21.14	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	151 1.37 12.65 44.54	0 0.00 0.00 0.00	223 2.02 18.68 54.93
14	30 0.27 5.43 2.51	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	2 0.02 0.36 66.67	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	1 0.01 0.18 4.17	1 0.01 0.18 0.29	2 0.02 0.36 1.23	3 0.03 0.54 0.74
15	603 5.47 46.96 50.38	0 0.00 0.00 0.00	6 0.05 0.47 46.15	0 0.00 0.00 0.00	1 0.01 0.08 33.33	38 0.34 2.96 97.44	0 0.00 0.00 0.00	25 0.23 1.95 48.08	1 0.01 0.08 14.29	0 0.00 0.00 0.00	17 0.15 1.32 5.01	22 0.20 1.71 13.58	20 0.18 1.56 4.93
16	30 0.27 6.25 2.51	3 0.03 0.63 75.00	1 0.01 0.21 7.69	0 0.00 0.00 0.00	0 0.00 0.00 0.00	1 0.01 0.21 2.56	0 0.00 0.00 0.00	2 0.02 0.42 3.85	1 0.01 0.21 14.29	0 0.00 0.00 0.00	1 0.01 0.21 0.29	12 0.11 2.50 7.41	1 0.01 0.21 0.25

Table 31													
2005 Sem2 Table of Tutorial by Score													
Tutorial	Score												
Frequency Percent Row Pct Col Pct	0	2	3	4	5	6	7	8	9	10	11-20	20.1-30	30.1-40
Total	1197 10.85	4 0.04	13 0.12	3 0.03	3 0.03	39 0.35	15 0.14	52 0.47	7 0.06	24 0.22	339 3.07	162 1.47	406 3.68

Table 32							
2005 Sem2 Table of Tutorial by Score							
Tutorial	Score						
Frequency Percent Row Pct Col Pct	40.1-50	50.1-61	61.1-<70	70-<80	80-<90	90-100	Total
1	63 0.57 10.47 6.94	25 0.23 4.15 4.28	28 0.25 4.65 8.97	37 0.34 6.15 10.08	72 0.65 11.96 5.66	330 2.99 54.82 6.20	602 5.46
2	121 1.10 14.14 13.33	0 0.00 0.00 0.00	0 0.00 0.00 0.00	52 0.47 6.07 14.17	0 0.00 0.00 0.00	629 5.70 73.48 11.82	856 7.76
3	23 0.21 3.54 2.53	27 0.24 4.16 4.62	0 0.00 0.00 0.00	22 0.20 3.39 5.99	44 0.40 6.78 3.46	400 3.63 61.63 7.52	649 5.88
4	10 0.09 1.48 1.10	14 0.13 2.08 2.40	7 0.06 1.04 2.24	8 0.07 1.19 2.18	47 0.43 6.97 3.69	525 4.76 77.89 9.86	674 6.11
5	15 0.14 2.14 1.65	15 0.14 2.14 2.57	0 0.00 0.00 0.00	26 0.24 3.70 7.08	38 0.34 5.41 2.99	578 5.24 82.34 10.86	702 6.36

Table 32							
2005 Sem2 Table of Tutorial by Score							
Tutorial	Score						
Frequency Percent Row Pct Col Pct	40.1-50	50.1-61	61.1-<70	70-<80	80-<90	90-100	Total
6	29 0.26 4.48 3.19	15 0.14 2.31 2.57	15 0.14 2.31 4.81	39 0.35 6.02 10.63	43 0.39 6.64 3.38	432 3.92 66.67 8.12	648 5.87
7	13 0.12 1.89 1.43	16 0.15 2.33 2.74	29 0.26 4.22 9.29	46 0.42 6.69 12.53	127 1.15 18.46 9.98	396 3.59 57.56 7.44	688 6.24
8	16 0.15 3.11 1.76	16 0.15 3.11 2.74	20 0.18 3.88 6.41	36 0.33 6.99 9.81	43 0.39 8.35 3.38	322 2.92 62.52 6.05	515 4.67
9	7 0.06 1.00 0.77	57 0.52 8.15 9.76	0 0.00 0.00 0.00	21 0.19 3.00 5.72	48 0.44 6.87 3.77	537 4.87 76.82 10.09	699 6.34
10	4 0.04 0.82 0.44	62 0.56 12.65 10.62	0 0.00 0.00 0.00	1 0.01 0.20 0.27	83 0.75 16.94 6.52	234 2.12 47.76 4.40	490 4.44
11	4 0.04 0.80 0.44	87 0.79 17.37 14.90	0 0.00 0.00 0.00	4 0.04 0.80 1.09	344 3.12 68.66 27.02	0 0.00 0.00 0.00	501 4.54
12	39 0.35 7.86 4.30	42 0.38 8.47 7.19	73 0.66 14.72 23.40	54 0.49 10.89 14.71	111 1.01 22.38 8.72	86 0.78 17.34 1.62	496 4.50
13	80 0.73 6.70 8.81	0 0.00 0.00 0.00	112 1.02 9.38 35.90	0 0.00 0.00 0.00	185 1.68 15.49 14.53	190 1.72 15.91 3.57	1194 10.83
14	7 0.06 1.27 0.77	1 0.01 0.18 0.17	8 0.07 1.45 2.56	7 0.06 1.27 1.91	51 0.46 9.24 4.01	439 3.98 79.53 8.25	552 5.00

Table 32							
2005 Sem2 Table of Tutorial by Score							
Tutorial	**Score**						
Frequency **Percent** **Row Pct** **Col Pct**	**40.1-50**	**50.1-61**	**61.1-<70**	**70-<80**	**80-<90**	**90-100**	**Total**
15	85 0.77 6.62 9.36	188 1.70 14.64 32.19	9 0.08 0.70 2.88	8 0.07 0.62 2.18	37 0.34 2.88 2.91	224 2.03 17.45 4.21	1284 11.64
16	392 3.55 81.67 43.17	19 0.17 3.96 3.25	11 0.10 2.29 3.53	6 0.05 1.25 1.63	0 0.00 0.00 0.00	0 0.00 0.00 0.00	480 4.35
Total	908 8.23	584 5.29	312 2.83	367 3.33	1273 11.54	5322 48.25	11030 100.00

Table 33												
2005 Sem2 Table of Tutorial by Time												
Tutorial	**Time**											
Frequency **Percent** **Row Pct** **Col Pct**	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11-20**
1	4 0.04 0.66 0.56	4 0.04 0.66 1.23	1 0.01 0.17 0.24	2 0.02 0.33 0.42	0 0.00 0.00 0.00	2 0.02 0.33 0.51	2 0.02 0.33 0.54	3 0.03 0.50 0.90	4 0.04 0.66 1.28	5 0.05 0.83 1.59	10 0.09 1.66 3.50	107 0.97 17.77 4.76
2	19 0.17 2.22 2.66	41 0.37 4.79 12.58	42 0.38 4.91 10.05	49 0.44 5.72 10.19	46 0.42 5.37 10.57	35 0.32 4.09 8.88	43 0.39 5.02 11.62	55 0.50 6.43 16.57	33 0.30 3.86 10.58	41 0.37 4.79 13.02	37 0.34 4.32 12.94	241 2.18 28.15 10.73
3	5 0.05 0.77 0.70	4 0.04 0.62 1.23	4 0.04 0.62 0.96	6 0.05 0.92 1.25	16 0.15 2.47 3.68	9 0.08 1.39 2.28	8 0.07 1.23 2.16	13 0.12 2.00 3.92	13 0.12 2.00 4.17	15 0.14 2.31 4.76	13 0.12 2.00 4.55	152 1.38 23.42 6.77
4	15 0.14 2.23 2.10	9 0.08 1.34 2.76	15 0.14 2.23 3.59	19 0.17 2.82 3.95	21 0.19 3.12 4.83	22 0.20 3.26 5.58	19 0.17 2.82 5.14	16 0.15 2.37 4.82	13 0.12 1.93 4.17	19 0.17 2.82 6.03	9 0.08 1.34 3.15	130 1.18 19.29 5.79
5	10 0.09 1.42 1.40	48 0.44 6.84 14.72	33 0.30 4.70 7.89	38 0.34 5.41 7.90	30 0.27 4.27 6.90	43 0.39 6.13 10.91	37 0.34 5.27 10.00	24 0.22 3.42 7.23	30 0.27 4.27 9.62	25 0.23 3.56 7.94	22 0.20 3.13 7.69	205 1.86 29.20 9.13
6	13 0.12 2.01 1.82	24 0.22 3.70 7.36	29 0.26 4.48 6.94	22 0.20 3.40 4.57	21 0.19 3.24 4.83	24 0.22 3.70 6.09	14 0.13 2.16 3.78	15 0.14 2.31 4.52	17 0.15 2.62 5.45	18 0.16 2.78 5.71	16 0.15 2.47 5.59	139 1.26 21.45 6.19
7	18 0.16 2.62 2.52	29 0.26 4.22 8.90	41 0.37 5.96 9.81	41 0.37 5.96 8.52	27 0.24 3.92 6.21	31 0.28 4.51 7.87	25 0.23 3.63 6.76	28 0.25 4.07 8.43	18 0.16 2.62 5.77	24 0.22 3.49 7.62	22 0.20 3.20 7.69	146 1.32 21.22 6.50
8	14 0.13 2.72 1.96	7 0.06 1.36 2.15	3 0.03 0.58 0.72	9 0.08 1.75 1.87	3 0.03 0.58 0.69	3 0.03 0.58 0.76	6 0.05 1.17 1.62	9 0.08 1.75 2.71	13 0.12 2.52 4.17	16 0.15 3.11 5.08	11 0.10 2.14 3.85	68 0.62 13.20 3.03
9	171 1.55 24.46 23.92	44 0.40 6.29 13.50	34 0.31 4.86 8.13	26 0.24 3.72 5.41	25 0.23 3.58 5.75	19 0.17 2.72 4.82	15 0.14 2.15 4.05	21 0.19 3.00 6.33	15 0.14 2.15 4.81	23 0.21 3.29 7.30	16 0.15 2.29 5.59	108 0.98 15.45 4.81

Table 33												
2005 Sem2 Table of Tutorial by Time												
Tutorial	**Time**											
Frequency **Percent** **Row Pct** **Col Pct**	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11-20**
10	11 0.10 2.24 1.54	8 0.07 1.63 2.45	1 0.01 0.20 0.24	15 0.14 3.06 3.12	17 0.15 3.47 3.91	8 0.07 1.63 2.03	18 0.16 3.67 4.86	10 0.09 2.04 3.01	19 0.17 3.88 6.09	13 0.12 2.65 4.13	13 0.12 2.65 4.55	91 0.83 18.57 4.05
11	13 0.12 2.59 1.82	3 0.03 0.60 0.92	14 0.13 2.79 3.35	27 0.24 5.39 5.61	14 0.13 2.79 3.22	12 0.11 2.40 3.05	19 0.17 3.79 5.14	5 0.05 1.00 1.51	13 0.12 2.59 4.17	10 0.09 2.00 3.17	8 0.07 1.60 2.80	94 0.85 18.76 4.19
12	39 0.35 7.86 5.45	7 0.06 1.41 2.15	27 0.24 5.44 6.46	24 0.22 4.84 4.99	19 0.17 3.83 4.37	7 0.06 1.41 1.78	7 0.06 1.41 1.89	11 0.10 2.22 3.31	9 0.08 1.81 2.88	5 0.05 1.01 1.59	11 0.10 2.22 3.85	72 0.65 14.52 3.21
13	46 0.42 3.85 6.43	46 0.42 3.85 14.11	51 0.46 4.27 12.20	32 0.29 2.68 6.65	37 0.34 3.10 8.51	38 0.34 3.18 9.64	36 0.33 3.02 9.73	32 0.29 2.68 9.64	32 0.29 2.68 10.26	38 0.34 3.18 12.06	43 0.39 3.60 15.03	339 3.07 28.39 15.09
14	24 0.22 4.35 3.36	0 0.00 0.00 0.00	8 0.07 1.45 1.91	7 0.06 1.27 1.46	8 0.07 1.45 1.84	11 0.10 1.99 2.79	19 0.17 3.44 5.14	7 0.06 1.27 2.11	15 0.14 2.72 4.81	10 0.09 1.81 3.17	12 0.11 2.17 4.20	121 1.10 21.92 5.39
15	277 2.51 21.57 38.74	41 0.37 3.19 12.58	94 0.85 7.32 22.49	130 1.18 10.12 27.03	128 1.16 9.97 29.43	112 1.02 8.72 28.43	89 0.81 6.93 24.05	63 0.57 4.91 18.98	56 0.51 4.36 17.95	47 0.43 3.66 14.92	35 0.32 2.73 12.24	153 1.39 11.92 6.81
16	36 0.33 7.50 5.03	11 0.10 2.29 3.37	21 0.19 4.38 5.02	34 0.31 7.08 7.07	23 0.21 4.79 5.29	18 0.16 3.75 4.57	13 0.12 2.71 3.51	20 0.18 4.17 6.02	12 0.11 2.50 3.85	6 0.05 1.25 1.90	8 0.07 1.67 2.80	80 0.73 16.67 3.56
Total	715 6.48	326 2.96	418 3.79	481 4.36	435 3.94	394 3.57	370 3.35	332 3.01	312 2.83	315 2.86	286 2.59	2246 20.36

Table 34					
2005 Sem2 Table of Tutorial by Time					
Tutorial	Time				
Frequency Percent Row Pct Col Pct	20.1-30	30.1-40	40.1-50	50.1-61	Total
1	126 1.14 20.93 7.63	127 1.15 21.10 10.18	118 1.07 19.60 13.32	87 0.79 14.45 14.17	602 5.46
2	93 0.84 10.86 5.63	56 0.51 6.54 4.49	22 0.20 2.57 2.48	3 0.03 0.35 0.49	856 7.76
3	132 1.20 20.34 7.99	103 0.93 15.87 8.25	96 0.87 14.79 10.84	60 0.54 9.24 9.77	649 5.88
4	104 0.94 15.43 6.30	103 0.93 15.28 8.25	84 0.76 12.46 9.48	76 0.69 11.28 12.38	674 6.11
5	90 0.82 12.82 5.45	47 0.43 6.70 3.77	14 0.13 1.99 1.58	6 0.05 0.85 0.98	702 6.36
6	93 0.84 14.35 5.63	83 0.75 12.81 6.65	75 0.68 11.57 8.47	45 0.41 6.94 7.33	648 5.87
7	93 0.84 13.52 5.63	63 0.57 9.16 5.05	49 0.44 7.12 5.53	33 0.30 4.80 5.37	688 6.24
8	105 0.95 20.39 6.36	95 0.86 18.45 7.61	92 0.83 17.86 10.38	61 0.55 11.84 9.93	515 4.67
9	95 0.86 13.59 5.75	51 0.46 7.30 4.09	20 0.18 2.86 2.26	16 0.15 2.29 2.61	699 6.34

Table 34					
2005 Sem2 Table of Tutorial by Time					
Tutorial	Time				
Frequency Percent Row Pct Col Pct	20.1-30	30.1-40	40.1-50	50.1-61	Total
10	73 0.66 14.90 4.42	72 0.65 14.69 5.77	54 0.49 11.02 6.09	67 0.61 13.67 10.91	490 4.44
11	95 0.86 18.96 5.75	84 0.76 16.77 6.73	49 0.44 9.78 5.53	41 0.37 8.18 6.68	501 4.54
12	74 0.67 14.92 4.48	79 0.72 15.93 6.33	56 0.51 11.29 6.32	49 0.44 9.88 7.98	496 4.50
13	233 2.11 19.51 14.10	112 1.02 9.38 8.97	62 0.56 5.19 7.00	17 0.15 1.42 2.77	1194 10.83
14	130 1.18 23.55 7.87	104 0.94 18.84 8.33	44 0.40 7.97 4.97	32 0.29 5.80 5.21	552 5.00
15	41 0.37 3.19 2.48	13 0.12 1.01 1.04	3 0.03 0.23 0.34	2 0.02 0.16 0.33	1284 11.64
16	75 0.68 15.63 4.54	56 0.51 11.67 4.49	48 0.44 10.00 5.42	19 0.17 3.96 3.09	480 4.35
Total	1652 14.98	1248 11.31	886 8.03	614 5.57	11030 100.00

D5_8: CORR PROCEDURE - TIME AND SCORE

Table 35	
2005 Sem2 Table of two Variables	
2 Variables:	Time Score

Table 36						
2005 Sem2 Table of Simple Statistics						
Variable	**N**	**Mean**	**Std Dev**	**Median**	**Minimum**	**Maximum**
Time	11030	19.35340	16.19220	15.00000	0	60.00000
Score	11030	70.84932	35.11557	86.00000	0	100.00000

Table 37		
2005 Sem2 Table with Spearman Correlation Coefficient of Time & Score		
Spearman Correlation Coefficients, N = 11030 Prob > |r| under H0: Rho=0		
	Time	**Score**
Time	1.00000	0.15725 <.0001
Score	0.15725 <.0001	1.00000

D5_9: MEANS PROCEDURE - ALL VARIABLES

Table 38									
2005 Sem2 Table of All Variables									
Tutorial	**N Obs**	**Variable**	**Minimum**	**10th Pctl**	**Mean**	**Median**	**75th Pctl**	**90th Pctl**	**Maximum**
1	116	tries	2.0	2.0	2.6	2.0	3.0	4.0	7.0
		max_score	7.0	57.0	89.1	96.0	100.0	100.0	100.0
		improve	0.0	0.0	25.0	19.5	45.0	55.0	91.0
		first_score	0.0	33.0	64.1	62.5	92.0	98.0	100.0
		tries_max	1.0	1.0	2.2	2.0	2.0	3.0	7.0
		post_max_tries	0.0	0.0	0.4	0.0	1.0	1.0	4.0
		first_time	1.0	14.0	34.5	36.0	44.0	54.0	60.0
		total_time	2.0	39.0	81.9	77.5	93.5	126.0	305.0
		best_time	1.0	14.0	31.3	28.5	41.5	53.0	59.0
2	149	tries	2.0	2.0	2.6	2.0	3.0	3.0	9.0
		max_score	25.0	75.0	95.3	100.0	100.0	100.0	100.0
		improve	0.0	0.0	28.0	25.0	50.0	75.0	100.0
		first_score	0.0	25.0	67.3	75.0	100.0	100.0	100.0
		tries_max	1.0	1.0	1.8	2.0	2.0	3.0	5.0
		post_max_tries	0.0	0.0	0.8	1.0	1.0	2.0	8.0
		first_time	1.0	4.0	16.8	14.0	23.0	36.0	47.0
		total_time	4.0	14.0	33.9	28.0	44.0	63.0	121.0
		best_time	1.0	3.0	13.7	11.0	18.0	32.0	46.0
3	87	tries	2.0	2.0	2.7	2.0	3.0	4.0	10.0
		max_score	14.0	14.0	84.6	100.0	100.0	100.0	100.0
		improve	0.0	0.0	45.0	57.0	72.0	86.0	100.0
		first_score	0.0	14.0	39.5	29.0	57.0	100.0	100.0
		tries_max	1.0	1.0	2.2	2.0	3.0	3.0	6.0
		post_max_tries	0.0	0.0	0.5	0.0	1.0	2.0	7.0
		first_time	1.0	10.0	30.3	28.0	46.0	53.0	60.0
		total_time	5.0	31.0	71.5	68.0	91.0	112.0	219.0
		best_time	2.0	11.0	27.0	26.0	36.0	46.0	57.0
4	95	tries	2.0	2.0	2.5	2.0	3.0	4.0	5.0
		max_score	14.0	90.0	92.8	97.0	100.0	100.0	100.0
		improve	0.0	0.0	19.3	4.0	35.0	69.0	90.0
		first_score	0.0	14.0	73.4	90.0	97.0	100.0	100.0
		tries_max	1.0	1.0	1.9	2.0	2.0	3.0	5.0
		post_max_tries	0.0	0.0	0.5	0.0	1.0	2.0	4.0
		first_time	1.0	7.0	29.5	30.0	41.0	51.0	59.0
		total_time	8.0	21.0	58.4	56.0	75.0	96.0	167.0
		best_time	2.0	6.0	25.5	24.0	38.0	46.0	59.0
5	76	tries	2.0	2.0	2.5	2.0	3.0	4.0	6.0
		max_score	40.0	90.0	96.6	100.0	100.0	100.0	100.0
		improve	0.0	0.0	18.0	10.0	30.0	50.0	90.0
		first_score	10.0	40.0	78.6	90.0	100.0	100.0	100.0
		tries_max	1.0	1.0	1.7	2.0	2.0	3.0	6.0
		post_max_tries	0.0	0.0	0.8	1.0	1.0	2.0	5.0
		first_time	1.0	3.0	16.9	13.0	24.0	38.0	60.0
		total_time	3.0	10.0	34.3	29.5	51.0	70.0	107.0
		best_time	1.0	3.0	13.8	10.0	17.5	33.0	56.0
6	85	tries	2.0	2.0	2.5	2.0	3.0	4.0	8.0
		max_score	14.0	57.0	89.1	100.0	100.0	100.0	100.0
		improve	0.0	0.0	32.7	21.0	57.0	86.0	93.0
		first_score	0.0	14.0	56.4	50.0	86.0	100.0	100.0
		tries_max	1.0	1.0	2.0	2.0	2.0	3.0	4.0
		post_max_tries	0.0	0.0	0.5	0.0	1.0	2.0	4.0
		first_time	1.0	4.0	23.4	21.0	36.0	45.0	58.0
		total_time	5.0	13.0	50.9	50.0	71.0	86.0	130.0
		best_time	2.0	4.0	21.8	19.0	35.0	45.0	55.0

Table 38									
2005 Sem2 Table of All Variables									
Tutorial	**N Obs**	**Variable**	**Minimum**	**10th Pctl**	**Mean**	**Median**	**75th Pctl**	**90th Pctl**	**Maximum**
7	111	tries	2.0	2.0	2.3	2.0	2.0	3.0	5.0
		max_score	11.0	67.0	91.2	100.0	100.0	100.0	100.0
		improve	0.0	0.0	22.7	11.0	33.0	78.0	100.0
		first_score	0.0	11.0	68.5	78.0	89.0	100.0	100.0
		tries_max	1.0	1.0	1.8	2.0	2.0	2.0	5.0
		post_max_tries	0.0	0.0	0.4	0.0	1.0	1.0	3.0
		first_time	1.0	4.0	21.1	18.0	31.0	47.0	59.0
		total_time	3.0	10.0	40.7	36.0	61.0	73.0	127.0
		best_time	1.0	3.0	17.5	14.0	24.0	41.0	60.0
8	58	tries	2.0	2.0	2.4	2.0	2.0	3.0	9.0
		max_score	33.0	58.0	90.4	100.0	100.0	100.0	100.0
		improve	0.0	0.0	33.3	25.0	50.0	92.0	100.0
		first_score	0.0	0.0	57.0	62.5	83.0	100.0	100.0
		tries_max	1.0	1.0	2.0	2.0	2.0	3.0	8.0
		post_max_tries	0.0	0.0	0.4	0.0	1.0	1.0	4.0
		first_time	1.0	4.0	30.6	36.0	45.0	50.0	58.0
		total_time	11.0	25.0	65.6	66.5	82.0	96.0	205.0
		best_time	5.0	14.0	31.4	31.5	42.0	49.0	58.0
9	70	tries	2.0	2.0	2.5	2.0	3.0	3.5	9.0
		max_score	29.0	100.0	97.0	100.0	100.0	100.0	100.0
		improve	0.0	0.0	26.6	29.0	43.0	43.0	100.0
		first_score	0.0	43.0	70.3	71.0	100.0	100.0	100.0
		tries_max	1.0	1.0	2.0	2.0	2.0	3.0	6.0
		post_max_tries	0.0	0.0	0.5	0.0	1.0	1.0	7.0
		first_time	1.0	2.5	18.9	18.0	28.0	41.0	60.0
		total_time	4.0	10.5	39.1	35.0	53.0	72.0	130.0
		best_time	1.0	3.5	16.0	12.0	23.0	33.5	49.0
10	61	tries	2.0	2.0	2.6	2.0	3.0	4.0	7.0
		max_score	20.0	40.0	81.0	100.0	100.0	100.0	100.0
		improve	0.0	0.0	38.4	40.0	60.0	80.0	100.0
		first_score	0.0	0.0	42.6	40.0	60.0	80.0	100.0
		tries_max	1.0	1.0	2.3	2.0	2.0	4.0	7.0
		post_max_tries	0.0	0.0	0.3	0.0	0.0	1.0	2.0
		first_time	1.0	7.0	26.0	22.0	40.0	52.0	58.0
		total_time	9.0	22.0	68.0	65.0	83.0	112.0	169.0
		best_time	3.0	8.0	28.9	26.0	42.0	51.0	60.0
11	39	tries	2.0	2.0	2.4	2.0	2.0	4.0	7.0
		max_score	40.0	60.0	75.4	80.0	80.0	80.0	80.0
		improve	0.0	0.0	24.4	20.0	40.0	60.0	60.0
		first_score	0.0	20.0	51.0	60.0	60.0	80.0	80.0
		tries_max	1.0	1.0	2.0	2.0	2.0	3.0	7.0
		post_max_tries	0.0	0.0	0.5	0.0	1.0	1.0	4.0
		first_time	1.0	8.0	27.6	25.0	40.0	53.0	58.0
		total_time	18.0	20.0	62.6	60.0	82.0	98.0	160.0
		best_time	4.0	6.0	27.2	26.0	40.0	48.0	58.0
12	59	tries	2.0	2.0	2.6	2.0	3.0	4.0	6.0
		max_score	17.0	50.0	77.0	83.0	92.0	100.0	100.0
		improve	0.0	0.0	28.1	17.0	42.0	75.0	100.0
		first_score	0.0	0.0	48.9	58.0	75.0	83.0	92.0
		tries_max	1.0	1.0	2.2	2.0	3.0	4.0	6.0
		post_max_tries	0.0	0.0	0.4	0.0	1.0	1.0	3.0
		first_time	1.0	3.0	25.8	22.0	43.0	52.0	59.0
		total_time	5.0	13.0	65.5	65.0	93.0	109.0	174.0
		best_time	1.0	4.0	28.9	27.0	42.0	55.0	60.0

Table 38									
2005 Sem2 Table of All Variables									
Tutorial	**N Obs**	**Variable**	**Minimum**	**10th Pctl**	**Mean**	**Median**	**75th Pctl**	**90th Pctl**	**Maximum**
13	269	tries	2.0	2.0	3.4	3.0	4.0	6.0	18.0
		max_score	0.0	33.0	74.9	83.0	100.0	100.0	100.0
		improve	0.0	0.0	46.8	50.0	83.0	100.0	100.0
		first_score	0.0	0.0	28.1	17.0	33.0	67.0	100.0
		tries_max	1.0	1.0	2.8	2.0	3.0	5.0	11.0
		post_max_tries	0.0	0.0	0.6	0.0	1.0	2.0	13.0
		first_time	1.0	4.0	20.5	20.0	29.0	40.0	58.0
		total_time	3.0	19.0	61.1	49.0	79.0	121.0	216.0
		best_time	1.0	5.0	18.1	16.0	25.0	36.0	58.0
14	47	tries	2.0	2.0	2.1	2.0	2.0	2.0	4.0
		max_score	43.0	76.0	94.0	100.0	100.0	100.0	100.0
		improve	0.0	0.0	20.3	10.0	19.0	62.0	100.0
		first_score	0.0	14.0	73.6	86.0	95.0	100.0	100.0
		tries_max	1.0	1.0	1.8	2.0	2.0	2.0	4.0
		post_max_tries	0.0	0.0	0.3	0.0	1.0	1.0	1.0
		first_time	2.0	4.0	24.2	22.0	32.0	47.0	60.0
		total_time	13.0	19.0	47.6	44.0	60.0	83.0	106.0
		best_time	8.0	10.0	23.5	19.0	31.0	46.0	57.0
15	239	tries	2.0	2.0	3.5	3.0	4.0	6.0	14.0
		max_score	0.0	49.0	77.6	92.0	100.0	100.0	100.0
		improve	0.0	0.0	58.5	53.0	97.0	100.0	100.0
		first_score	0.0	0.0	19.1	0.0	47.0	53.0	100.0
		tries_max	1.0	1.0	3.1	3.0	4.0	6.0	13.0
		post_max_tries	0.0	0.0	0.4	0.0	0.0	2.0	7.0
		first_time	1.0	2.0	7.6	6.0	10.0	16.0	34.0
		total_time	4.0	7.0	26.2	18.0	35.0	56.0	105.0
		best_time	1.0	2.0	7.9	5.0	9.0	18.0	43.0
16	72	tries	2.0	2.0	2.3	2.0	2.0	3.0	5.0
		max_score	25.0	48.0	49.2	48.0	48.0	53.0	72.0
		improve	0.0	0.0	4.8	0.0	1.0	15.0	49.0
		first_score	0.0	33.0	44.3	48.0	48.0	48.0	58.0
		tries_max	1.0	1.0	1.4	1.0	2.0	2.0	3.0
		post_max_tries	0.0	0.0	0.9	1.0	1.0	2.0	4.0
		first_time	1.0	5.0	21.3	19.5	33.0	41.0	56.0
		total_time	6.0	14.0	48.6	41.5	63.0	89.0	194.0
		best_time	3.0	5.0	24.0	22.0	39.0	45.0	56.0

APPENDIX D6 : MIXED PROCEDURE-TUTORIALS_TESTS

Table 1	
Model Information	
Data Set	WORK.SHORT
Dependent Variable	COL1
Covariance Structure	Variance Components
Estimation Method	REML
Residual Variance Method	Profile
Fixed Effects SE Method	Model-Based
Degrees of Freedom Method	Containment

Table 2	
Dimensions	
Covariance Parameters	2
Columns in X	5
Columns in Z	736
Subjects	1
Max Obs Per Subject	2941

Table 3	
Number of Observations	
Number of Observations Read	2941
Number of Observations Used	2403
Number of Observations Not Used	538

Table 4						
Least Squares Means						
Effect	**NAME OF FORMER VARIABLE**	**Estimate**	**Standard Error**	**DF**	**t Value**	**Pr > |t|**
NAME	test1	69.3059	0.7980	1727	86.85	<.0001
NAME	test2	48.9733	0.8054	1727	60.81	<.0001
NAME	test3	47.7654	0.8365	1727	57.10	<.0001
NAME	test4	57.0947	0.8608	1727	66.33	<.0001

Table 5							
Differences of Least Squares Means							
Effect	**NAME OF FORMER VARIABLE**	**NAME OF FORMER VARIABLE**	**Estimate**	**Standard Error**	**DF**	**t Value**	**Pr > |t|**
NAME	test1	test2	20.3326	0.9924	1727	20.49	<.0001
NAME	test1	test3	21.5405	1.0168	1727	21.18	<.0001
NAME	test1	test4	12.2112	1.0373	1727	11.77	<.0001
NAME	test2	test3	1.2079	1.0222	1727	1.18	0.2375
NAME	test2	test4	-8.1214	1.0424	1727	-7.79	<.0001
NAME	test3	test4	-9.3293	1.0646	1727	-8.76	<.0001

Table 6						
Analysis Variable : COL1						
NAME OF FORMER VARIABLE	**N Obs**	**N**	**Mean**	**Std Dev**	**Minimum**	**Maximum**
test1	2921	2647	65.6977711	20.9922980	0	100.0000000
test2	2921	2638	45.5686126	20.2159097	0	100.0000000
test3	2921	2512	50.6966561	20.4964359	0	100.0000000
test4	2921	2361	56.6327827	22.7932735	0	100.0000000

Table 7								
Obs	**Effect**	**_NAME_**	**__NAME_**	**Estimate**	**StdErr**	**DF**	**tValue**	**Probt**
1	_NAME_	test1	test2	20.3326	0.9924	1727	20.49	<.0001
4	_NAME_	test2	test3	1.2079	1.0222	1727	1.18	0.2375
5	_NAME_	test2	test4	-8.1214	1.0424	1727	-7.79	<.0001

APPENDIX E: PERFORMANCE TABLES

Table 1 Table of period by took_maths			
period	Took_maths		
Frequency Row Pct	0	1	Total
2003sem2	455 35.30	834 64.70	1289
2004sem1	118 51.53	111 48.47	229
2004sem2	293 47.56	323 52.44	616
2005sem1	11 32.35	23 67.65	34
2005sem2	36 41.38	51 58.62	87
Total	913	1342	2255
Frequency Missing = 944			

Table 2 Statistics for Tabe of period by took_maths			
Statistic	DF	Value	Prob
Chi-Square	4	39.7568	<.0001
Likelihood Ratio Chi-Square	4	39.5884	<.0001
Mantel-Haenszel Chi-Square	1	17.2258	<.0001
Phi Coefficient		0.1328	
Contingency Coefficient		0.1316	
Cramer's V		0.1328	

Table 3			
Table of symbol1 by Gender			
symbol1	Gender		
Frequency Row Pct	Female	Male	Total
A	120 51.95	111 48.05	231
B	89 61.38	56 38.62	145
C	221 55.39	178 44.61	399
D	174 54.21	147 45.79	321
E	42 59.15	29 40.85	71
F	24 57.14	18 42.86	42
G	22 59.46	15 40.54	37
Total	692	554	1246
Frequency Missing = 1953			

Table 4			
Statistics for Table of symbol1 by Gender			
Statistic	DF	Value	Prob
Chi-Square	6	4.0940	0.6640
Likelihood Ratio Chi-Square	6	4.1148	0.6611
Mantel-Haenszel Chi-Square	1	0.4342	0.5099
Phi Coefficient		0.0573	
Contingency Coefficient		0.0572	
Cramer's V		0.0573	

Effective Sample Size = 1246
Frequency Missing = 1953
WARNING: 61% of the data are missing.

Table 5								
Table of symbol1 by RACE								
symbol1	RACE							
Frequency Row Pct	Unknown	White	Coloured	Indian	Asian	African	Other	Total
Table of symbol1 by RACE	Table of symbol1 by RACE	Table of symbol 1 by RACE	Table of symbol1 by RACE	Table of symbol1 by RACE	Table of symbol 1 by RACE	Table of symbol1 by RACE	Table of symbol 1 by RACE	Table of symbol 1 by RACE
B	4 2.76	0 0.00	90 62.07	7 4.83	2 1.38	40 27.59	2 1.38	145
	5 1.24	2 0.50	245 60.95	30 7.46	8 1.99	107 26.62	5 1.24	402
D	4 1.24	1 0.31	200 62.11	24 7.45	7 2.17	80 24.84	6 1.86	322
E	1 1.41	0 0.00	47 66.20	1 1.41	1 1.41	19 26.76	2 2.82	71
F	0 0.00	0 0.00	24 57.14	1 2.38	4 9.52	13 30.95	0 0.00	42
G	0 0.00	0 0.00	22 59.46	3 8.11	1 2.70	11 29.73	0 0.00	37
Total	21	10	748	102	32	317	20	1250
Frequency Missing = 1949								

Table 6			
Statistics for Table of symbol1 by RACE			
Statistic	DF	Value	Prob
Chi-Square	36	68.9721	0.0008
Likelihood Ratio Chi-Square	36	64.3345	0.0025
Mantel-Haenszel Chi-Square	1	1.3038	0.2535
Phi Coefficient		0.2349	
Contingency Coefficient		0.2287	
Cramer's V		0.0959	
WARNING: 47% of the cells have expected counts less than 5. Chi-Square may not be a valid test.			

Table 7						
Table of symbol1 by Examination Board						
symbol1	Examination Board					
Frequency Row Pct	Eastern Cape Education Department	Foreign Examination	Gauteng Education Department	Joint Matriculation Board	Kwazulu Natal Education Department	Mpumalanga Education Department
A	12 5.19	20 8.66	6 2.60	1 0.43	5 2.16	2 0.87
B	10 6.90	3 2.07	8 5.52	1 0.69	3 2.07	2 1.38
C	37 9.25	11 2.75	13 3.25	3 0.75	7 1.75	4 1.00
D	29 9.06	10 3.13	12 3.75	2 0.63	3 0.94	1 0.31
E	8 11.43	0 0.00	1 1.43	0 0.00	2 2.86	0 0.00
F	5 12.20	0 0.00	2 4.88	1 2.44	1 2.44	0 0.00
G	3 8.33	0 0.00	0 0.00	2 5.56	2 5.56	0 0.00
Total	104	44	42	10	23	9
Frequency Missing = 1956						

Table 7 continued						
Table of symbol1 by Examination Board						
symbol1	Examination Board					
Frequency Row Pct	Northern Cape Education Department	Norther Province Education Department	NorthWest Education Department	Free State Education Department	Western Cape Education Department	Total
A	4 1.73	2 0.87	0 0.00	1 0.43	178 77.06	231
B	1 0.69	3 2.07	0 0.00	2 1.38	112 77.24	145
C	4 1.00	9 2.25	0 0.00	2 0.50	310 77.50	400
D	6 1.88	2 0.63	2 0.63	3 0.94	250 78.13	320
E	1 1.43	0 0.00	1 1.43	1 1.43	56 80.00	70
F	0 0.00	0 0.00	1 2.44	0 0.00	31 75.61	41
G	0 0.00	0 0.00	0 0.00	1 2.78	28 77.78	36
Total	16	16	4	10	965	1243
Frequency Missing = 1956						

Table 8			
Statistics for symbol1 by Examination Board			
Statistic	DF	Value	Prob
Chi-Square	60	80.2431	0.0416
Likelihood Ratio Chi-Square	60	76.7411	0.0714
Mantel-Haenszel Chi-Square	1	0.0803	0.7769
Phi Coefficient		0.2541	

Table 8			
Statistics for symbol1 by Examination Board			
Statistic	DF	Value	Prob
Contingency Coefficient		0.2463	
Cramer's V		0.1037	
WARNING: 70% of the cells have expected counts less than 5. Chi-Square may not be a valid test.			

Effective Sample Size = 1243
Frequency Missing = 1956

Table 9						
Table of symbol1 by Grade 12 Status						
symbol1	Grade 12 Status					
Frequency Row Pct	Age Exemption	Conditional Exemption	Full Exemption	Exemption on Foreign Qualification	Provisional Age Exemption	Recognition of Prior Learning
A	15 6.61	19 8.37	180 79.30	8 3.52	0 0.00	0 0.00
B	4 2.82	11 7.75	120 84.51	1 0.70	0 0.00	0 0.00
C	16 4.04	37 9.34	326 82.32	6 1.52	0 0.00	1 0.25
D	15 4.78	44 14.01	228 72.61	5 1.59	0 0.00	1 0.32
E	3 4.35	5 7.25	55 79.71	0 0.00	0 0.00	1 1.45
F	1 2.56	8 20.51	26 66.67	0 0.00	0 0.00	0 0.00
G	1 2.78	10 27.78	21 58.33	0 0.00	0 0.00	0 0.00
Total	55	134	956	20	0	3
Frequency Missing = 1976						

Table 10			
Statistics for Table of symbol1 by Grade 12 Status			
Statistic	DF	Value	Prob
Chi-Square	42	69.5747	0.0047
Likelihood Ratio Chi-Square	42	66.2495	0.0099
Mantel-Haenszel Chi-Square	1	3.4897	0.0618
Phi Coefficient		0.2385	
Contingency Coefficient		0.2320	
Cramer's V		0.0974	
WARNING: 59% of the cells have expected counts less than 5. Chi-Square may not be a valid test.			

Table 11			
Table of symbol1 by Prior Learning			
symbol1	Prior Learning		
Frequency Row Pct	No	Yes	Total
A	162 72.65	61 27.35	223
B	123 89.13	15 10.87	138
C	326 83.38	65 16.62	391
D	237 81.72	53 18.28	290
E	48 78.69	13 21.31	61
F	30 83.33	6 16.67	36
G	28 87.50	4 12.50	32
Total	954	217	1171
Frequency Missing = 2028			

Table 12			
Statistics for Table of symbol1 by Prior Learning			
Statistic	DF	Value	Prob
Chi-Square	6	18.9852	0.0042
Likelihood Ratio Chi-Square	6	18.6931	0.0047
Mantel-Haenszel Chi-Square	1	3.5512	0.0595
Phi Coefficient		0.1273	
Contingency Coefficient		0.1263	

Effective Sample Size = 1171
Frequency Missing = 2028

Table 13				
Table of symbol1 by GroupedAge				
symbol1	GroupedAge			
Frequency Row Pct	No delay after Grade 12	Delay of no more than two years	Delay of more than two years	Total
A	90 39.30	109 47.60	30 13.10	229
B	71 49.31	69 47.92	4 2.78	144
C	187 47.34	174 44.05	34 8.61	395
D	133 41.82	157 49.37	28 8.81	318
E	32 45.71	35 50.00	3 4.29	70
F	13 30.95	27 64.29	2 4.76	42
G	12 32.43	24 64.86	1 2.70	37
Total	538	595	102	1235
Frequency Missing = 1964				

Effective Sample Size = 1235
Frequency Missing = 1964

Table 14			
Statistics for Table of symbol1 by Grouped Age			
Statistic	DF	Value	Prob
Chi-Square	12	27.4306	0.0067
Likelihood Ratio Chi-Square	12	29.0045	0.0039
Mantel-Haenszel Chi-Square	1	0.0490	0.8248
Phi Coefficient		0.1490	
Contingency Coefficient		0.1474	
Cramer's V		0.1054	

Effective Sample Size = 1235
Frequency Missing = 1964

Table 15			
Table of symbol1 by took_maths			
symbol1	took_maths		
Frequency Row Pct	0	1	Total
A	85 29.93	199 70.07	284
B	79 40.10	118 59.90	197
C	232 41.88	322 58.12	554
D	241 47.53	266 52.47	507
E	46 43.81	59 56.19	105
F	37 51.39	35 48.61	72
G	45 62.50	27 37.50	72
Total	765	1026	1791
Frequency Missing = 1408			

Table 16			
Statistics for Table of symbol1 by took_maths			
Statistic	DF	Value	Prob
Chi-Square	6	38.2779	<.0001
Likelihood Ratio Chi-Square	6	38.8139	<.0001
Mantel-Haenszel Chi-Square	1	33.6395	<.0001
Phi Coefficient		0.1462	
Contingency Coefficient		0.1447	
Cramer's V		0.1462	

Effective Sample Size = 1791
Frequency Missing = 1408

Table 17									
Table of symbol1 by Home Language									
symbol1	Home Language								
Frequency Row Pct	Afrikaans	English and Afrikaans	Ndebele	English	Tsongo	North Sotho	Other	South Sotho	Tswana
A	29 12.55	33 14.29	0 0.00	121 52.38	1 0.43	1 0.43	15 6.49	1 0.43	3 1.30
B	26 17.93	20 13.79	0 0.00	58 40.00	1 0.69	3 2.07	2 1.38	2 1.38	9 6.21
C	49 12.19	50 12.44	1 0.25	195 48.51	2 0.50	3 0.75	4 1.00	3 0.75	15 3.73
D	55 17.08	52 16.15	2 0.62	128 39.75	3 0.93	1 0.31	8 2.48	2 0.62	6 1.86
E	7 9.86	10 14.08	0 0.00	32 45.07	1 1.41	0 0.00	0 0.00	0 0.00	1 1.41
F	3 7.14	7 16.67	0 0.00	17 40.48	1 2.38	0 0.00	0 0.00	1 2.38	2 4.76
G	4 10.81	7 18.92	0 0.00	15 40.54	0 0.00	0 0.00	0 0.00	1 2.70	0 0.00
Total	173	179	3	566	9	8	29	10	36
Frequency Missing = 1949									

Table 17 continued					
Table of symbol1 by Home Language					
symbol1	Home Language				
Frequency Row Pct	Venda	Swati	Xhosa	Zulu	Total
A	0 0.00	3 1.30	20 8.66	4 1.73	231
B	1 0.69	0 0.00	21 14.48	2 1.38	145
C	5 1.24	4 1.00	66 16.42	5 1.24	402
D	1 0.31	1 0.31	62 19.25	1 0.31	322
E	0 0.00	0 0.00	17 23.94	3 4.23	71

Table 17 continued					
Table of symbol1 by Home Language					
symbol1	Home Language				
Frequency Row Pct	Venda	Swati	Xhosa	Zulu	Total
F	0 0.00	0 0.00	10 23.81	1 2.38	42
G	0 0.00	0 0.00	9 24.32	1 2.70	37
Total	7	8	205	17	1250
Frequency Missing = 1949					

Table 18			
Statistics for Table of symbol1 by Home Language			
Statistic	DF	Value	Prob
Chi-Square	72	105.1186	0.0066
Likelihood Ratio Chi-Square	72	106.6222	0.0050
Mantel-Haenszel Chi-Square	1	7.0175	0.0081
Phi Coefficient		0.2900	
Contingency Coefficient		0.2785	
Cramer's V		0.1184	
WARNING: 62% of the cells have expected counts less than 5. Chi-Square may not be a valid test.			

Effective Sample Size = 1250
Frequency Missing = 1949

Table 19				
Table of symbol1 by Academic Language				
symbol1	Academic Language			
Frequency Row Pct	Afrikaans	Both	English	Total
A	18 7.83	20 8.70	192 83.48	230
B	15 10.42	13 9.03	116 80.56	144
C	22 5.47	33 8.21	347 86.32	402
D	19 5.94	40 12.50	261 81.56	320
E	3 4.23	2 2.82	66 92.96	71
F	1 2.38	3 7.14	38 90.48	42
G	3 8.11	2 5.41	32 86.49	37
Total	81	113	1052	1246
Frequency Missing = 1953				

Table 20			
Statistics for Table of symbol1 by Academic Lannguage			
Statistic	DF	Value	Prob
Chi-Square	12	16.5079	0.1691
Likelihood Ratio Chi-Square	12	17.2063	0.1420
Mantel-Haenszel Chi-Square	1	2.3458	0.1256
Phi Coefficient		0.1151	
Contingency Coefficient		0.1143	
Cramer's V		0.0814	
WARNING: 24% of the cells have expected counts less than 5. Chi-Square may not be a valid test.			

Effective Sample Size = 1246
Frequency Missing = 1953

Table 21										
TTEST procedure : Performance by Mathematics Profile										
Statistics										
Variable	took_maths	N	Lower CL Mean	Mean	Upper CL Mean	Lower CL Std Dev	Std Dev	Upper CL Std Dev	Std Err	Minimum
final	0	764	58.377	59.274	60.171	12.023	12.626	13.293	0.4568	17
final	1	1027	62.157	62.905	63.652	11.696	12.201	12.753	0.3807	19
final	Diff (1-2)		-4.791	-3.63	-2.47	11.991	12.384	12.804	0.5917	

Table 22					
T-Tests					
Variable	Method	Variances	DF	t Value	Pr > |t|
final	Pooled	Equal	1789	-6.14	<.0001
final	Satterthwaite	Unequal	1613	-6.10	<.0001

Table 23					
T-Tests					
Variable	Method	Variances	DF	t Value	Pr > |t|
Final	Pooled	Equal	1789	-6.14	<.0001
Final	Satterthwaite	Unequal	1613	-6.10	<.0001

Table 24										
TTEST procedure: performance by National Science Profile										
Statistics										
Variable	took_nat_sci	N	Lower CL Mean	Mean	Upper CL Mean	Lower CL Std Dev	Std Dev	Upper CL Std Dev	Std Err	Minimum
final	0	1377	59.836	60.499	61.162	12.089	12.541	13.027	0.338	17
final	1	414	63.049	64.208	65.366	11.225	11.99	12.868	0.5893	21
final	Diff (1-2)		-5.074	-3.709	-2.344	12.022	12.416	12.836	0.6959	

Table 25					
T-Tests					
Variable	Method	Variances	DF	t Value	Pr > |t|
final	Pooled	Equal	1789	-5.33	<.0001
final	Satterthwaite	Unequal	706	-5.46	<.0001

Table 26					
Equality of Variances					
Variable	Method	Num DF	Den DF	F Value	Pr > F
final	Folded F	1376	413	1.09	0.2680

Table 27										
TTEST procedure: Performance by Business Profile										
Statistics										
Variable	took_bus_sci	N	Lower CL Mean	Mean	Upper CL Mean	Lower CL Std Dev	Std Dev	Upper CL Std Dev	Std Err	Minimum
final	0	893	59.692	60.513	61.335	11.952	12.507	13.115	0.4185	17
final	1	898	61.377	62.194	63.01	11.914	12.465	13.07	0.416	19
final	Diff (1-2)		-2.838	-1.68	-0.523	12.09	12.486	12.909	0.5901	

Statistics 28		
Variable	took_bus_sci	Maximum
final	0	98
final	1	96
final	Diff (1-2)	

Table 29					
T-Tests					
Variable	Method	Variances	DF	t Value	Pr > |t|
final	Pooled	Equal	1789	-2.85	0.0045
final	Satterthwaite	Unequal	1789	-2.85	0.0045

Table 30					
Equality of Variances					
Variable	Method	Num DF	Den DF	F Value	Pr > F
final	Folded F	892	897	1.01	0.9203

Table 31										
TTEST procedure: Performance by Language Profile										
Statistics										
Variable	took_languages	N	Lower CL Mean	Mean	Upper CL Mean	Lower CL Std Dev	Std Dev	Upper CL Std Dev	Std Err	Minimum
final	0	740	59.609	60.52	61.43	12.005	12.617	13.294	0.4638	19
final	1	1051	61.194	61.945	62.696	11.899	12.407	12.962	0.3827	17
final	Diff (1-2)		-2.601	-1.425	-0.249	12.098	12.494	12.918	0.5996	

Table 32					
T-Tests					
Variable	Method	Variances	DF	t Value	Pr > |t|
final	Pooled	Equal	1789	-2.38	0.0176
final	Satterthwaite	Unequal	1574	-2.37	0.0179

Table 33					
Equality of Variances					
Variable	Method	Num DF	Den DF	F Value	Pr > F
final	Folded F	739	1050	1.03	0.6193

Table 34										
TTESTS Procedure: Performance by Fine Arts Profile										
Statistics										
Variable	took_fine_arts	N	Lower CL Mean	Mean	Upper CL Mean	Lower CL Std Dev	Std Dev	Upper CL Std Dev	Std Err	Minimum
final	0	1737	60.722	61.308	61.895	12.061	12.462	12.891	0.299	19
final	1	54	59.063	62.889	66.715	11.783	14.017	17.304	1.9075	17
final	Diff (1-2)		-4.971	-1.581	1.8101	12.114	12.511	12.935	1.7288	

Table 35					
T-Tests					
Variable	Method	Variances	DF	t Value	Pr > |t|
final	Pooled	Equal	1789	-0.91	0.3607
final	Satterthwaite	Unequal	55.6	-0.82	0.4165

Table 36					
Equality of Variances					
Variable	Method	Num DF	Den DF	F Value	Pr > F
final	Folded F	53	1736	1.27	0.1942

Table 37										
TTEST Procedure: Performance by English Profile										
Statistics										
Variable	took_english	N	Lower CL Mean	Mean	Upper CL Mean	Lower CL Std Dev	Std Dev	Upper CL Std Dev	Std Err	Minimum
final	0	695	59.104	60.031	60.958	11.826	12.447	13.139	0.4722	19
final	1	1096	61.456	62.196	62.936	11.982	12.483	13.029	0.3771	17
final	Diff (1-2)		-3.351	-2.165	-0.979	12.074	12.469	12.892	0.6046	

Table 38					
T-Tests					
Variable	Method	Variances	DF	t Value	Pr > |t|
final	Pooled	Equal	1789	-3.58	0.0004
final	Satterthwaite	Unequal	1480	-3.58	0.0004

Table 39					
Equality of Variances					
Variable	Method	Num DF	Den DF	F Value	Pr > F
final	Folded F	1095	694	1.01	0.9375

APPENDIX F: PERFORMANCE FINAL INTRODUCTORY STATISTICS

F1: FINAL IS BY SELECTED DEMOGRAPHICS

Table 1				
Table of Final IS Profile by Grouped Age				
Final IS Profile	Grouped Age			
Frequency Row Pct Col Pct	1	2	3	Total
DROPOUT	23 28.75 4.15	42 52.50 6.72	15 18.75 12.93	80
FAIL	46 38.02 8.30	72 59.50 11.52	3 2.48 2.59	121
PASS	485 44.33 87.55	511 46.71 81.76	98 8.96 84.48	1094
Total	554	625	116	1295
Frequency Missing = 1893				

Table 2			
Table of Final IS Profile by Gender			
Final IS Profile	Gender		
Frequency Row Pct Col Pct	Female	Male	Total
DROPOUT	45 53.57 6.22	39 46.43 6.64	84
FAIL	69 56.56 9.54	53 43.44 9.03	122
PASS	609 55.16 84.23	495 44.84 84.33	1104
Total	723	587	1310
Frequency Missing = 1878			

Table 3

Table of Final IS Profile by RACE

Final IS Profile	RACE							
Frequency Row Pct Col Pct	Únknown	White	Coloured	Indian	Asian	African	Other	Total
DROPOUT	2 2.38 9.52	0 0.00 0.00	44 52.38 5.62	9 10.71 8.18	3 3.57 8.11	26 30.95 7.81	0 0.00 0.00	84
FAIL	0 0.00 0.00	0 0.00 0.00	78 63.93 9.96	5 4.10 4.55	5 4.10 13.51	33 27.05 9.91	1 0.82 4.76	122
PASS	19 1.71 90.48	10 0.90 100.00	661 59.60 84.42	96 8.66 87.27	29 2.61 78.38	274 24.71 82.28	20 1.80 95.24	1109
Total	21	10	783	110	37	333	21	1315

Frequency Missing = 1873

Table 4

Table of Final IS Profile by Home language

Final IS Profile	Home language							
Frequency Row Pct Col Pct	Afrikaans	English and Afrikaans	Ndebele	English	Tsonga	North Sotho	Other	South Sotho
DROPOUT	16 19.05 8.47	12 14.29 6.52	0 0.00 0.00	29 34.52 4.90	1 1.19 10.00	1 1.19 12.50	4 4.76 12.12	0 0.00 0.00
FAIL	14 11.48 7.41	19 15.57 10.33	0 0.00 0.00	51 41.80 8.61	1 0.82 10.00	0 0.00 0.00	0 0.00 0.00	2 1.64 25.00
PASS	159 14.34 84.13	153 13.80 83.15	3 0.27 100.00	512 46.17 86.49	8 0.72 80.00	7 0.63 87.50	29 2.61 87.88	6 0.54 75.00
Total	189	184	3	592	10	8	33	8

Frequency Missing = 1873

Table 5						
Table of Final IS Profile by Home language						
Final IS Profile	Home language					
Frequency Row Pct Col Pct	Tswana	Venda	Swati	Xhosa	Zulu	Total
DROPOUT	0 0.00 0.00	0 0.00 0.00	0 0.00 0.00	20 23.81 9.05	1 1.19 5.56	84
FAIL	3 2.46 8.33	0 0.00 0.00	0 0.00 0.00	29 23.77 13.12	3 2.46 16.67	122
PASS	33 2.98 91.67	5 0.45 100.00	8 0.72 100.00	172 15.51 77.83	14 1.26 77.78	1109
Total	36	5	8	221	18	1315
Frequency Missing = 1873						

Table 6									
Table of Final IS Profile by Area of residence									
Final IS Profile	Area of residence								
Frequency Row Pct Col Pct	Unknown	Western Cape	Eastern Cape	Northern Cape	Free State	Gauteng	Mpumalanga	Limpopo Province	North West Province
DROPOUT	3 3.57 5.00	71 84.52 7.01	7 8.33 6.54	0 0.00 0.00	0 0.00 0.00	0 0.00 0.00	0 0.00 0.00	2 2.38 11.11	0 0.00 0.00
FAIL	2 1.64 3.33	95 77.87 9.38	15 12.30 14.02	1 0.82 5.88	1 0.82 16.67	2 1.64 8.00	1 0.82 12.50	1 0.82 5.56	1 0.82 20.00
PASS	55 4.97 91.67	847 76.58 83.61	85 7.69 79.44	16 1.45 94.12	5 0.45 83.33	23 2.08 92.00	7 0.63 87.50	15 1.36 83.33	4 0.36 80.00
Total	60	1013	107	17	6	25	8	18	5
Frequency Missing = 1876									

Table 7

Table of Final IS Profile by Area of residence

Final IS Profile	Area of residence							
Frequency Row Pct Col Pct	Kwazulu Natal	Namibia	Zimbabwe	Angola	Botswana	Lesotho	Swaziland	Total
DROPOUT	0 0.00 0.00	0 0.00 0.00	1 1.19 14.29	0 0.00 0.00	0 0.00 0.00	0 0.00 .	0 0.00 0.00	84
FAIL	2 1.64 14.29	0 0.00 0.00	0 0.00 0.00	0 0.00 0.00	1 0.82 5.26	0 0.00 .	0 0.00 0.00	122
PASS	12 1.08 85.71	8 0.72 100.00	6 0.54 85.71	2 0.18 100.00	18 1.63 94.74	0 0.00 .	3 0.27 100.00	1106
Total	14	8	7	2	19	0	3	1312

Frequency Missing = 1876

Table 8

Table of Final IS Profile by Church

Final IS Profile	Church						
Frequency Row Pct Col Pct	Anglican	New Apostolic	Old Apostolic	Baptist	Moravian	Congregational	Lutheran
DROPOUT	12 14.29 7.36	4 4.76 6.56	1 1.19 3.57	3 3.57 8.82	1 1.19 4.76	1 1.19 4.76	2 2.38 8.00
FAIL	18 14.75 11.04	5 4.10 8.20	2 1.64 7.14	1 0.82 2.94	3 2.46 14.29	3 2.46 14.29	1 0.82 4.00
PASS	133 12.05 81.60	52 4.71 85.25	25 2.26 89.29	30 2.72 88.24	17 1.54 80.95	17 1.54 80.95	22 1.99 88.00
Total	163	61	28	34	21	21	25

Frequency Missing = 1878

Table 9								
Table of Final IS Profile by Church								
Final IS Profile	Church							
Frequency Row Pct Col Pct	Calvin Protestant	Full Gospel	African Methodist Episcopal	Methodist	United Reformed	Apostolic Faith Mission	Presbyterian	Roman Catholic
DROPOUT	0 0.00 0.00	3 3.57 6.12	1 1.19 6.67	7 8.33 7.53	6 7.14 7.69	4 4.76 11.76	3 3.57 12.50	7 8.33 6.36
FAIL	2 1.64 15.38	6 4.92 12.24	3 2.46 20.00	4 3.28 4.30	7 5.74 8.97	0 0.00 0.00	2 1.64 8.33	12 9.84 10.91
PASS	11 1.00 84.62	40 3.62 81.63	11 1.00 73.33	82 7.43 88.17	65 5.89 83.33	30 2.72 88.24	19 1.72 79.17	91 8.24 82.73
Total	13	49	15	93	78	34	24	110
Frequency Missing = 1878								

Table 10							
Table of Final IS Profile by Church							
Final IS Profile	Church						
Frequency Row Pct Col Pct	Seventh Day Adventist	Jehovas Witnes	Islamic	Hindu	Other	Jewish	Total
DROPOUT	0 0.00 0.00	0 0.00 0.00	19 22.62 5.94	0 0.00 0.00	10 11.90 5.92	0 0.00 0.00	84
FAIL	7 5.74 25.00	1 0.82 9.09	25 20.49 7.81	2 1.64 16.67	18 14.75 10.65	0 0.00 0.00	122
PASS	21 1.90 75.00	10 0.91 90.91	276 25.00 86.25	10 0.91 83.33	141 12.77 83.43	1 0.09 100.00	1104
Total	28	11	320	12	169	1	1310
Frequency Missing = 1878							

Table 11						
Table of Final IS Profile by INC						
Final IS Profile	INC					
Frequency Row Pct Col Pct	Unknown	Less than R2 000.00	Between R2 001.00 and R6 000.00	Between R6 000.00 and R10 000.00	More than R10 000.00	Total
DROPOUT	10 17.86 9.90	7 12.50 5.60	18 32.14 3.98	14 25.00 5.51	7 12.50 5.15	56
FAIL	5 5.68 4.95	6 6.82 4.80	41 46.59 9.07	27 30.68 10.63	9 10.23 6.62	88
PASS	86 9.31 85.15	112 12.12 89.60	393 42.53 86.95	213 23.05 83.86	120 12.99 88.24	924
Total	101	125	452	254	136	1068
Frequency Missing = 2120						

F2: FINAL IS PROFILE BY GRADE 12 BACKGROUND

Table 12								
Table of Final IS Profile by AVERAGE GRADE 12 SYMBOL								
Final IS Profile	AVERAGE GRADE 12 SYMBOL							
Frequency Row Pct Col Pct	A	B	C	D	E	EE	F	Total
DROPOUT	1 1.25 3.85	2 2.50 1.23	30 37.50 5.42	31 38.75 7.60	15 18.75 13.64	0 0.00 0.00	1 1.25 20.00	80
FAIL	0 0.00 0.00	5 4.35 3.09	38 33.04 6.86	61 53.04 14.95	7 6.09 6.36	1 0.87 100.00	3 2.61 60.00	115
PASS	25 2.33 96.15	155 14.47 95.68	486 45.38 87.73	316 29.51 77.45	88 8.22 80.00	0 0.00 0.00	1 0.09 20.00	1071
Total	26	162	554	408	110	1	5	1266
Frequency Missing = 1922								

Table 13							
Table of Final IS Profile by AVERAGE GRADE 11 SYMBOL							
Final IS Profile	AVERAGE GRADE 11 SYMBOL						
Frequency Row Pct Col Pct	A	B	C	D	E	F	Total
DROPOUT	1 3.23 4.76	3 9.68 2.68	15 48.39 5.34	6 19.35 2.20	6 19.35 6.67	0 0.00 0.00	31
FAIL	0 0.00 0.00	4 5.80 3.57	21 30.43 7.47	30 43.48 10.99	14 20.29 15.56	0 0.00 0.00	69
PASS	20 2.94 95.24	105 15.44 93.75	245 36.03 87.19	237 34.85 86.81	70 10.29 77.78	3 0.44 100.00	680
Total	21	112	281	273	90	3	780
Frequency Missing = 2408							

Table 14

Table of Final IS Profile by GRADE 12 STATUS

Final IS Profile	GRADE 12 STATUS					
Frequency Row Pct Col Pct	Age Exemption	Conditional Exemption	Failed	Full Exemption	Exemption on Foreign Qualification	Provisional Age Exemption
DROPOUT	9 10.84 14.75	9 10.84 6.47	0 0.00 0.00	54 65.06 5.39	2 2.41 9.09	0 0.00 .
FAIL	2 1.67 3.28	21 17.50 15.11	2 1.67 50.00	81 67.50 8.09	0 0.00 0.00	0 0.00 .
PASS	50 4.61 81.97	109 10.05 78.42	2 0.18 50.00	866 79.82 86.51	20 1.84 90.91	0 0.00 .
Total	61	139	4	1001	22	0

Frequency Missing = 1900

Table 15

Table of Final IS Profile by GRADE 12 STATUS

Final IS Profile	GRADE 12 STATUS				
Frequency Row Pct Col Pct	Recognition of Prior Learning	Senate Discretion	School Leaving Certificate	Status	Total
DROPOUT	1 1.20 25.00	3 3.61 10.34	5 6.02 18.52	0 0.00 0.00	83
FAIL	1 0.83 25.00	6 5.00 20.69	7 5.83 25.93	0 0.00 0.00	120
PASS	2 0.18 50.00	20 1.84 68.97	15 1.38 55.56	1 0.09 100.00	1085
Total	4	29	27	1	1288

Frequency Missing = 1900

Table 16			
Table of Final IS Profile by PRIOR LEARNING			
Final IS Profile	PRIOR LEARNING		
Frequency Row Pct Col Pct	No	Yes	Total
DROPOUT	39 60.00 3.99	26 40.00 10.88	65
FAIL	87 83.65 8.90	17 16.35 7.11	104
PASS	851 81.28 87.10	196 18.72 82.01	1047
Total	977	239	1216
Frequency Missing = 1972			

F3: FINAL IS PROFILE BY GRADE 12 PROFILE

Table 17

Table of Final IS Profile by Mathematics

Final IS Profile	Mathematics								
Frequency Row Pct Col Pct	1	2	3	4	5	6	7	8	Total
DROPOUT	14 21.88 9.46	12 18.75 5.91	10 15.63 5.00	13 20.31 5.16	9 14.06 6.12	5 7.81 5.05	1 1.56 7.69	0 0.00 0.00	64
FAIL	29 30.21 19.59	23 23.96 11.33	13 13.54 6.50	23 23.96 9.13	7 7.29 4.76	1 1.04 1.01	0 0.00 0.00	0 0.00 0.00	96
PASS	105 11.60 70.95	168 18.56 82.76	177 19.56 88.50	216 23.87 85.71	131 14.48 89.12	93 10.28 93.94	12 1.33 92.31	3 0.33 100.00	905
Total	148	203	200	252	147	99	13	3	1065

Frequency Missing = 2123

Table 18

Table of Final IS Profile by English

Final IS Profile	English										
Frequency Row Pct Col Pct	1	2	3	4	4.5	5	5.5	6	7	8	Total
DROPOUT	0 0.00 0.00	3 4.00 30.00	2 2.67 18.18	15 20.00 7.65	1 1.33 100.00	27 36.00 5.68	0 0.00 0.00	23 30.67 6.35	3 4.00 3.75	1 1.33 8.33	75
FAIL	1 0.84 50.00	1 0.84 10.00	1 0.84 9.09	35 29.41 17.86	0 0.00 0.00	42 35.29 8.84	0 0.00 0.00	35 29.41 9.67	4 3.36 5.00	0 0.00 0.00	119
PASS	1 0.10 50.00	6 0.63 60.00	8 0.84 72.73	146 15.27 74.49	0 0.00 0.00	406 42.47 85.47	1 0.10 100.00	304 31.80 83.98	73 7.64 91.25	11 1.15 91.67	956
Total	2	10	11	196	1	475	1	362	80	12	1150

Frequency Missing = 2038

Table 19

Table of Final IS Profile by National Science

Final IS Profile	National Science												
Frequency Row Pct Col Pct	1	2	2.5	3	3.5	4	5	5.5	6	7	7.5	8	Total
DROPOUT	3 10.34 6.98	7 24.14 8.97	0 0.00 .	8 27.59 10.00	0 0.00 0.00	7 24.14 5.07	2 6.90 2.94	0 0.00 0.00	2 6.90 8.00	0 0.00 0.00	0 0.00 .	0 0.00 .	29
FAIL	7 20.00 16.28	8 22.86 10.26	0 0.00 .	6 17.14 7.50	0 0.00 0.00	11 31.43 7.97	3 8.57 4.41	0 0.00 0.00	0 0.00 0.00	0 0.00 0.00	0 0.00 .	0 0.00 .	35
PASS	33 8.78 76.74	63 16.76 80.77	0 0.00 .	66 17.55 82.50	2 0.53 100.00	120 31.91 86.96	63 16.76 92.65	2 0.53 100.00	23 6.12 92.00	4 1.06 100.00	0 0.00 .	0 0.00 .	376
Total	43	78	0	80	2	138	68	2	25	4	0	0	440

Frequency Missing = 2748

Table 20

Table of Final IS Profile by Social Science

Final IS Profile	Social Science									
Frequency Row Pct Col Pct	1	1.5	2	2.5	3	3.5	3.666666667	4	4.5	4.666666667
DROPOUT	1 2.94 10.00	0 0.00 0.00	2 5.88 11.76	2 5.88 50.00	0 0.00 0.00	3 8.82 50.00	1 2.94 100.00	10 29.41 10.99	1 2.94 10.00	0 0.00 0.00
FAIL	1 1.85 10.00	0 0.00 0.00	5 9.26 29.41	1 1.85 25.00	2 3.70 16.67	0 0.00 0.00	0 0.00 0.00	18 33.33 19.78	1 1.85 10.00	0 0.00 0.00
PASS	8 2.39 80.00	2 0.60 100.00	10 2.99 58.82	1 0.30 25.00	10 2.99 83.33	3 0.90 50.00	0 0.00 0.00	63 18.81 69.23	8 2.39 80.00	1 0.30 100.00
Total	10	2	17	4	12	6	1	91	10	1

Frequency Missing = 2765

Table 21

Table of Final IS Profile by Social Science

Final IS Profile	Social Science						
Frequency Row Pct Col Pct	5	5.5	6	6.5	7	8	Total
DROPOUT	3 8.82 3.16	0 0.00 0.00	10 29.41 9.09	0 0.00 0.00	1 2.94 2.44	0 0.00 0.00	34
FAIL	9 16.67 9.47	2 3.70 28.57	9 16.67 8.18	1 1.85 100.00	5 9.26 12.20	0 0.00 0.00	54
PASS	83 24.78 87.37	5 1.49 71.43	91 27.16 82.73	0 0.00 0.00	35 10.45 85.37	15 4.48 100.00	335
Total	95	7	110	1	41	15	423

Frequency Missing = 2765

Table 22

Table of Final IS Profile by Fine Arts

Final IS Profile	Fine Arts								
Frequency Row Pct Col Pct	1	2	3	4	5	6	7	8	Total
DROPOUT	1 20.00 33.33	1 20.00 12.50	0 0.00 0.00	1 20.00 10.00	0 0.00 0.00	1 20.00 10.00	1 20.00 25.00	0 0.00 0.00	5
FAIL	0 0.00 0.00	1 25.00 12.50	1 25.00 16.67	1 25.00 10.00	1 25.00 6.25	0 0.00 0.00	0 0.00 0.00	0 0.00 0.00	4
PASS	2 4.08 66.67	6 12.24 75.00	5 10.20 83.33	8 16.33 80.00	15 30.61 93.75	9 18.37 90.00	3 6.12 75.00	1 2.04 100.00	49
Total	3	8	6	10	16	10	4	1	58

Frequency Missing = 3130

Table 23										
Table of Final IS Profile by Business Science										
Final IS Profile	Business Science									
Frequency Row Pct Col Pct	1	1.333333333	1.5	1.666666667	2	2.333333333	2.5	2.666666667	3	3.333333333
DROPOUT	1 1.82 9.09	0 0.00 0.00	2 3.64 50.00	0 0.00 0.00	6 10.91 18.75	1 1.82 25.00	0 0.00 0.00	0 0.00 0.00	4 7.27 10.81	0 0.00 0.00
FAIL	4 4.08 36.36	0 0.00 0.00	0 0.00 0.00	0 0.00 0.00	7 7.14 21.88	0 0.00 0.00	5 5.10 33.33	2 2.04 100.00	7 7.14 18.92	3 3.06 27.27
PASS	6 0.77 54.55	1 0.13 100.00	2 0.26 50.00	1 0.13 100.00	19 2.44 59.38	3 0.39 75.00	10 1.28 66.67	0 0.00 0.00	26 3.34 70.27	8 1.03 72.73
Total	11	1	4	1	32	4	15	2	37	11
Frequency Missing = 2256										

Table 24										
Table of Final IS Profile by Business Science										
Final IS Profile	Business Science									
Frequency Row Pct Col Pct	3.5	3.666666667	4	4.333333333	4.5	4.666666667	5	5.333333333	5.5	5.666666667
DROPOUT	1 1.82 3.45	1 1.82 5.26	12 21.82 7.41	1 1.82 3.70	1 1.82 1.69	2 3.64 5.41	9 16.36 5.77	0 0.00 0.00	3 5.45 8.11	1 1.82 4.00
FAIL	5 5.10 17.24	2 2.04 10.53	18 18.37 11.11	3 3.06 11.11	10 10.20 16.95	3 3.06 8.11	13 13.27 8.33	3 3.06 7.32	1 1.02 2.70	2 2.04 8.00
PASS	23 2.95 79.31	16 2.05 84.21	132 16.94 81.48	23 2.95 85.19	48 6.16 81.36	32 4.11 86.49	134 17.20 85.90	38 4.88 92.68	33 4.24 89.19	22 2.82 88.00
Total	29	19	162	27	59	37	156	41	37	25
Frequency Missing = 2256										

Table 25

Table of Final IS Profile by Business Science

Final IS Profile	Business Science									
Frequency Row Pct Col Pct	6	6.333333333	6.5	6.666666667	7	7.333333333	7.5	7.666666667	8	Total
DROPOUT	6 10.91 4.76	1 1.82 6.67	0 0.00 0.00	1 1.82 11.11	1 1.82 2.70	0 0.00 0.00	0 0.00 0.00	0 0.00 0.00	1 1.82 6.67	55
FAIL	8 8.16 6.35	1 1.02 6.67	0 0.00 0.00	0 0.00 0.00	1 1.02 2.70	0 0.00 0.00	0 0.00 0.00	0 0.00 0.00	0 0.00 0.00	98
PASS	112 14.38 88.89	13 1.67 86.67	15 1.93 100.00	8 1.03 88.89	35 4.49 94.59	1 0.13 100.00	2 0.26 100.00	2 0.26 100.00	14 1.80 93.33	779
Total	126	15	15	9	37	1	2	2	15	932

Frequency Missing = 2256

Table 26

Table of Final IS Profile by Languages

Final IS Profile	Languages														
Frequency Row Pct Col Pct	1	2	3	3.5	4	4.5	5	5.333333333	5.5	6	6.5	7	7.5	8	Total
DROPOUT	0 0.00 0.00	0 0.00 0.00	2 2.82 22.22	0 0.00 0.00	7 9.86 10.29	3 4.23 18.75	15 21.13 7.11	0 0.00 0.00	2 2.82 8.33	23 32.39 6.82	0 0.00 0.00	13 18.31 4.85	0 0.00 0.00	6 8.45 4.05	71
FAIL	1 0.85 20.00	1 0.85 14.29	1 0.85 11.11	0 0.00 0.00	9 7.63 13.24	3 2.54 18.75	26 22.03 12.32	0 0.00 0.00	2 1.69 8.33	42 35.59 12.46	0 0.00 0.00	26 22.03 9.70	0 0.00 0.00	7 5.93 4.73	118
PASS	4 0.44 80.00	6 0.66 85.71	6 0.66 66.67	2 0.22 100.00	52 5.70 76.47	10 1.10 62.50	170 18.64 80.57	1 0.11 100.00	20 2.19 83.33	272 29.82 80.71	4 0.44 100.00	229 25.11 85.45	1 0.11 100.00	135 14.80 91.22	912
Total	5	7	9	2	68	16	211	1	24	337	4	268	1	148	1101

Frequency Missing = 2087

F4: FINAL IS PROFILE BY TUTORIAL NUMBER

Table 27								
Table of Final IS Profile by Tutorial one								
Final IS Profile	Tutorial one							
Frequency Row Pct Col Pct	0	1-29	40-49	50-59	60-69	70-75	75+	Total
DROPOUT	159 75.36 45.30	1 0.47 100.00	0 0.00 0.00	8 3.79 5.13	5 2.37 5.49	1 0.47 1.18	37 17.54 1.94	211
FAIL	83 27.67 23.65	0 0.00 0.00	0 0.00 0.00	31 10.33 19.87	21 7.00 23.08	16 5.33 18.82	149 49.67 7.80	300
PASS	109 5.23 31.05	0 0.00 0.00	2 0.10 100.00	117 5.61 75.00	65 3.12 71.43	68 3.26 80.00	1724 82.69 90.26	2085
Total	351	1	2	156	91	85	1910	2596
Frequency Missing = 592								

Table 28					
Table of Final IS Profile by Tutorial two					
Final IS Profile	Tutorial two				
Frequency Row Pct Col Pct	0	50-59	70-75	75+	Total
DROPOUT	167 79.15 43.15	8 3.79 3.35	0 0.00 0.00	36 17.06 1.83	211
FAIL	90 30.00 23.26	46 15.33 19.25	0 0.00 0.00	164 54.67 8.33	300
PASS	130 6.24 33.59	185 8.87 77.41	1 0.05 100.00	1769 84.84 89.84	2085
Total	387	239	1	1969	2596
Frequency Missing = 592					

Table 29

Table of Final IS Profile by Tutorial three

Final IS Profile	Tutorial three						
Frequency Row Pct Col Pct	0	1-29	40-49	50-59	70-75	75+	Total
DROPOUT	169 80.09 31.59	0 0.00 0.00	0 0.00 0.00	9 4.27 3.16	0 0.00 0.00	33 15.64 1.92	211
FAIL	130 43.33 24.30	0 0.00 0.00	0 0.00 0.00	49 16.33 17.19	3 1.00 5.77	118 39.33 6.87	300
PASS	236 11.32 44.11	4 0.19 100.00	3 0.14 100.00	227 10.89 79.65	49 2.35 94.23	1566 75.11 91.21	2085
Total	535	4	3	285	52	1717	2596

Frequency Missing = 592

Table 30

Table of Final IS Profile by Tutorial four

Final IS Profile	Tutorial four					
Frequency Row Pct Col Pct	0	50-59	60-69	70-75	75+	Total
DROPOUT	179 84.83 45.66	3 1.42 3.61	0 0.00 0.00	0 0.00 0.00	29 13.74 1.38	211
FAIL	102 34.00 26.02	21 7.00 25.30	3 1.00 27.27	1 0.33 10.00	173 57.67 8.24	300
PASS	111 5.32 28.32	59 2.83 71.08	8 0.38 72.73	9 0.43 90.00	1898 91.03 90.38	2085
Total	392	83	11	10	2100	2596

Frequency Missing = 592

Table 31							
Table of Final IS Profile by Tutorial five							
Final IS Profile	Tutorial five						
Frequency Row Pct Col Pct	0	40-49	50-59	60-69	70-75	75+	Total
DROPOUT	184 87.20 45.21	0 0.00 0.00	1 0.47 2.70	0 0.00 0.00	0 0.00 0.00	26 12.32 1.26	211
FAIL	111 37.00 27.27	0 0.00 0.00	9 3.00 24.32	7 2.33 25.00	15 5.00 27.27	158 52.67 7.64	300
PASS	112 5.37 27.52	1 0.05 100.00	27 1.29 72.97	21 1.01 75.00	40 1.92 72.73	1884 90.36 91.10	2085
Total	407	1	37	28	55	2068	2596
Frequency Missing = 592							

Table 32									
Table of Final IS Profile by Tutorial six									
Final IS Profile	Tutorial six								
Frequency Row Pct Col Pct	0	1-29	30-39	40-49	50-59	60-69	70-75	75+	Total
DROPOUT	184 87.20 36.15	0 0.00 0.00	0 0.00 0.00	0 0.00 0.00	3 1.42 1.69	0 0.00 0.00	0 0.00 0.00	24 11.37 1.32	211
FAIL	135 45.00 26.52	0 0.00 0.00	0 0.00 0.00	0 0.00 0.00	35 11.67 19.66	6 2.00 17.65	3 1.00 6.00	121 40.33 6.65	300
PASS	190 9.11 37.33	3 0.14 100.00	2 0.10 100.00	1 0.05 100.00	140 6.71 78.65	28 1.34 82.35	47 2.25 94.00	1674 80.29 92.03	2085
Total	509	3	2	1	178	34	50	1819	2596
Frequency Missing = 592									

Table 33							
Table of Final IS Profile by Tutorial seven							
Final IS Profile	Tutorial seven						
Frequency Row Pct Col Pct	0	1-29	40-49	50-59	60-69	75+	Total
DROPOUT	187 88.63 30.76	0 0.00 0.00	0 0.00 0.00	0 0.00 0.00	0 0.00 0.00	24 11.37 1.32	211
FAIL	156 52.00 25.66	0 0.00 0.00	0 0.00 0.00	15 5.00 14.42	3 1.00 4.76	126 42.00 6.93	300
PASS	265 12.71 43.59	1 0.05 100.00	1 0.05 100.00	89 4.27 85.58	60 2.88 95.24	1669 80.05 91.75	2085
Total	608	1	1	104	63	1819	2596
Frequency Missing = 592							

Table 34								
Table of Final IS Profile by Tutorial eight								
Final IS Profile	Tutorial eight							
Frequency Row Pct Col Pct	0	1-29	30-39	40-49	50-59	60-69	75+	Total
DROPOUT	185 89.81 39.11	0 0.00 0.00	0 0.00 0.00	0 0.00 0.00	4 1.94 2.94	0 0.00 0.00	17 8.25 0.97	206
FAIL	122 46.56 25.79	0 0.00 0.00	1 0.38 100.00	0 0.00 0.00	27 10.31 19.85	11 4.20 14.10	101 38.55 5.77	262
PASS	166 8.41 35.10	3 0.15 100.00	0 0.00 0.00	1 0.05 100.00	105 5.32 77.21	67 3.39 85.90	1633 82.68 93.26	1975
Total	473	3	1	1	136	78	1751	2443
Frequency Missing = 745								

Table 35					
Table of Final IS Profile by Tutorial nine					
Final IS Profile	Tutorial nine				
Frequency Row Pct Col Pct	0	50-59	70-75	75+	Total
DROPOUT	193 91.47 14.59	1 0.47 2.50	0 0.00 0.00	17 8.06 1.39	211
FAIL	177 59.00 13.38	12 4.00 30.00	3 1.00 21.43	108 36.00 8.86	300
PASS	953 45.71 72.03	27 1.29 67.50	11 0.53 78.57	1094 52.47 89.75	2085
Total	1323	40	14	1219	2596
Frequency Missing = 592					

Table 36							
Table of Final IS Profile by Tutorial ten							
Final IS Profile	Tutorial ten						
Frequency Row Pct Col Pct	0	40-49	50-59	60-69	70-75	75+	Total
DROPOUT	195 92.42 29.55	0 0.00 0.00	2 0.95 1.83	1 0.47 0.60	0 0.00 0.00	13 6.16 0.79	211
FAIL	180 60.00 27.27	1 0.33 50.00	11 3.67 10.09	10 3.33 5.95	2 0.67 33.33	96 32.00 5.81	300
PASS	285 13.67 43.18	1 0.05 50.00	96 4.60 88.07	157 7.53 93.45	4 0.19 66.67	1542 73.96 93.40	2085
Total	660	2	109	168	6	1651	2596
Frequency Missing = 592							

Table 37							
Table of Final IS Profile by Tutorial eleven							
Final IS Profile	Tutorial eleven						
Frequency Row Pct Col Pct	0	30-39	50-59	60-69	70-75	75+	Total
DROPOUT	206 97.63 15.14	0 0.00 0.00	0 0.00 0.00	0 0.00 0.00	0 0.00 0.00	5 2.37 0.50	211
FAIL	248 82.67 18.22	0 0.00 0.00	3 1.00 3.95	8 2.67 5.48	0 0.00 0.00	41 13.67 4.11	300
PASS	907 43.50 66.64	1 0.05 100.00	73 3.50 96.05	138 6.62 94.52	15 0.72 100.00	951 45.61 95.39	2085
Total	1361	1	76	146	15	997	2596
Frequency Missing = 592							

Table 38						
Table of Final IS Profile by Tutorial twelve						
Final IS Profile	Tutorial twelve					
Frequency Row Pct Col Pct	0	50-59	60-69	70-75	75+	Total
DROPOUT	207 98.10 15.68	2 0.95 0.78	0 0.00 0.00	0 0.00 0.00	2 0.95 0.23	211
FAIL	249 83.00 18.86	11 3.67 4.28	6 2.00 4.14	0 0.00 0.00	34 11.33 3.89	300
PASS	864 41.44 65.45	244 11.70 94.94	139 6.67 95.86	1 0.05 100.00	837 40.14 95.88	2085
Total	1320	257	145	1	873	2596
Frequency Missing = 592						

Table 39							
Table of Final IS Profile by Tutorial thirteen							
Final IS Profile	Tutorial thirteen						
Frequency Row Pct Col Pct	0	1	2	4	5	7	Total
DROPOUT	206 97.63 16.43	0 0.00 0.00	0 0.00 0.00	1 0.47 0.91	1 0.47 0.85	3 1.42 0.30	211
FAIL	245 81.67 19.54	2 0.67 9.52	4 1.33 4.88	8 2.67 7.27	4 1.33 3.42	37 12.33 3.66	300
PASS	803 38.51 64.04	19 0.91 90.48	78 3.74 95.12	101 4.84 91.82	112 5.37 95.73	972 46.62 96.05	2085
Total	1254	21	82	110	117	1012	2596
Frequency Missing = 592							

Table 40									
Table of Final IS Profile by Tutorial fourteen									
Final IS Profile	Tutorial fourteen								
Frequency Row Pct Col Pct	0	1-29	30-39	40-49	50-59	60-69	70-75	75+	Total
DROPOUT	200 94.79 21.51	0 0.00 0.00	0 0.00 0.00	0 0.00 0.00	1 0.47 14.29	0 0.00 0.00	0 0.00 0.00	10 4.74 0.67	211
FAIL	186 62.00 20.00	2 0.67 10.53	0 0.00 0.00	1 0.33 2.94	1 0.33 14.29	4 1.33 4.08	2 0.67 13.33	104 34.67 6.97	300
PASS	544 26.09 58.49	17 0.82 89.47	1 0.05 100.00	33 1.58 97.06	5 0.24 71.43	94 4.51 95.92	13 0.62 86.67	1378 66.09 92.36	2085
Total	930	19	1	34	7	98	15	1492	2596
Frequency Missing = 592									

Table 41									
Table of Final IS Profile by Tutorial fifteen									
Frequency Row Pct Col Pct	0	1-29	30-39	40-49	50-59	60-69	70-75	75+	
DROPOUT	210 99.53 11.08	0 0.00 0.00	0 0.00 0.00	0 0.00 0.00	0 0.00 0.00	0 0.00 0.00	0 0.00 0.00	1 0.47 0.24	211
FAIL	275 91.67 14.51	2 0.67 20.00	0 0.00 0.00	1 0.33 9.09	9 3.00 6.25	3 1.00 3.57	1 0.33 33.33	9 3.00 2.16	300
PASS	1410 67.63 74.41	8 0.38 80.00	32 1.53 100.00	10 0.48 90.91	135 6.47 93.75	81 3.88 96.43	2 0.10 66.67	407 19.52 97.60	2085
Total	1895	10	32	11	144	84	3	417	2596
Frequency Missing = 592									

Table 42								
Table of Final IS Profile by Tutorial sixteen								
Final IS Profile	Tutorial sixteen							
Frequency Row Pct Col Pct	0	1-29	30-39	40-49	50-59	60-69	75+	Total
DROPOUT	209 99.05 10.93	1 0.47 3.13	0 0.00 0.00	0 0.00 0.00	0 0.00 0.00	0 0.00 0.00	1 0.47 0.24	211
FAIL	276 92.00 14.44	6 2.00 18.75	6 2.00 5.17	0 0.00 0.00	0 0.00 0.00	3 1.00 4.00	9 3.00 2.14	300
PASS	1427 68.44 74.63	25 1.20 78.13	110 5.28 94.83	4 0.19 100.00	36 1.73 100.00	72 3.45 96.00	411 19.71 97.62	2085
Total	1912	32	116	4	36	75	421	2596
Frequency Missing = 592								

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