



UNIVERSITY OF NAIROBI
SCHOOL OF COMPUTING AND INFORMATICS

COMPUTERIZED SYSTEM TO AID SETTING OF UNIVERSITY EXAMINATIONS

BY

GRIFFIN KITILI KENGA

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SUPERVISED BY

PROF.ELIJAH OMWENGA

This project report is submitted in partial fulfillment of the requirements for the degree of Master of Science in information systems, University of Nairobi.

Declaration

Student's Declaration:

I declare that the work presented here is, to the best of my knowledge, original and the result of my own investigations, except as acknowledged, and has not been submitted, either in part or whole. Formulations and ideas taken from other sources are cited as such.

NAME OF THE CANDIDATE: Griffin Kitili Kenga

SIGNATURE:  DATE: 01/12/2012

Supervisor's Declaration:

This is to certify that this project report is a record of the student's own work carried out by him under my supervision. The matter embodied in this report is original and has not been submitted for the award of any other degree.

NAME OF SUPERVISOR: Prof. Elijah Omwenga

SIGNATURE:  DATE: 01/12/2012

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First, I would like to express my deep gratitude to Professor Elijah Omwenga, my supervisor, for his patient guidance and enthusiastic encouragement throughout this project. I would also like to thank Mr. Evans Miriti Msc projects coordinator and the chairman of the panel Mr. Tonny Omwansa.

Dedication

This work is dedicated to the following:

Mr. Robert Woods, former principal st.Charles Lwanga School-Kitui

My children Viola and Tony.

My wife Janet.

Table of contents

Declaration	ii
Acknowledgements	iii
Dedication	iv
Table of contents	v
LIST OF TABLES	ix
LIST OF FIGURES.....	ix
Abstract	xii
Abbreviations	xiii
CHAPTER ONE	14
1. Introduction	14
1.1. Background.....	14
1.2. Statement of the problem.....	14
1.3. Purpose of the study	14
1.4. The scope of the project	15
1.5. Justification of the project	15
1.6. Research objectives	15
1.7. Research questions.....	15
1.8. Assumptions	16
1.9. The conceptual model of the system.	16
CHAPTER TWO.....	17
2. Literature review	17
2.1. Introduction	17
2.2. Assessments in higher education	17
2.3. Types of assessments	18
2.4. Issues that arise when constructing assessments.....	18

2.5.	Quality of the assessments.....	19
2.6.	Systems used to construct assessment questions	19
2.6.1.	Constructing questions for effective exams.....	19
2.6.2.	Constructing examinations questions that test six levels of difficulty	20
2.6.3.	Increasing supply of questions for examinations	20
2.6.4.	Computerized systems for setting examinations.....	20
2.6.4.1.	Eworkbook.....	20
2.6.4.2.	CAFA system.....	22
2.7.	The gaps in construction of examination questions	24
CHAPTER THREE.....		25
3.	RESEARCH METHODOLOGY.....	25
3.1.	Introduction	25
3.2.	Population.....	25
3.3.	Sampling.....	25
3.3.1.	Sample size.	25
3.3.2.	Selecting the respondents from the sample.....	26
3.4.	Procedure.....	27
3.5.	Analysis.....	28
3.5.1.	Data preparation.....	28
3.5.1.1.	Editing of data.....	28
3.5.1.2.	Coding of data.....	28
3.5.1.3.	Classification of data.....	28
3.5.2.	Data analysis.....	28
3.6.	Instrument development	28
3.7.	Instrument validity	29
3.8.	Instrument reliability	29
3.9.	Project resources.	29

3.10.	Project budget	30
3.11.	Project schedule	31
CHAPTER FOUR		32
4.	SYSTEM DESIGN AND IMPLEMENTATION	32
4.1.	The system design methodology	32
4.2.	System Requirement Specification	33
4.1.1.	User characteristics	33
4.1.2.	System specific requirements	33
4.1.2.1.	Functional requirements	33
4.1.2.2.	Non functional requirements	33
4.3.	System architecture	34
4.3.1.	System user	34
4.3.2.	User interface	34
4.3.3.	System modules	34
4.3.4.	System database	35
4.4.	User interface requirements	35
4.4.1.	User interface design	35
4.4.2.	Hardware interfaces	36
4.2.	Software interfaces	36
4.3.	System design	36
4.3.1.	Data modeling	37
4.3.1.1.	Terminologies used	37
4.3.1.2.	Business processes	37
4.3.1.3.	Entity identification	37
4.3.1.4.	Normalization	38
4.5.	INPUT AND OUTPUT DESIGN SYSTEM	40
4.5.1.	Input design	40

4.5.2.	Output design	40
4.6.	SYSTEM IMPLEMENTATION	40
4.6.1.	Introduction	40
4.6.2.	System snapshots	41
4.6.2.1.	Splash screen	41
4.6.2.2.	Login screen.....	41
CHAPTER FIVE.....		45
5.	RESEARCH FINDINGS.....	45
5.1.	Introduction	45
5.2.	Restatement of research objectives	45
5.3.	Restatement of research questions	45
5.4.	Study	45
5.5.	Study results.....	46
5.6.	Discussions	55
5.7.	Implications of the study	55
5.8.	Significance of the findings	55
5.9.	Limitations of the study.....	55
5.10.	Recommendations for further work	56
5.11.	Conclusion.....	56
REFERENCES:.....		57
Appendix A: student questionnaire		60
Appendix B: Questionnaire for lecturer.....		62
Appendix C: Past Examination Papers Review Form		65
Appendix D: List of universities		66
Appendix E: Student population in Kenyan universities		68
Appendix F: Sample code.....		69
Appendix G: User manual		85

LIST OF TABLES

Table 1: Project resources	29
Table 2: Project budget	30
Table 3: Project schedule	31
Table 1: Normalization	38
Table 2: Response rate	46
Table 7: Student enrolment by gender in universities, 2005/2006-2009/2010.....	68

LIST OF FIGURES

Figure 1: Conceptual model	16
Figure 2: Eworkbook system architecture	21
Figure 3: CAFA system architecture	23
Figure 4: Reversed waterfall model	32
Figure 5: System architecture.....	35
Figure 6: System design	36
Figure 7: Logical data model	39
Figure 8: Login screen	41
Figure 9: System interface	42
Figure 10: Examination dialog.....	42
Figure 11: Programmes report	42

Figure 12: Course report	43
Figure 13: Difficulty level report	43
Figure 14: Examination report	43
Figure 15: Exam statistics.....	44
Figure 16: Common forms of assessments according to internal examiners	46
Figure 17: Common forms of assessments according to students.....	47
Figure 18: Reference materials used by internal examiners when setting examinations.....	48
Figure 19: Issues raised by external examiners.....	49
Figure 20: How often the external examiners raise the issues	49
Figure 21: Do internal examiners recycle questions.....	50
Figure 22: opinion of internal examiners on examination recycling.....	50
Figure 23: Familiarity of examination questions according to students	51
Figure 24: References used by students when revising for examinations.....	51
Figure 25: Do students expect questions to be recycled?	52
Figure 26: Sources of examination questions according to students.....	52
Figure 27: Review of past examination papers from University of Nairobi.....	53
Figure 28: Review of past exam papers from Strathmore	53
Figure 29: Some of the tools used by internal examiners when setting examinations	54
Figure 30: Common practices in handling examinations according to internal examiners	54
Figure 31: splash screen.....	85
Figure 32: Launching the program	85

Figure 33: User interface	86
Figure 34: Creating new programme.....	87
Figure 35: Programme report.....	87
Figure 36: Programme report.....	87
Figure 37: Courses dialog.....	88
Figure 38: Course report.....	89
Figure 39: Creating topics	90
Figure 40: difficulty level report.....	90
Figure 41: Creating keywords:	91
Figure 42: Question setting	92
Figure 43: Setting examination	93
Figure 44: Examination	93
Figure 45: Exams statistics	94

Abstract

Kenyan university examinations offices depend on external examiners report as well as internal examiners professionalism to get quality examination questions. To improve the quality of teaching and learning, examiners must set good questions to test the students in the examinations. Tracking previously examined questions is important if examiners want to improve on the quality of examinations. However, it is not practically possible for the examiner to remember all the questions previously examined. When setting or moderating an examination, it becomes difficult to know if the questions presented in the examination have been used in a past examination, which topics were examined and difficulty levels that were tested. There is a possibility therefore, for questions to be recycled from one semester to the next. This problem is more common in academic programmes where lecturers have to examine the courses they teach.

The purpose of this study was to investigate re-using of examination questions in Kenyan universities. The study was conducted in a sample of 501 respondents selected from both private and public university students and their internal examiners. Data was collected from the respondents using semi structured questionnaires and a review of past examination papers. Data was then summarized and analyzed using statistical charts.

The study found out that fifty eight per cent (58%) of students sitting for a university examination anticipate that they will find recycled questions while fifty four per cent (54%) of internal examiners admitted that examination questions are being recycled. A system was then designed to help examiners set examinations. The system is used to create questions for given programme, course and testing a given topic and difficulty level. The questions are then stored in the database from where they will be selected to be used in the examination .If a question has been used in a previous examination, its counter increments by one (1) and will show the date when it was lastly used. By studying this information presented about the question, the examiner can choose or ignore the question(s). This way, the examiner can make an informed decision to set a quality examination that covers topics, difficulty levels and has not been used recently.

Keywords: *Examination, recycle, assessment, internal examiners, academic programmes, university, question bank.*

Abbreviations

CAT Continuous Assessment Test

CAFA Computer Aided Formative Assessment

UMS User management subsystem

QMS Question Management Subsystem

TMS Test Management Subsystem

CMS Course Management Subsystem

RDBMS Relational Database Management system

CHAPTER ONE

1. Introduction

1.1. Background

It is believed that university examinations undergo several stages before they are administered to students to ensure they meet several requirements: Programme requirements; course requirements; Level of study; syllabus coverage; difficulty level; distribution of marks; originality; clarity and structure of questions. Assessment methods in Kenyan institutions of higher learning have largely remained the same. The actual practice of constructing these assessments has been of great concern. But because of the discreet nature of the examination handling process, internal examiners have continued same routine of setting, administering and marking students' assessments unperturbed. Most importantly, the examiners continue to re-use examination questions. Researchers believe that re-using questions more often gives some candidates unfair advantage (Timothy, 2008). Sometimes the internal examiners opt to duplicate or recycle past examination material in a bid to beat the deadlines. Consequently, the examinations have become more predictable. Recycling examination questions in this case means reproducing the question semantically and syntactically.

1.2. Statement of the Problem

When setting or moderating an examination, it becomes difficult to know if the questions presented in the examination have been used in a past examination, which topics were examined and difficulty levels that were tested. There is a possibility therefore, for questions to be recycled from one semester to the next. This problem is more persistent in academic programmes, where lecturers have to examine the courses they teach.

1.3. Purpose of the Study

The purpose of this study was to investigate recycling of examination questions in local universities in Kenya, particularly in academic programmes. A system was then developed to be used by examiners when setting examinations.

1.4. The Scope of the Project

The study was done using students and internal examiners participants drawn from local universities in Kenya in order to answer the research questions. The data collected was analyzed in order to draw relevant conclusions regarding the problem.

The system was designed to aid in setting university examinations. The system then tracks the information about a question: topic tested frequency of use, difficulty level used and last time the question was used. The system does not generate a marking scheme for the examination and does not limit the number of times a question can be reused.

1.5. Justification of the Project

The study provides information that can be used to curb the problem of recycling the questions in academic programmes. The examiner can use this system to set and store questions when teaching a course. When he/she requires an examination, s/he will select questions from the question bank but will check the information provided by the system to make sure s/he does not test questions that test same difficulty level, topic or have been used more often.

1.6. Research Objectives

The main objective of this research was to investigate re-use of examination questions in local universities in Kenya, in academic programmes and design a system that can be used to aid setting examinations. The specific objectives of this research were:-

- i. To examine the current forms of assessments in local universities in Kenya.
- ii. To perform a comparison of the past examinations questions.
- iii. To assess the tools for constructing university examinations in local universities in Kenya.
- iv. To design a system that can aid examiners to set examination questions.

1.7. Research Questions

The study focussed on the following questions:

- i. What are the most commonly used form(s) of assessment(s) in academic programmes?
- ii. How often are examination questions recycled?
- iii. What are the existing systems that can be used to construct examinations?
- iv. What are some of the measures put in place to control the preparation of assessments?

1.8. Assumptions

A number of assumptions were made before the study: That the sample selected represented the population; That the research instruments administered would be valid and reliable; Respondents would answer the survey questions truthfully; The questionnaires would be completed and returned on time; The internal examiners are also the course/unit lecturers; That student respondents were in at least second semester of their study. That student can access past examination questions from the library or from their friends who have done the same course before.

1.9. The Conceptual Model

The inputs identified were programmes, courses, topics, keywords and difficulty levels. The outputs identified were examination questions, examination statistics, course, programme, keyword and topics report. The environment measures identified are examination setting tools, external examiners, internal examiners, policies and procedures from the department.

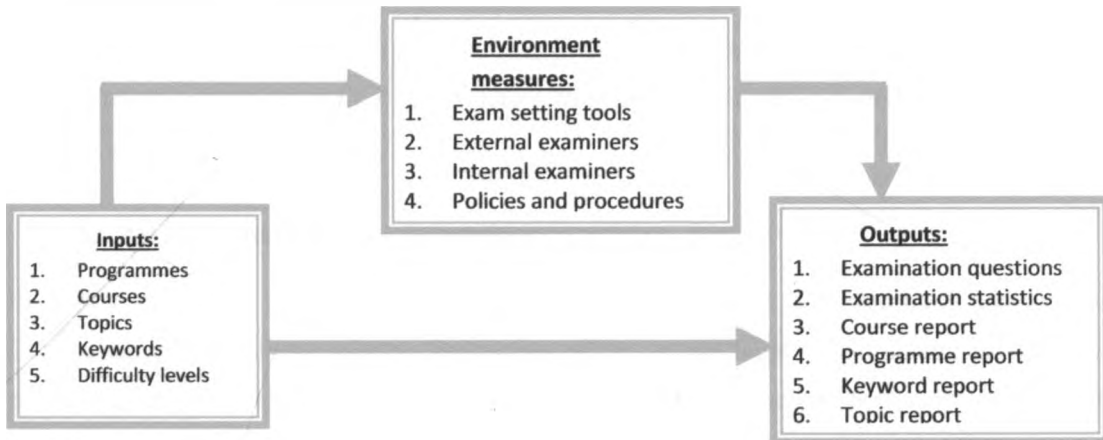


Figure 1: Conceptual model

CHAPTER TWO

2. Literature Review

2.1. Introduction

Education plays an important role in our lives. Throughout the entire life, from the moment one is born to the moment one dies, is a process of learning. During this process one acquires knowledge through learning and instruction in a formal or informal setting. Where learning and instruction is conducted in a formal setting e.g. in a classroom, there is need to assess the outcomes of this learning and instruction. The assessment is carefully and systematically structured to monitor the progress of learners and assist the instructors in making appropriate decisions (Hewit, Hewit, & Whittier, 1997). The feedback from this assessment is usually used by the instructors to make corrections in order to achieve success (Gunter, H.Estes, & Schwab, 1999).

2.2. Assessments in Higher Education

In higher education, assessments define the actual curriculum and dominate the lives of students. Curriculum in this context refers to the totality of the content taught and the aims to be realized within a particular institution or educational system. These assessments include both continuous assessments and the end of semester examinations (Soliman, 1999). Usually, the instructors will teach and assess the students. However, it is the context of instruction as well as assessment that determine the effectiveness of student learning (Ramsden, 1994). In fact studies show that the experience of learning is diminished by the assessment methods perceived to be inappropriate (Struyven, Dochy, & Janssen, 2004). In most local universities in Kenya, departments under the faculties are left to handle this important process of handling assessments. Fortunately, the institutions of higher learning are now hard pressed to provide publicly verifiable information for the purpose of accountability and quality (Ramsden, 1994). This follows the realization that decisions made in these institutions have important and lifelong consequences. The procedures of conducting the assessments are of great concern to the general public- both individuals directly (parents, students and teachers) and indirectly (tax payers and the government) affected by the assessments (Sylvia, 1995). The internal examiners are obliged to ensure these assessments meet the core objectives of teaching and learning. Assessments are therefore integrated in all parts of instruction and learning. This means assessments can be done before, during and after instruction (Magno & Ouano,

2009). Assessment in this case is defined as a process of collecting various information needed to come up with overall information that reflects the attainment of goals and purposes (Magno & Ouano, 2009).

2.3. Types of Assessments

Assessments can be classified into two broad categories. These categories include the formative assessments and summative assessments. In formative assessment the tutor can monitor the level of understanding of the learners and how effectively he/she is teaching. Summative assessment on the other hand can be administered at the end of the semester to arrive at the overall student's achievement (Soliman, 1999). The formative assessment is intended for diagnostic purposes, to assess the strengths and weaknesses so that learning and teaching of the courses may be improved. Summative assessment is mainly used to determine whether or not particular standards have been achieved (Cox, 1994). There are also other forms of assessments that the instructors can use. These include portfolio based assessment, performance based assessment, project based assessment and written assessments.

Performance based assessment is where the tasks given to the learners reflect real life situation. This method of assessment is more reliable than the traditional written assessments (Harold & O'Neil, 1997). In written assessments students select or compose responses to a prompt. In most cases the prompt consist of printed materials. The student then does the assessment within a stipulated time. These assessments may be in form of multi choice questions and open ended questions. It is accompanied by a highly structured form of teaching and assessment which promote reproductive learning (Magno & Ouano, 2009). Projects are cumulative forms of assessments and reflect students work done over a period of time rather than in response to a prompt. Examples include research paper or developing a product. Projects based assessments can promote independence and deeper strategies of understanding (Brown, Bull, & Pendleburg, 1997). Portfolio based assessment foster independent learning skills and provides learners with experience similar to what they may face in their professional careers for processes like appraisals. The overall goal of portfolio assessment is to demonstrate and provide evidence that the student has mastered a given set of learning objectives (Struyven, Dochy, & Janssen, 2004). They are seen as means of bringing changes in instructional practice (Heywood, 1989).

2.4. Issues that arise when Constructing Assessments

Internal examiners must set examinations questions for the course(s) they teach every semester. The process of gathering good questions for the assessment require large amount of time and effort (Parchuri, 2008). As a result, some internal examiners opt to re-use examination questions. Often, such incidents go unreported and the good news is that high pass rates may occur. Bad news though is that these high

achievements may mask any dissatisfaction and also hide the fact that the students may not have understood the material they have learned as completely as might appear. Consequently, the employers are increasingly concerned with this trend of grade inflation and now question the quality of graduates and grades (Chan, Hao, & Suen, 2005). Examinations are not meant for students to please their lecturers or merely get good grades but to please themselves by achieving worthwhile goals (Hersh, et al., 2009). A student may pass a recycled examination simply because he/she had revised that past examination paper. In addition, some examinations require that students choose optional questions. Thus candidates may only choose those questions they have seen before. This raises questions as to whether the internal examiner documents the follow up of quantitative or qualitative data. Quantitative data are actual scores achieved on an examination and qualitative data consist of other observations made while the student is tested and tells how she or he achieved the scores (Sylvia, 1995)

2.5. Quality of the Assessments

Final and mid semester tests are not enough and neither are standardized tests helpful as learning tools. The assessment must be timely and appropriate to inform the students and their tutors during and not after, to allow corrections (Hersh, et al., 2009). Do the internal examiners really have time to construct questions? According to (Struyven, Dochy, & Janssen, 2004), there is a concern that the assessment process is not always well controlled because they largely test the quality of student notes and lecturer's notes. In addition, ambiguous questions, unclear directions and vague scoring criteria for example can threaten the reliability of an assessment (Davis, 2002). Increasing frequency of reuse of assessment questions has been noted to be positively correlated with the amount of cheating (Gehring, 2004). Ramsden (1994) observes that there are no foolproof techniques for guaranteeing quality in the institutions of higher learning. There are only lecturers and educational effectiveness depends on their professionalism, their experience and their commitment.

2.6. Systems used to Construct Assessment Questions

Researchers have suggested a number of systems and best practices that can be used to construct and store examination questions as well as assessing students.

2.6.1. Constructing Questions for Effective Exams

Davis(2002), in his work has suggested a number of steps to be followed when constructing examination questions. The internal examiner must prepare new examination every time he/she teaches a course. The internal examiner prepares copies of the old examination material and gives to the students to use for revision. The internal examiner will also make up test items throughout the semester. These questions are

constructed at the end of every topic and then saved for use in the examinations. Finally the internal examiner may ask the students to submit test questions but limit the number of questions that can be submitted by students. The lecturer can then adopt some of the questions.

2.6.2. Constructing Examinations Questions that test Six Levels of Difficulty

(Karl O Jones, Harland, Reid, & Bartlett, 2009) and Soliman (1999) have given a number of best practices when constructing assessments by revisiting the Bloom's Taxonomy that require the assessors consider difficulty levels of questions when setting examinations namely: knowledge, comprehension, application, analysis, synthesis and evaluation.

2.6.3. Increasing Supply of Questions for Examinations

(Gehringer, 2004) noted that if examiners are to reuse examination questions less frequently or not at all, then there is need to increase the supply of questions from different sources;

- Internal examiners constructing the questions,
- Taking questions from course textbooks,
- Borrowing questions from colleagues who teach the same course
- Use teaching assistants to set questions
- Industrial contacts, where people in the industry can write questions and then submit them to the university.
- Students themselves submitting questions to the internal examiner

2.6.4. Computerized Systems for Setting Examinations

2.6.4.1. Eworkbook

This is a computer aided assessment system used to evaluate students online (Costagliola, Ferruci, Fuccella, & Oliveto, 2007). It creates the tutor and then takes the student's online tests based on multiple choice, multiple response and true/false questions. The learners can only view tests published in the courses in which they are members. The tutor manages the class and can accept or deny student's request and expel the student from the course. The good aspect of the system is that it allows reusability of the authored content. To achieve this, the system allows a good organization of the material kept in the learning platform. It also allows interoperability of the systems in order to enable sharing and exchange of the material. The system therefore has a question database organized in hierarchical structure. To ensure

security, the author of the question establishes the permissions for the question. The system is a three layered architecture.

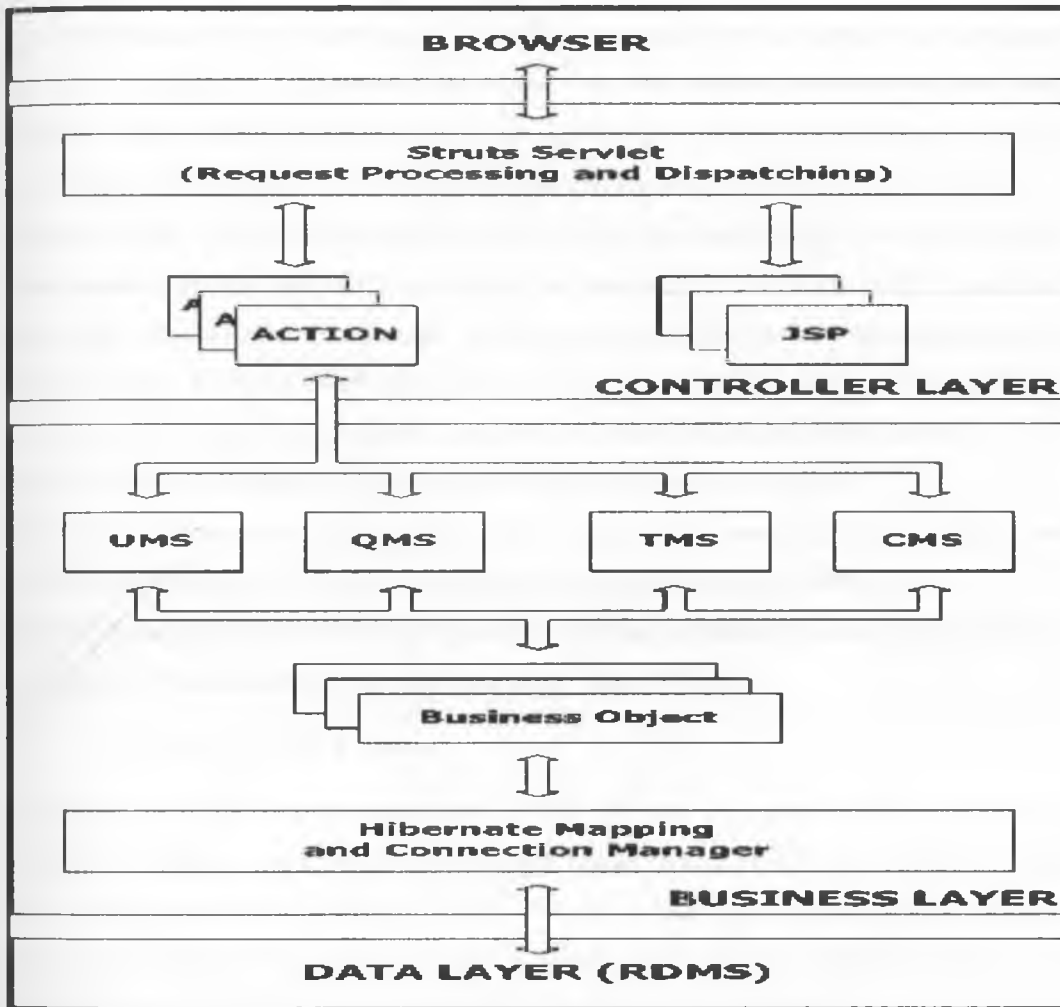


Figure 2: Eworkbook system architecture

The browser: The navigation is facilitated across interfaces based on menus and navigation bars. The application is fully accessible with a web browser. User data is inserted using HTML forms and some data integrity check is done using JavaScript code.

Controller layer: It gets client inputs, dispatches the requests to the appropriate component and manages the view to return as a response to the client. The web browser interacts with the Struts servlet that processes the request and dispatches it to the Action class responsible for serving it according to predefined configuration. The strut servlet uses JSP pages to implement the interfaces.

Business layer: It accesses the data layer which is implemented through relational database Management systems (RDBMS) to persist the data across the functionalities provided by Hibernate framework..The action classes interact with the modules of the business layer responsible for the logic of the application. It interacts with four different subsystems in the business layer. Namely;

UMS (User management subsystem) that provides insert update and delete facilities.

QMS (Question Management Subsystem) manages the question database.

TMS (Test Management Subsystem) which manages the test subsystem: creation of the test, test evaluation, execution of the test and managing the history of learner performance.

CMS (Course management subsystem) allows insertion, update and deletion of the course.

Data layer: It contains the information contained in the RDBMS.

2.6.4.2. CAFA System

Computer Aided Formative Assessment (CAFA) system is mainly aimed to provide a guide to the students to master certain knowledge that they must possess, help them to find out weaknesses in their study and then take some remedy measures. The system can test the students and instantly give feedback to teachers and students as well (Liu, Xiang, Decheng, & Jianguo, 2010).The system is made up of item bank information management and personal information management. The system architecture has four modules:

Login module: That allows the student and teacher to log in.

Information management module: This module manages the student information, teacher information and item bank information.

Paper generating module: Interacts with the student generating the questions. After answering the questions then the student feedback module gives the student a feedback.

Feedback module: It generates the feedback information to teachers and students. The students can get the feedback information of the condition of the examination questions after point to hand in the paper while teachers get the information about the whole class.

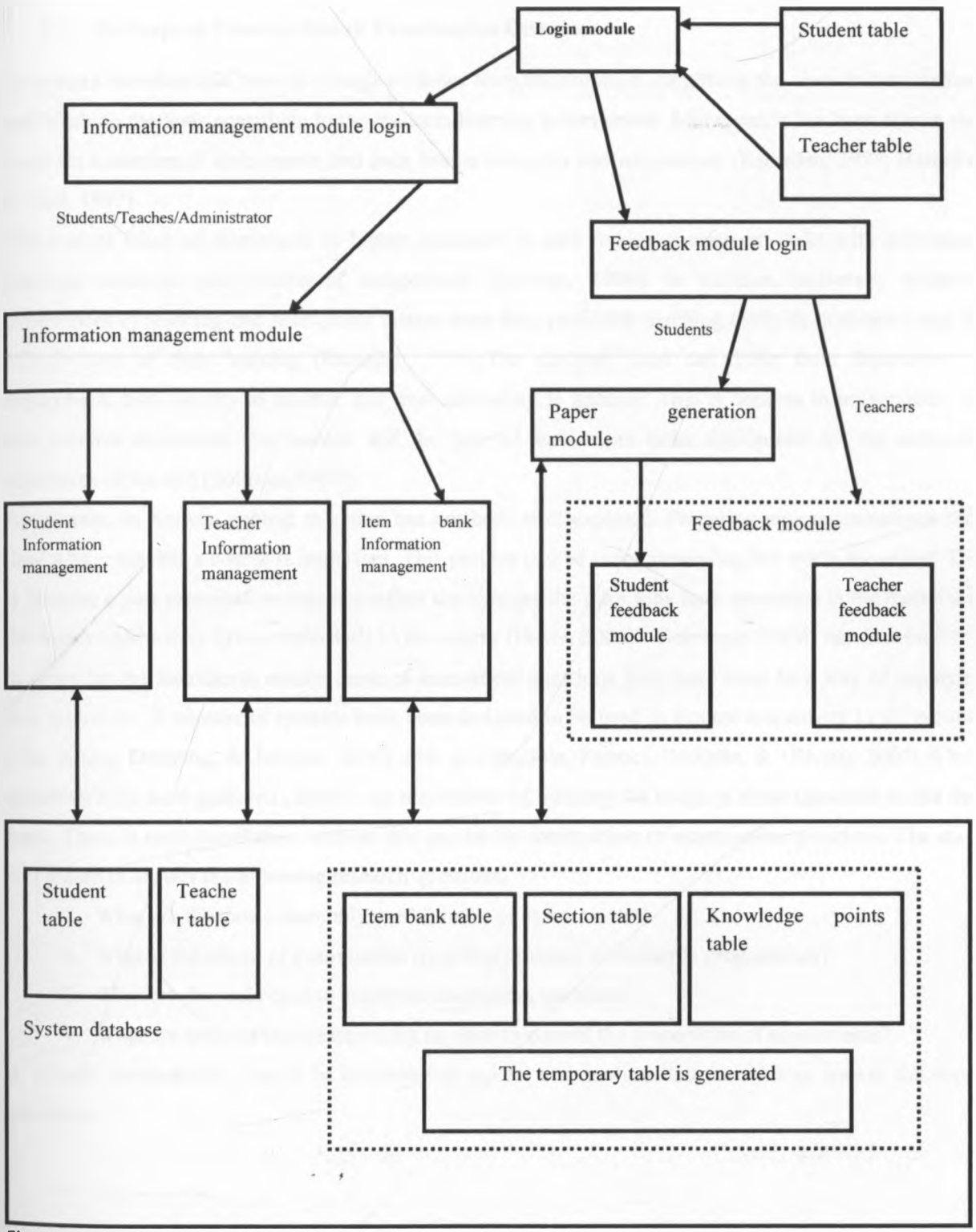


Figure 3: CAFA system architecture

2.7. The Gaps in Construction of Examination Questions

It appears therefore that there is enough evidence from the literature supporting the view that assessment and teaching methods contribute to the students learning achievement. Moreover, it has been shown that there are a number of assessments and each has its strengths and weaknesses (Ramsden, 1994; Harold & O'Neil, 1997).

The current focus of assessment in higher education is now linking assessment tasks with anticipated learning outcomes and criteria of competence (Soliman, 1999). In addition, university student's experiences of teaching and assessment matter more than particular teaching methods in determining the effectiveness of their learning (Ramsden, 1994). The methods used can differ from department to department, from faculty to another and from university to another. This is because in universities, the unit lecturer determines the number and the type of assessment tasks appropriate for the aims and objectives of the unit (Soliman, 1999).

Apparently, in Kenyan context this area has not been well explored. Preparing new examinations each time a tutor teaches a course is important. This process can be time-consuming but worth the effort. This is because a past examination may not reflect the changes the tutor may have presented in the material or the topics he/she may have emphasized in the course (Davis, 2002). Gehringer (2004) has observed that in order for the faculties to reduce reuse of assessment questions then there must be a way of supplying new questions. A number of systems have been designed to be used in student assessment in universities (Liu, Xiang, Decheng, & Jianguo, 2010) and (Costagliola, Ferruci, Fuccella, & Oliveto, 2007). Where questions have been gathered, there is no mechanism of tracking the usage of those questions in the data bank. There is need therefore to address this gap in the construction of examination questions. The study was aimed to answer the following research questions.

- i. What are the most commonly used form(s) of assessment(s).
- ii. What is the extent of examination recycling problem in academic programmes?
- iii. What are the tools used to construct assessment questions?
- iv. What are some of the measures put in place to control the preparation of assessments?

A suitable methodology was to be employed to collect and analyze data in order to answer the above questions.

CHAPTER THREE

3. RESEARCH METHODOLOGY

3.1. Introduction

In order to answer the research questions, the study was conducted through a survey of private and public university students and internal examiners. During pre-testing, the survey was initially given to KCA University faculty of science and commerce for a pilot test. Once refined, the survey was then administered to internal examiners and students in selected universities (public and private). Analysis of survey data was performed using statistical charts.

3.2. Population

In this study, the population consisted of internal examiners and students in academic programmes in local universities in Kenya. However, the target population consisted of internal examiners and students in the academic programmes from two local universities in Kenya selected by stratified sampling.

3.3. Sampling

Using stratified sampling, two local universities within Nairobi metropolitan were selected. The universities were categorised into two; public universities and private accredited/chartered universities. Based on this criterion, the following universities were selected:

University of Nairobi –Public University, within Nairobi metropolitan and well established, with a student population of 37,415 in the academic year 2008/2009.

Strathmore university- Private accredited university, within Nairobi metropolitan and well established, with a student population of 1910 in the academic year 2008/2009.

3.3.1. Sample size.

The sample size was selected using a formula, $n = \frac{z^2 pq}{d^2}$, (Mugenda & Mugenda, 2003).where;

n= is the desired sample size when the target population is greater than 10000.

z= is the standard normal deviate at required confidence level of 95%.

p= is the proportion in the target population that is estimated to have characteristics being measured.

q=1-p.

d= is the level of statistical significance set

Therefore: Using the confidence level of 95% gives z value of z=1.96 from the tables.

p is estimated to be 80%=0.8, the target population in the academic programmes.

q=1-0.8=0.2.

d=3.5%

$$\begin{aligned} \therefore n &= \frac{z^2 pq}{d^2} \\ n &= \frac{1.96^2 \times 0.8 \times 0.2}{0.035^2} \\ n &= \frac{1.96 \times 1.96 \times 0.8 \times 0.2}{0.035 \times 0.035} \\ n &= \frac{0.614656}{0.001225} \\ n &= 501 \end{aligned}$$

The sample size was therefore 501 respondents.

3.3.2. Selecting the Respondents from the Sample

The respondents were selected proportionately. The target population was 39,325 from the two universities. So the proportion was 1910:37,415. Therefore using the formula $n_i = n \cdot p_i$ (Kothari, 2004), where;

n_i is the sample size from i^{th} strata and p_i is the proportion from the i^{th} strata.

$N = 39,325$ is the target population

$n = 501$ is the sample size

$$P_1 = \frac{1910}{39,325}$$

$$P_2 = \frac{37,415}{39,325}$$

$$n_1 = 501 \times \frac{1,910}{39,325} = 24$$

$$n_2 = 501 \times \frac{37,415}{39,325} = 477$$

Where n_1 is the sample from Strathmore University and n_2 is the sample from university of Nairobi

In the actual study, the instruments were administered to 501 respondents. In each sampled university, academic departments were chosen randomly and the questionnaires administered to students and internal examiners. For the University of Nairobi twenty eight (28) internal examiners and 449 student respondents were selected, while from Strathmore University, four (4) internal examiners and twenty (20) student respondents were selected for the study. Constituent colleges were not considered in administering the instruments. The survey was conducted from the main campuses of the selected universities. The student respondents had to be at least in their second semester of study. This is because at the second semester of study the students have at least sat for one end of semester examinations. Lecturers in academic programs set the examinations for the units they teach. This means lecturers are also the internal examiners.

To review past examinations, available hard copies of the past papers were retrieved and studied for comparison. In the sampled universities, past examination papers in degree and diploma programmes were studied to find out similarity between questions.

3.4. Procedure

The semi structured questionnaires were administered to students and internal examiners respondents. The target was 501 questionnaires. The tools were then administered to internal examiners and students. The internal examiners were given two days to study and fill the questions.

The past examination papers from the same university were reviewed. This was done after seeking permission from relevant authorities like examination officers and librarians. The actual data collection began immediately after the proposal presentation 24/11/2010 and was completed on 26/01/2011.

3.5. Analysis

3.5.1. Data Preparation

3.5.1.1. Editing of data

Field editing of data was done in order to ensure that individual handwriting styles (in the questionnaires) of the respondents was easier to decipher. This was done soon after data collection. Central editing was done after all the questionnaires had been completed and returned.

3.5.1.2. Coding of data

Numerals and symbols were assigned so that the responses could be put into a limited number of categories. This ensured efficient data analysis.

3.5.1.3. Classification of data

The collected data was arranged into categories on the basis of common characteristics.

3.5.2. Data Analysis

The main focus of data analysis was on forms of assessments used in local universities, the extent of recycling of examination questions in academic programmes, the existing tools for preparing examination questions and finally measures put in place to check preparations of examinations. This was achieved by analysing the information from the semi-structured questionnaires and past examinations. The information was meant to help answer the following questions.

- What are the most commonly used form(s) of assessment(s)?
- How often are the questions recycled in the academic programmes?
- What are the existing tools for setting examination questions?
- What are some of the measures put in place to control the preparation of assessments?

3.6. Instrument Development

Semi structured questionnaires (see appendix A and B) and past examinations review were used (see appendix C). The instruments were pre-tested for unclear wording and revised accordingly. It was pilot tested with fifty three (53) students and seven (7) internal examiners in KCA university main campus (See appendix D). It was assumed that the 60 respondents (10%) would be representative of the student and internal examiner population of the university academic programs. Past examination papers were reviewed in diploma and degree programmes.

3.7. Instrument validity

In some cases the questions in the semi structured questionnaires could have been misinterpreted. To increase the likelihood of this face validity, the survey was pre-tested using a sample of 60 respondents in KCA University, academic programmes. Enough literature review on the instruments to be used was also done to ensure they provide adequate coverage of the problem thus giving the research enough content validity (Mugenda & Mugenda, 2003).

3.8. Instrument reliability

To ensure the repeatability of the results, the questionnaire was designed to allow same questions to be asked but with different wording. In addition, a test-retest was performed for the instrument.

3.9. Project Resources.

Table 1: Project resources

RESOURCE	SPECIFICATION	USAGE
Books	Related to problem under study	Literature survey
Journals	Related to problem under study	Literature survey
Internet access	Hours of access	Literature survey
Discussions	Experts with more knowledge of on examinations	Literature survey
Laptop	System model: HP530 notebook.	Developing the system
	Processor: intel® core™ Duo CPU, Speed: 1.66 GHZ,	
	Memory: RAM 1GB	
Operating system	Windows xp professional	Running applications
Programming language	Microsoft VB.NET 2008	Coding
Relational database management system	Microsoft SQL server 2000	Database
Office applications	Microsoft Word 2007, Powerpoint 2007,Excel 2007	Documentation

3.10. Project budget

Table 2: Project budget

Resource Name	Quantity	Units	Availability	Estimated cost per unit(Ksh)	Total estimated cost(Kshs)
Books		Number	Borrowed from library	0	0
Journals		Number	Borrowed from library	0	0
Internet Access	100	Hours	Hours of access	10	1000
Disussions	2	Sessions	Number of discussions	1000	2000
Human resouce/Labour	1	Skills	Skills used by researcher	20000	20000
Laptop	1	Number	Researcher owned	50000	50000
Microsoft Office programs	1	Number	Bought by researcher	10000	10000
Printing papers	4	Number	Bought by researcher	500	2000
Printer	1	Number	Researcher owned	5000	5000
Transport	10	Trips	Paid by researcher	500	5000
Meals	20	Number	Paid by researcher	300	6000
Binding services	9	Number	Paid by researcher	150	1350
Total cost					102350

3.11. Project Schedule.

Table 3:Project schedule

TaskNo	Task name	Expected start	Expected Finish	Expected Duration	Actual start	Actual Finish	Actual Duration	Deliverable
1	Problem identification	22/2/2010	19/2/2010	14 Days	2/2/2010	12/2/2010	11 Days	Abstract
2	Literature review	22/2/2010	29/4/2010	49 Days	2/2/2010	9/5/2010	97 Days	Gap(s) to be addressed
3	Proposal writing	12/5/2010	11/6/2010	23 Days	15/5/2010	19/9/2010	127 Days	Proposal document
4	Proposal presentation	24/6/2010	24/6/2010	1Day	25/10/2010	25/10/2010	1 Day	Proposal
5	Data collection	25/6/2010	25/7/2010	21 Days	9/01/2011	26/1/2011	18 Days	Data
6	Data analysis	26/7/2010	2/8/2010	6 Days	27/01/2011	7/2/2011	12 Days	Results
7	System design	6/8/2010	6/9/2010	26 Days	17/12/2010	26/1/2011	41 Days	System design
8	System implementation	29/9/2010	12/10/2010	10 Days	26/1/2011	12/2/2011	28 Days	Running system
9	Progress presentation	13/9/2010	13/9/2010	1 Day	15/2/2011	15/2/2011	1 Day	Compiled system
10	Compile final document	11/11/2010	9/12/2010	21 Days	16/2/2011	3/4/2011	46 Days	Final report
11	Final presentation	14/12/2010	14/12/2010	1 Day	23/11/2012	23/11/2012	1 Day	Defense

CHAPTER FOUR

4. SYSTEM DESIGN AND IMPLEMENTATION

4.1. The system Design Methodology.

The methodology chosen was a revised waterfall model. There were four phases during the design of the system using this methodology.

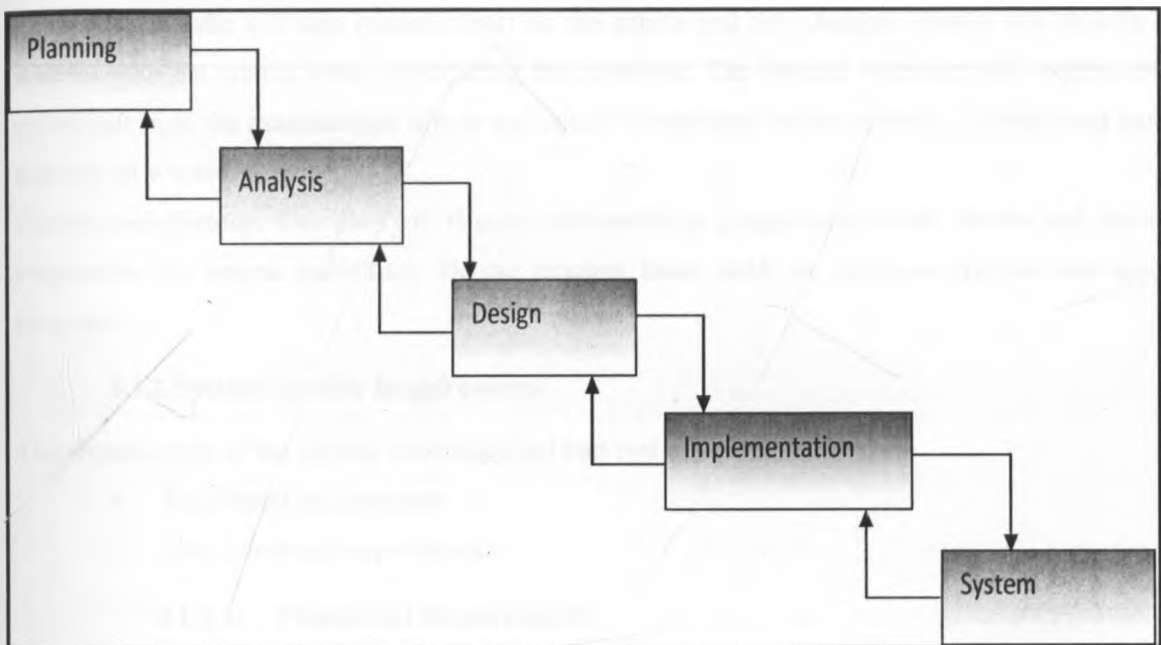


Figure 4: Reversed waterfall model

Planning: The needs and scope of the system were identified. Data collection was done to establish the need for new system.

Analysis: The requirements of the system were established. Several systems were compared and the proposed system was then recommended as the best alternative.

System design: The logical and physical designs of the system were created to model the requirements.

Implementation: The actual realization of the design was done using the selected software and hardware.

4.2. System Requirement Specification

4.1.1. User characteristics

Examinations officer: This user will need a report on the examination from the system. He/she must have access to the system and can query the system to access past examination papers. He can also provide guidelines on how the system operates. He/she is expected to be conversant with common computer application programmes like office suite. Knowledge on database systems will also be required.

Internal examiner: This user will require information about the programmes he/she is teaching and examining. He/she will also require report on the course and any changes. He/she will then be able to interact with the system when constructing the questions. The internal examiner will require additional guidelines from the examinations officer and course coordinator when necessary. He/she must have basic training on windows.

Course coordinator: This user will require information on programme details. He/she will therefore be responsible for course guidelines. He/she requires basic skills on database systems and application programs.

4.1.2. System Specific Requirements

The requirements of the system were classified into two categories:

- a. Functional requirements
- b. Non functional requirements

4.1.2.1. Functional Requirements

This provides the services the system should provide, how the system will react to particular inputs and how the system should behave in particular situations.

User views: The system should provide reports on programmes, courses and questions.

Constructing a new question: The system should allow the user to construct a new question after capturing parameters like question number, programme identifier, difficulty level, keyword and question detail.

Constructing a new examination: The system should allow the user to select questions that will be included in the examination.

Editing course details: The system should allow the user to make changes to the existing course details.

Editing programme details: The system should allow the user to edit existing programme details.

4.1.2.2. Non Functional Requirements

This defines properties and constraints of the system. It gives the attributes that the system will provide.

Security: The system authenticates users through password. The allocation of the user accounts is done by the system administrator. This is because the users may change from semester to another.

Performance (Response time): The system gives feedback for any requests within a time not more than a minute if the system is functioning properly.

Usability: The system allows new users to access and interact with the interface with little or no training. Besides, the users should be able to access the necessary commands on the user interface easily.

Reliability: The system should meet all the requirements specified by the designer. The system continues to operate without failure for at least four months.

4.3. System Architecture

The architecture of this system has focused on major components and how they interact. These components include the system modules, the user interface as well as the users.

4.3.1. System User

System users can be course coordinator updating course and/or programme. It can also be the internal examiner setting examination questions or even examination officer retrieving an examination form the question bank.

4.3.2. User Interface

The user interface provides the user with forms that can be used to edit course, programmes, questions and examination. The interface then connects with the system modules.

4.3.3. System Modules

- **Examination module:** It allows the user to create new questions. It also allows the user to post questions using a number of parameters like difficulty level, question number and question details. This module must communicate with course module.
- **Course module:** Allows the user to update the course details. This module communicates with both the examination and programme modules.
- **Programme module:** Allows the user to update the programme details. This module communicates with course module.

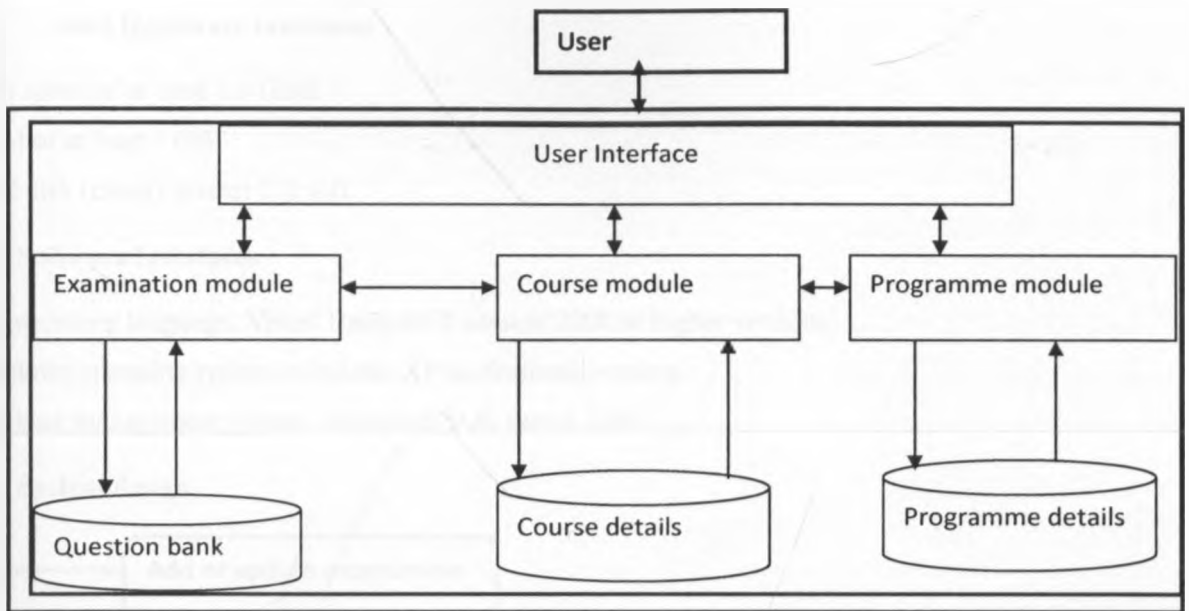


Figure 5: System architecture

4.3.4. System Database

Provides storage for the previous questions, examinations, course details and programme details. The database helps the internal examiner to easily retrieve and compare existing questions when constructing a new examination. It also helps the examiner to refer to any updates to the course to ensure he/she covers the syllabus adequately when testing.

4.4. User Interface Requirements

4.4.1. User Interface Design

The user launches the application and logs in. The system then displays the main menu; file, report and help. From the main menu user can access the submenus, a number of options/menus. Examination, course, programme menu and exit.

Programme menu: User can enter new or edit programme details

Course menu: User can enter/update course details

Topics menu: The user can enter/edit course topics

Difficulty level menu: Allows the user to enter the difficulty level of the question

Keyword menu: Allows the user to enter the keyword for the question.

Questions menu: Allows the user to create new questions

Set exams menu: Allows the user to select questions to be included in the examination

Exit menu: Allows the user to close the program.

4.4.2. Hardware interfaces

CPU speed of at least 1.5 GHZ.

RAM of at least 1 GB

Hard disk (client) at least 120 GB

4.2. Software Interfaces

Programming language: Visual Basic.NET version 2008 or higher versions

Windows operating system: windows XP professional version.

Database management system: Microsoft SQL server 2000

4.3. System design

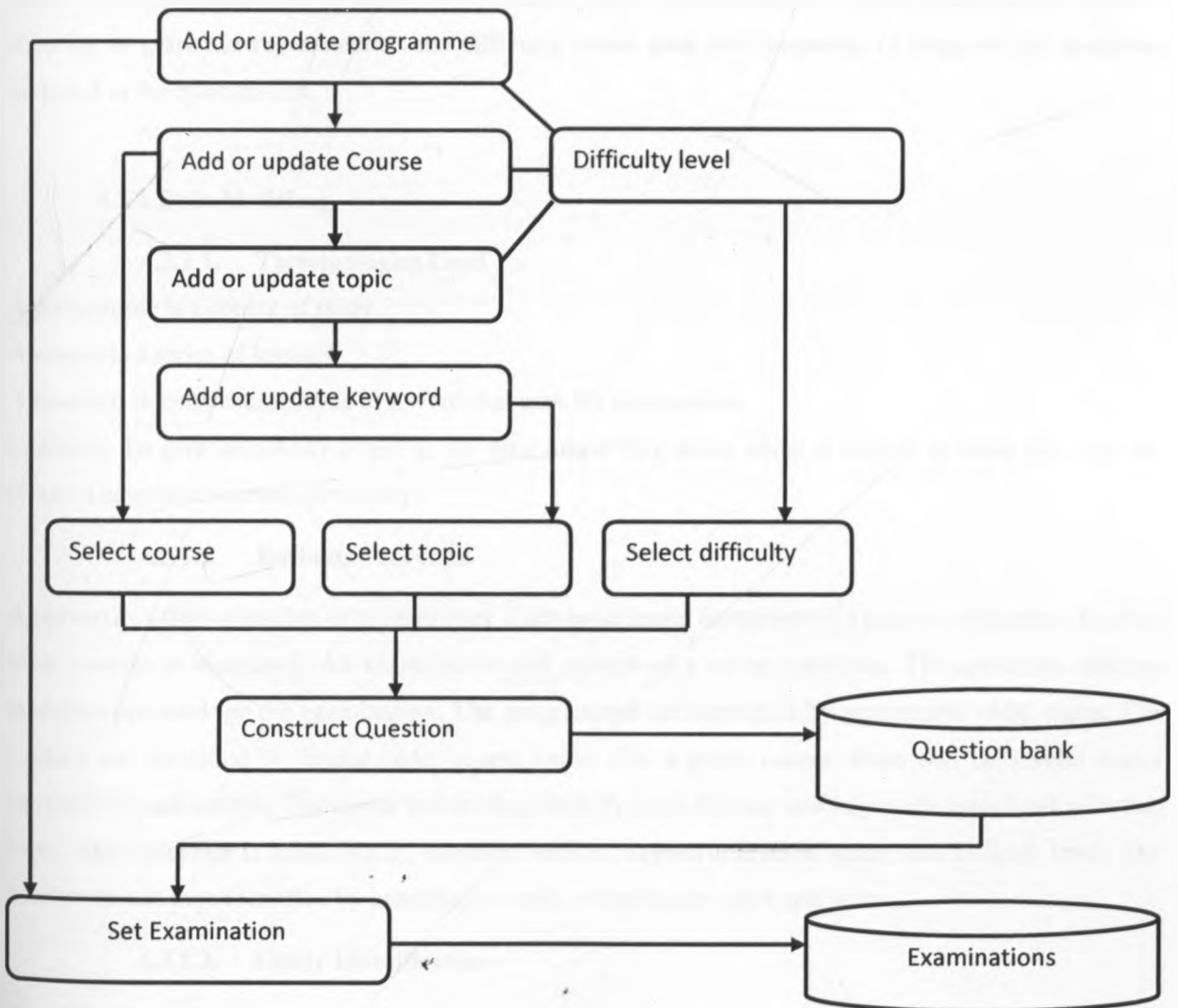


Figure 6: System design

The user can login to add or update programmes. Once a programme has been created, courses associated with that programme will be added. Topics for each course are then added. A given topic can have subtopics which can be captured as keywords. The difficulty level used depend on the programme, course and level of study (Bloom's taxonomy is used).When constructing questions, the user will pick the course, topic and difficulty level before typing the question. Once constructed the question is send to the question bank. To set a new examination, the examiner must specify the programme and course. The questions are filtered depending on the course chosen. The system provides a view of the question bank. The user previews the exam questions based on topics covered, difficulty level used, and frequency of usage (FQ). If the question has been used, its frequency counter increments by one (1) and time and date stamp is updated to show the last time that question was used. The user may print out the examination or send it to the examination database. The system allows the examiner to print examination statistics showing in graphical representation the difficulty levels used and frequency of usage of the questions included in the examination.

4.3.1.Data Modeling

4.3.1.1. Terminologies Used

A programme is a course of study

A course is a series of lessons

A question is a sentence, phrase or a word that asks for information.

Examine: To give somebody a test to see how much they know about a subject or what they can do.
(Oxford advanced learners dictionary)

4.3.1.2. Business Processes

A university offers a number of programmes. Each programme comprises of a number of courses. Each of these courses is examined. An examination will consist of a set of questions. The questions must be therefore prepared for the examination. The programmes are identified by programme code, name. The courses are identified by course code, course name. For a given course, there will be several topics covered for each course. The topics will be described by topic number and keywords associated with that topic. Each question is identified by question number, keyword, level of study and difficult level. The examination is then identified by examination code, examination name and year.

4.3.1.3. Entity Identification

The following entities were identified

- Programme
- Course
- Question
- Examination
- Topics

The following descriptions explain how the entities relate

A number of programmes are offered and each programme has a number of courses.

A number of examinations can be used to examine students taking a particular course.

An examination has a number of questions

4.3.1.4. Normalization

The database was normalized to remove redundancy and remove database anomalies (see table 4)

UN-NORMALIZED FORM	FIRST NORMAL FORM	SECOND NORMAL FORM	THIRD NORMAL FORM
Exam_Name	Exam_No(PK)	Exam_No(PK)	Exam_No(PK)
Exam_Year	Programme_No(PK)	Exam_Name	Exam_Name
Question_Details	Course_No(PK)	Exam_Year	Exam_Year
Difficulty_Level	Exam_Name	Question_Details	Programme_No(FK)
Keyword_Name	Exam_Year	Difficulty_Level	Course_No(FK)
Topic_Name	Question_Details	Keyword_Name	Question_No(FK)
Programme_Name	Difficulty_Level		
Course_Name	Keyword_Name	Course_No(PK)	Course_No(PK)
	Topic_Name	Course_Name	Course_Name
	Programme_Name	Topic_Name	Programme_No(FK)
	Course_Name		
		Programme_No(PK)	Programme_No(PK)
		Programme_Name	Programme_Name
			Topic_No(PK)
			Topic_Details
			Course_No(FK)
			Question_No(PK)
			Question_Details
			Date_Created
			Year
			Keyword_No(FK)
			Difficulty_Level_No(FK)
			Difficulty_Level_No(PK)
			Level_Name
			Keyword_No(PK)
			Keyword_Name
			Topic_No(FK)

Table 4: Normalization

Logical Data Model

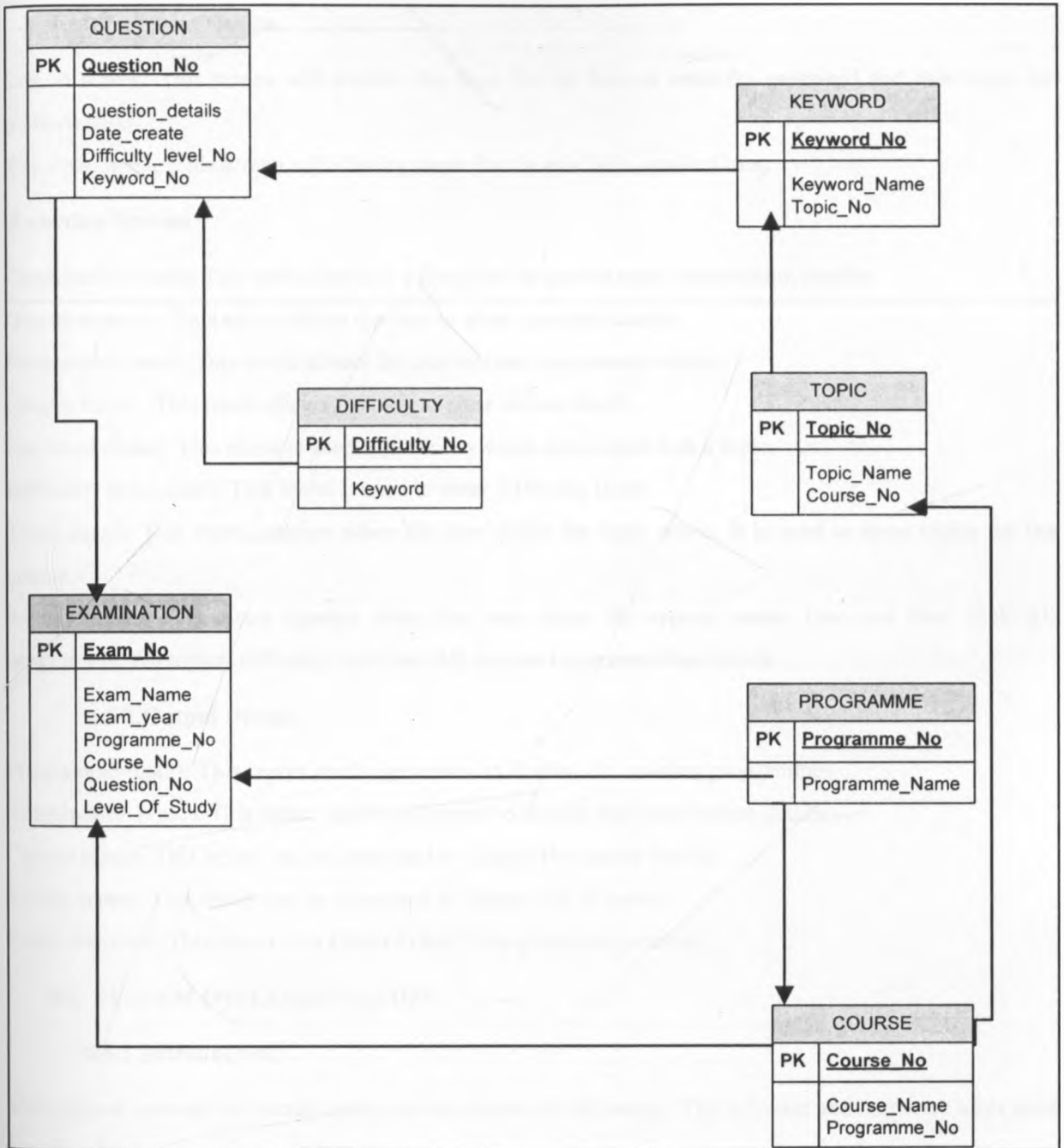


Figure 7: Logical data model

4.5. INPUT AND OUTPUT DESIGN SYSTEM

4.5.1. Input Design

Log in screen: This screen will provide the form for the user to enter the password and user name for authorization.

The main menu: This screen will display menu for the available applications.

Function Screens

Examination menu: This menu displays a form for the user to enter examination details.

Question menu: This menu allows the user to enter question details.

Programme menu: This menu allows the user to enter programme details.

Course menu: This menu allows the user to enter course details.

Keyword dialog: This menu is used to enter keywords associated with a topic.

Difficulty level menu: This menu is used to enter difficulty level.

Topic menu: This menu appears when the user clicks the topic menu. It is used to enter topics for the course.

Report menu: This menu appears when the user clicks the reports menu. One can then click All programme, All topics, difficulty level and All courses to generate the reports.

4.5.2. Output Design

Programme report: This report can be generated to display the existing programmes

Examination report: This report can be generated to display the examination details

Course report: This report can be generated to display the course details.

Topics report: This report can be generated to display list of topics

Exam statistics: This report is in form of chart for a given examination.

4.6. SYSTEM IMPLEMENTATION

4.6.1. Introduction

This chapter presents the actual system as was shown in the design. The software and hardware tools used are also shown.

4.6.2. System snapshots

4.6.2.1. Splash screen



4.6.2.2. Login Screen

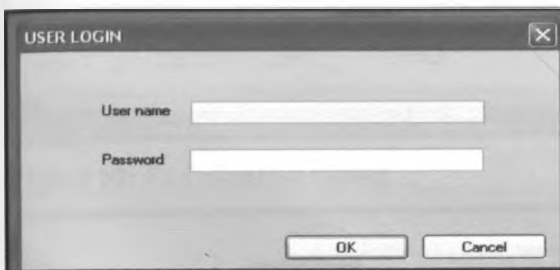


Figure 8: Login screen

System Interface

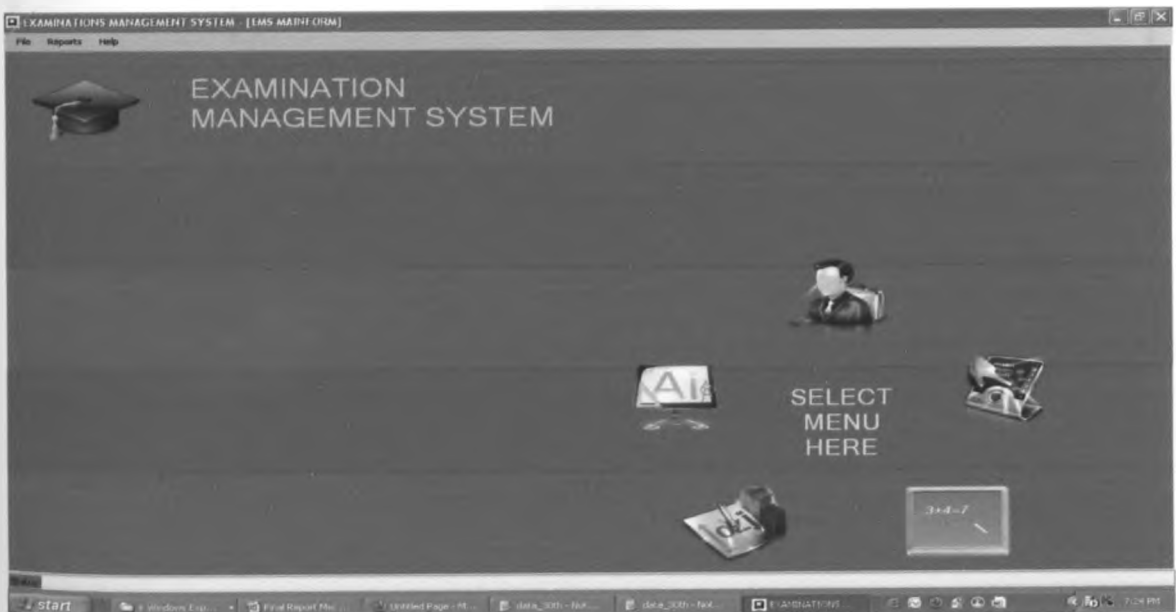


Figure 9: System interface



Figure 10: Examination dialog

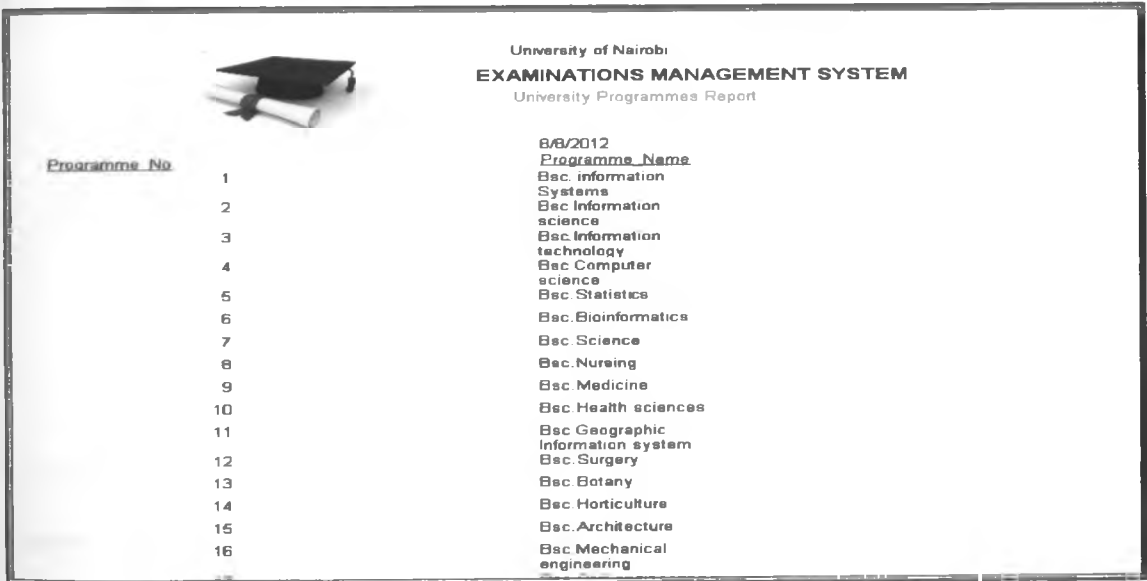



Figure 11: Programmes report

Figure 12: Course report




University of Nairobi
EXAMINATIONS MANAGEMENT SYSTEM
University Programmes Report

8/8/2012

Course No	Course Name
1	Operating systems
2	Computer networks
4	Event driven programming
5	Human computer interaction
6	Database systems
7	Computer applications
8	Ecommerce
9	Research methodology
10	Systems analysis and design
11	Object Oriented Programming
12	Data structures and algorithms
13	Object oriented

Figure 13: Difficulty level report



University of Nairobi
EXAMINATIONS MANAGEMENT SYSTEM
University Exams Report

8/8/2012

Qn. No	Question
1	Explain the function of each of the following components of communication model: i). Source ii). Transmitter iii). Reciever iv). Destination [8 Marks]
2	Describe one function for each of the seven layers of OSI reference model [7 Marks]
4	Discuss the following guided media under subtopics: types/categories, advantages, disadvantages and construction: i). Twisted pair ii). Fibre optic iii). Coaxial [12 Marks]
6	Briefly outline the following digital encoding formats: i). NRZ-L ii). Manchester [6 Marks]
8	Describe the following error detection techniques as used in digital data communication [4 Marks] i). Parity check ii). CRC
9	Describe the sliding window flow control. [3 Marks]

Figure 14: Examination report

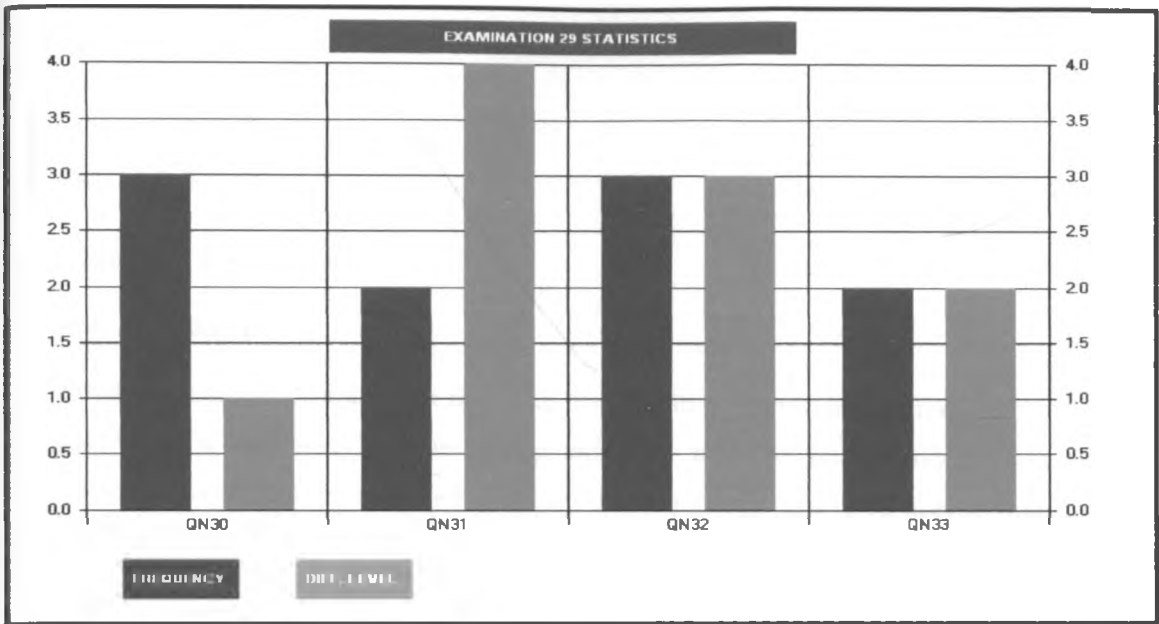


Figure 15: Exam statistics

CHAPTER FIVE

5. RESEARCH FINDINGS

5.1. Introduction

The study investigated examination recycling problem in academic programmes in local universities in Kenya. Using a case study of one private university and one public university, a sample of 501 respondents was used. The tools used to collect data were semi-structured questionnaires and review of past examinations papers. The respondents were students and internal examiners in the academic programmes.

5.2. Restatement of Research Objectives

The research was set out to investigate recycling of examination questions in local universities in Kenya, in academic programmes. The specific objectives of the research were:-

- i. To examine the current forms of assessments in local universities in Kenya.
- ii. To perform a comparison of the past examinations questions.
- iii. To assess the systems for constructing university examinations in local universities in Kenya.
- iv. To design a system that can aid examiners to set examination questions.

5.3. Restatement of Research Questions

The study was intended to answer the following questions.

- i. What are the most commonly used form(s) of assessment(s) in academic programmes?
- ii. How often are examination questions recycled?
- iii. What are the existing systems that can be used to construct examinations?
- iv. What are some of the measures put in place to control the preparation of assessments?

5.4. Study

The study was done to 501 respondents from Strathmore University and university of Nairobi. Four hundred and sixty nine (469) respondents were students in the academic programmes and thirty two (32) respondents were internal examiners in the academic programme. The past examination papers from the academic programmes from the two local universities were studied. The tools were administered between 9th and 26th.January, 2011, after the students reported from the Christmas holiday.

However, the questionnaires that were completed and returned were three hundred and thirty two (332) representing 66% of the target sample: Three hundred and twenty (320) questionnaires were from students while twelve (12) questionnaires were from the internal examiners.

Target sample	Respondents	Completed questionnaires	Response rate
469	Students	320	68%
32	Internal examiners	12	38%
Total=501		Total=332	66%

Table 5: Response rate

5.5. Study Results

Based on the data collected from the student and internal examiner respondents as well as the review of past examinations papers, it was possible to answer the first two questions. The last two questions were answered using the questionnaires from the internal examiners.

a) What are the most commonly used form(s) of assessment(s)?

i. Internal examiners responses

The internal examiners indicated that they use assignments, continuous assessment tests, presentations and end of semester examinations as the main forms of assessments. The other assessment methods appeared to vary depending on the requirements of the programme (see figure 16).

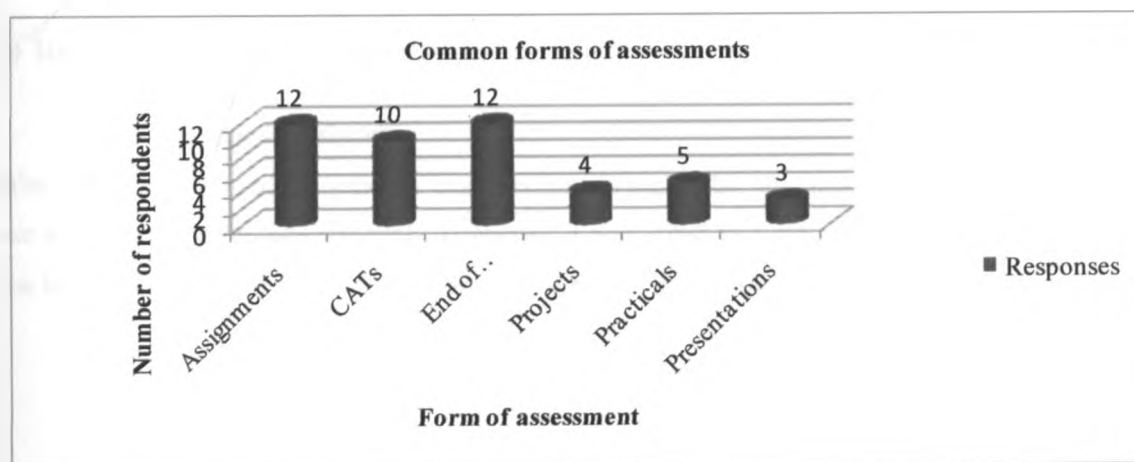


Figure 16: Common forms of assessments according to internal examiners

ii. Students responses

All the student respondents were continuing students and from their responses they confirmed they had done a number of assessments. From the results the main assessments done were assignments, continuous assessment tests and end of semester examinations (See figure 17).

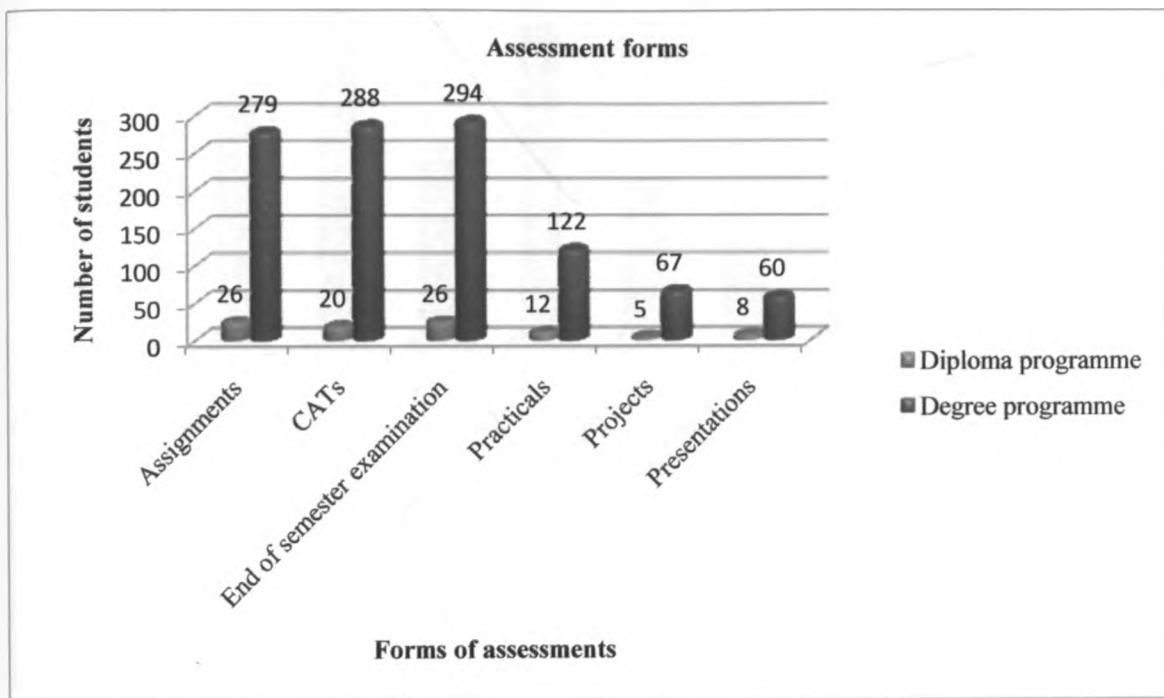


Figure 17: Common forms of assessments according to students

b) How often are examination questions recycled?

i. Internal examiners

When preparing the end of semester examinations in particular, the internal examiners indicated that they use a number of reference materials. However, it was noted that majority of the respondents preferred to use textbooks, past end of semester examination papers and lecture notes(see figure 18).

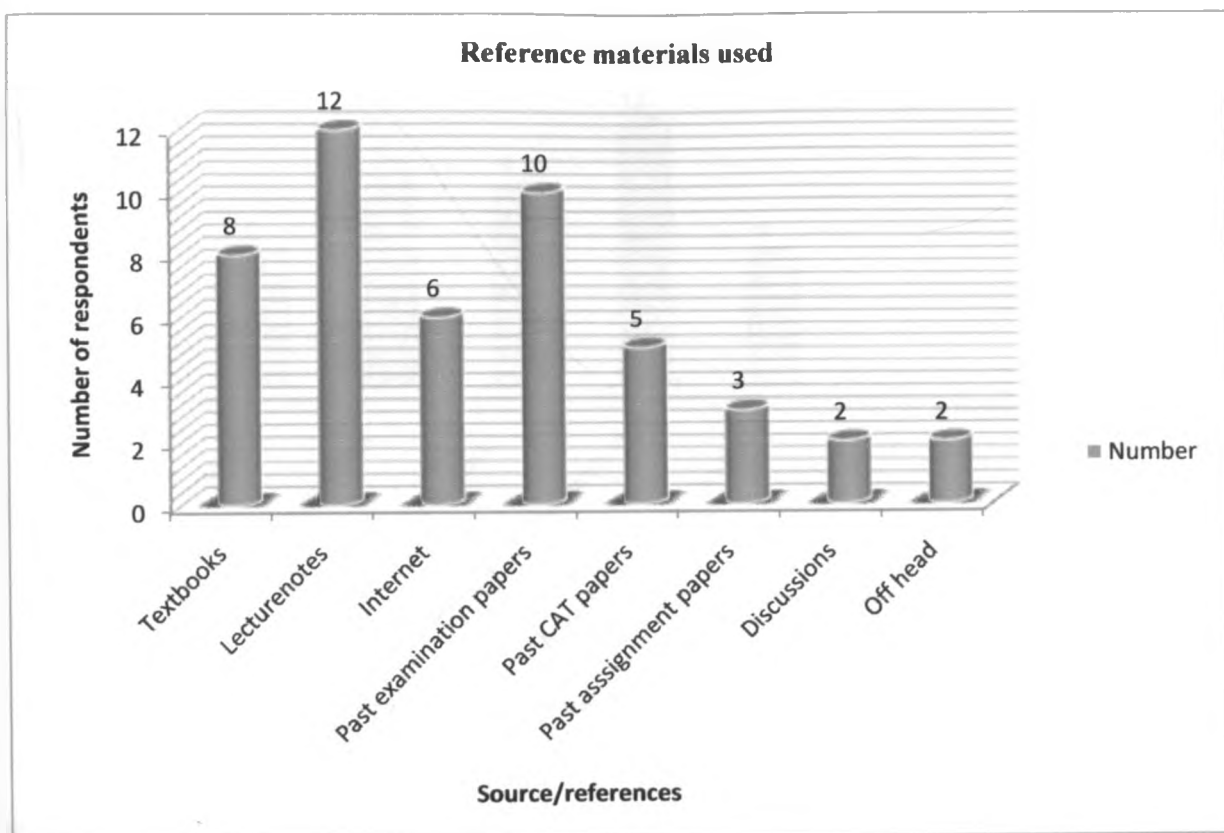


Figure 18: Reference materials used by internal examiners when setting examinations

The draft examinations are usually moderated by the external examiners who make recommendations regarding the quality of the examination. When asked about some of the issues the external examiners raise, the internal examiners cited syllabus coverage, completeness of the question, structure of the questions, distribution of the marks as well as quality of the examination questions.

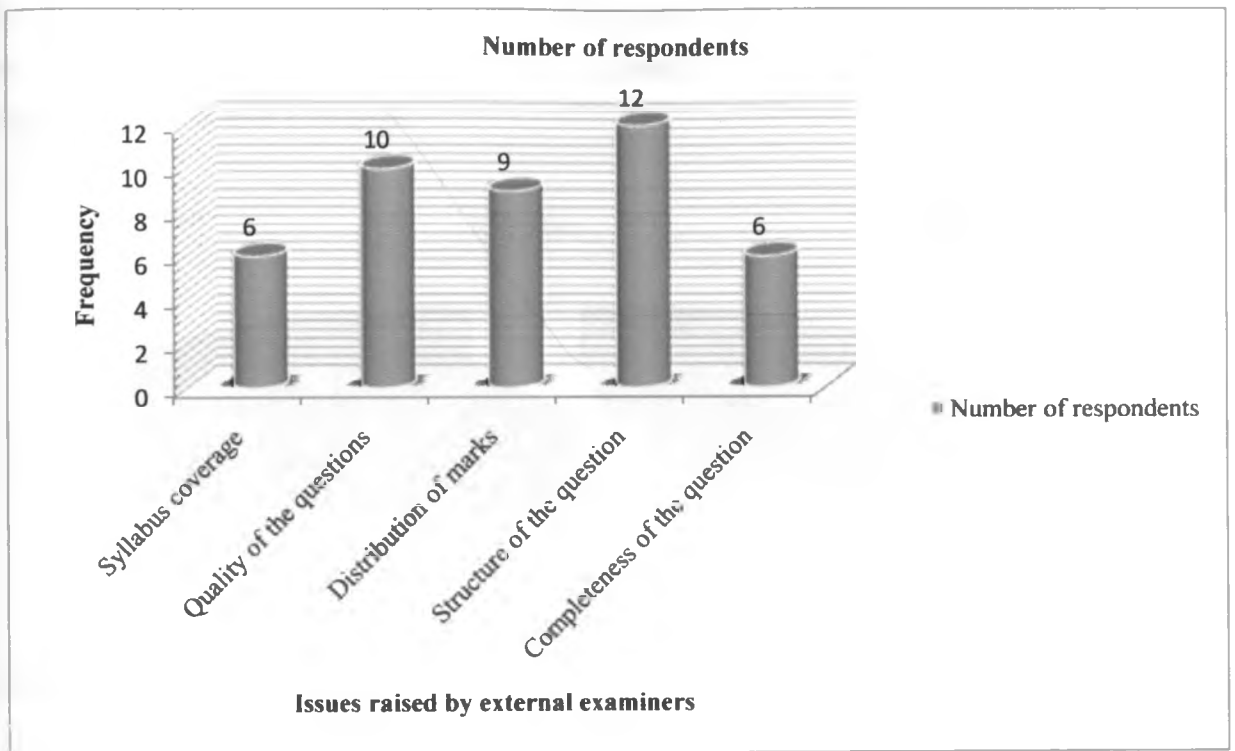


Figure 19: Issues raised by external examiners

When asked how often such issues appear in the external examiners report, 10 respondents indicated that the issues are raised very often.

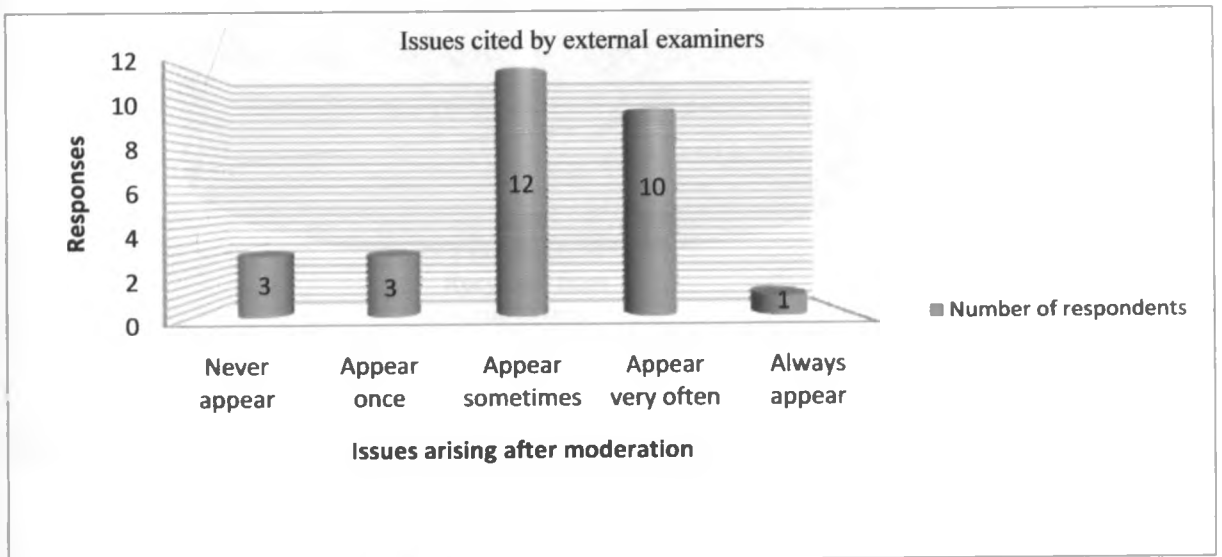


Figure 20: How often the external examiners raise the issues

When asked if they recycle examinations, only forty four percent (44%) of internal examiners agreed that they recycle examinations. However, fifty six percent (56%) admit that they had seen recycled examinations from their colleagues.

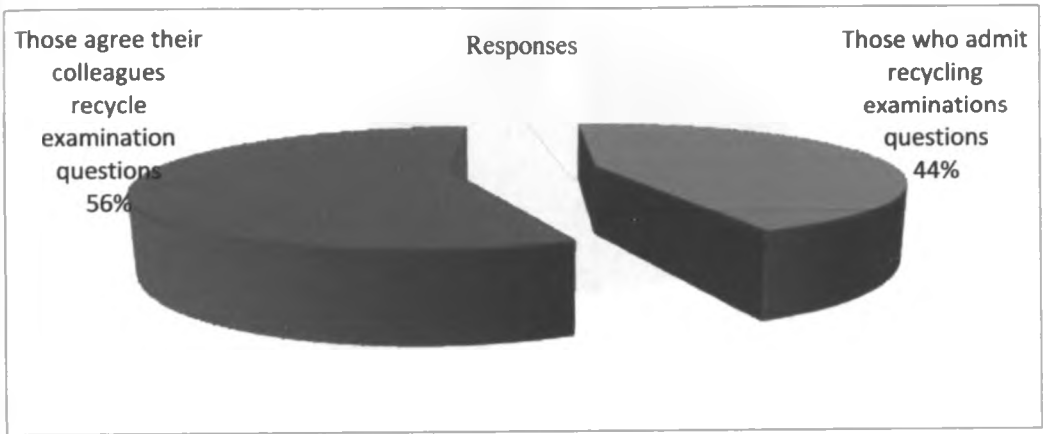


Figure 21: Do internal examiners recycle questions

When asked about the occurrence of this problem of recycling of questions, majority of the respondents indicated that examination questions were being recycled now and again.

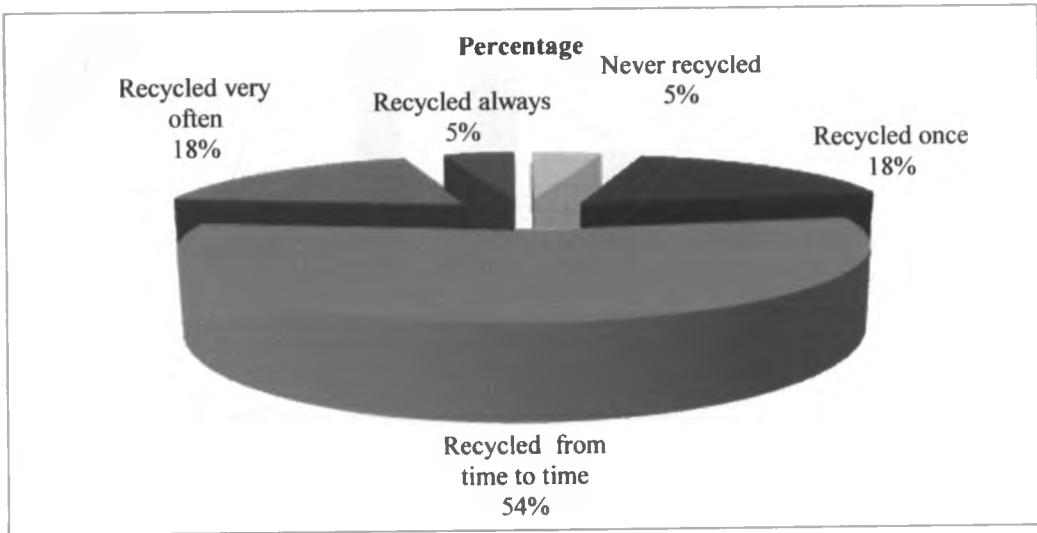


Figure 22: opinion of internal examiners on examination recycling

ii. Data from students

It was noted that majority of the questions appearing from the examinations are familiar to the students.

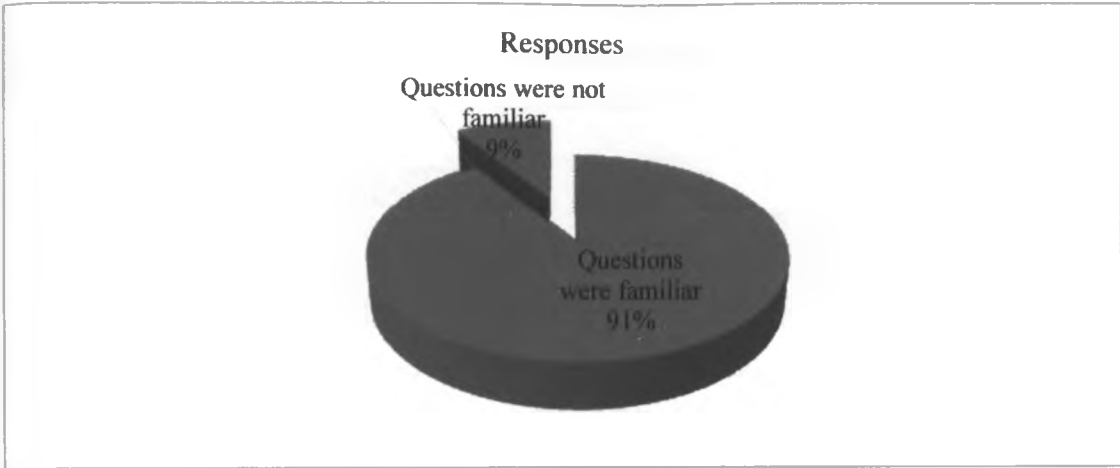


Figure 23: Familiarity of examination questions according to students

The student respondents then gave a variety of sources they use when preparing for examinations

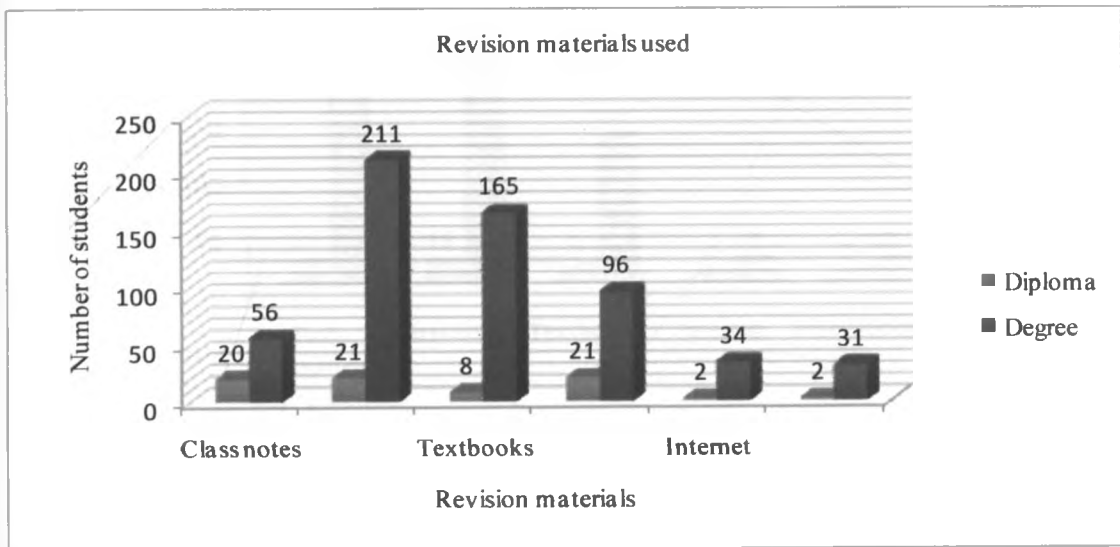


Figure 24: References used by students when revising for examinations

The students were asked whether they anticipated finding recycled questions in their examinations. 58% of the students showed that they expected questions to be recycled.

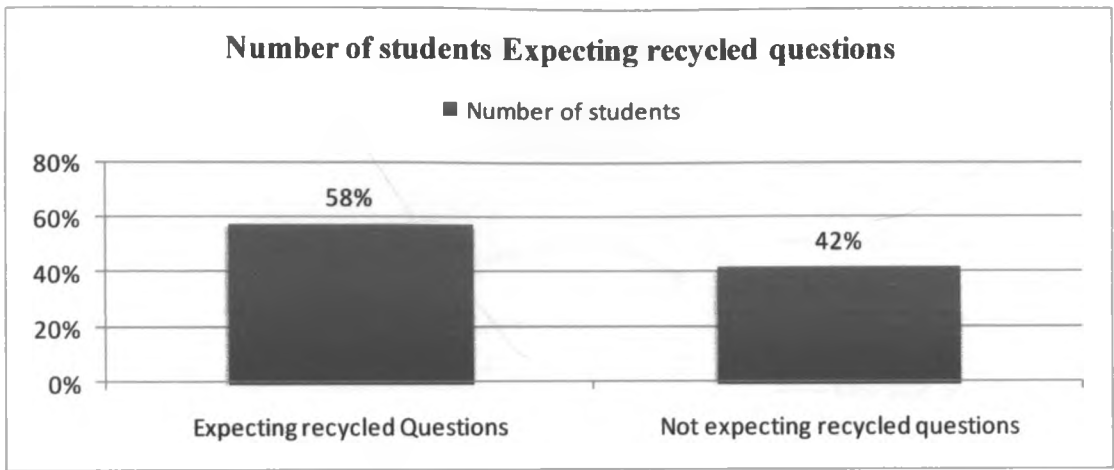


Figure 25: Do students expect questions to be recycled?

The student respondents were then asked to specify the sources where they had previously seen questions.

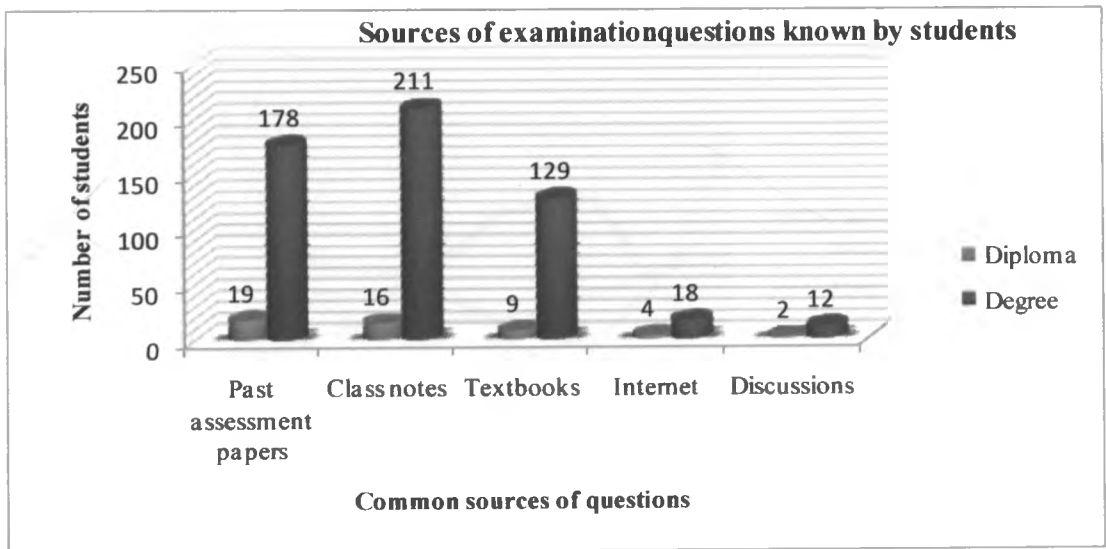


Figure 26: Sources of examination questions according to students

iii. Review of past examination papers

It was observed that given one examination paper as a reference, questions that appeared in the next five papers were either partly or wholly recycled. The originality of questions was exponentially decreasing as more papers were compared.

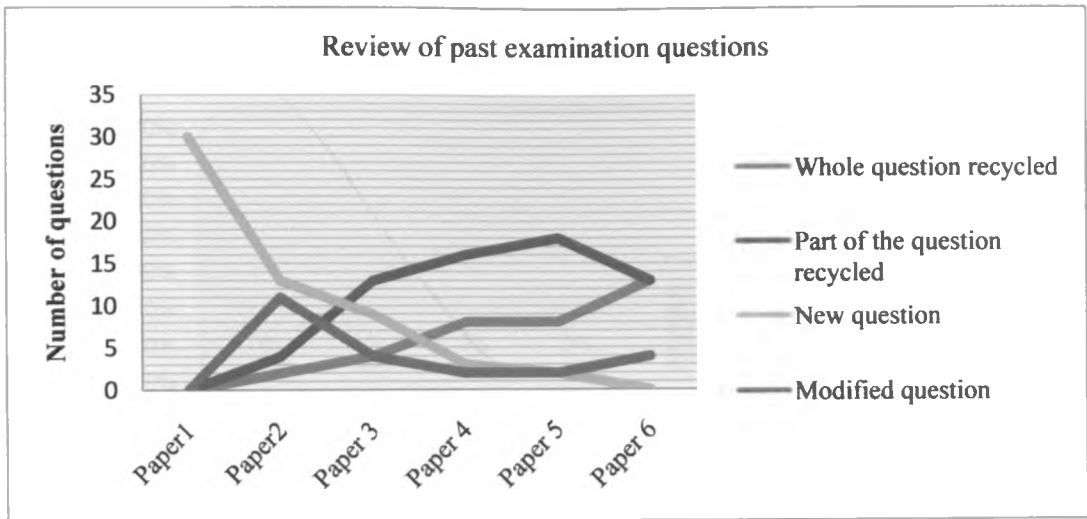


Figure 27: Review of past examination papers from University of Nairobi.

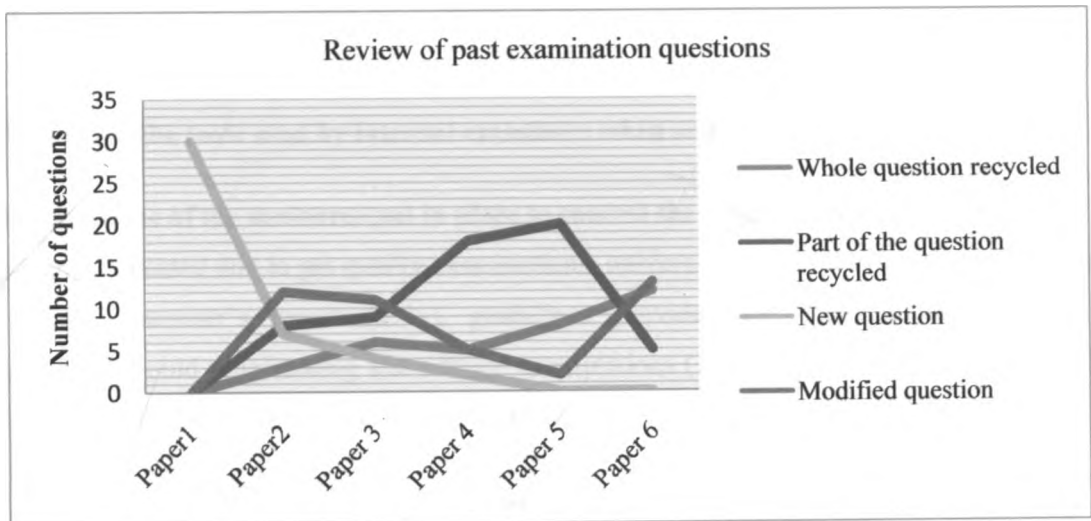


Figure 28: Review of past exam papers from Strathmore

c) What are the systems used to construct assessment questions?

The responses showed that 67% use personal computers, 22% use lecturer workstations while 1% use question banks to prepare examinations.

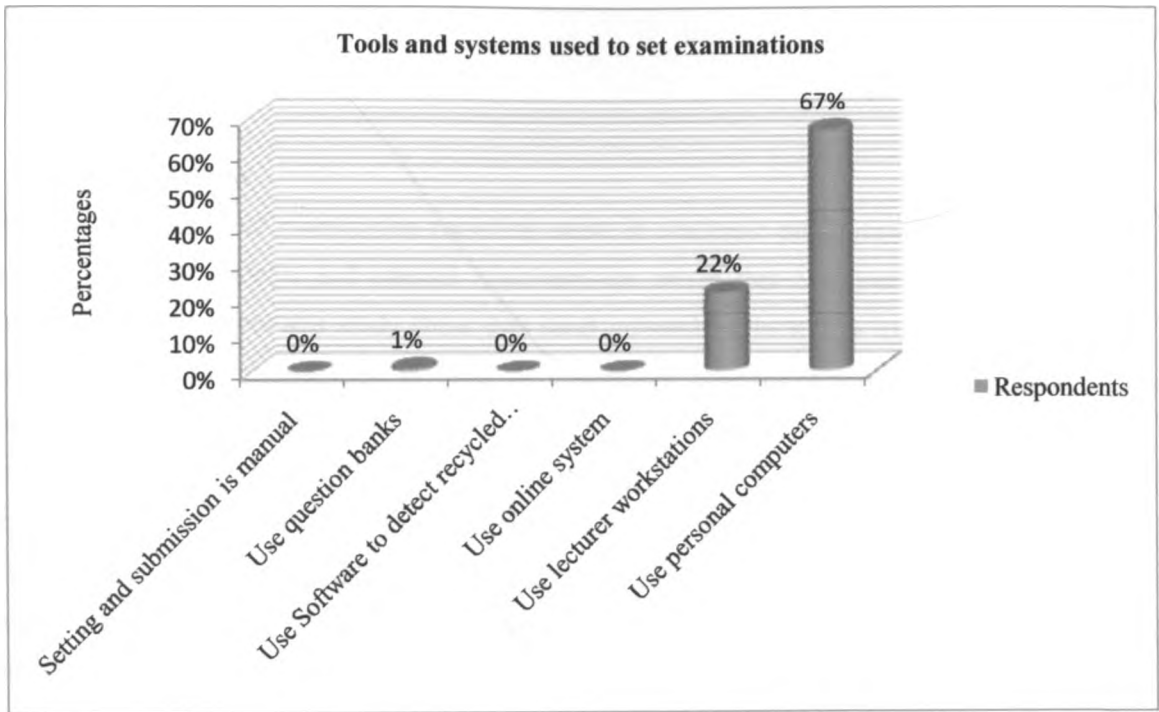


Figure 29: Some of the tools used by internal examiners when setting examinations

d) What are some of the measures put in place to control the preparation of assessments

The respondents indicated that to get quality examinations, universities rely on lecturer's professionalism (33%), external examiner's report (27%), guidelines provided by examinations office (24%), departmental heads could proofreading and editing examinations (11%) and in some cases examinations office may proof reading and editing the examination(5%).

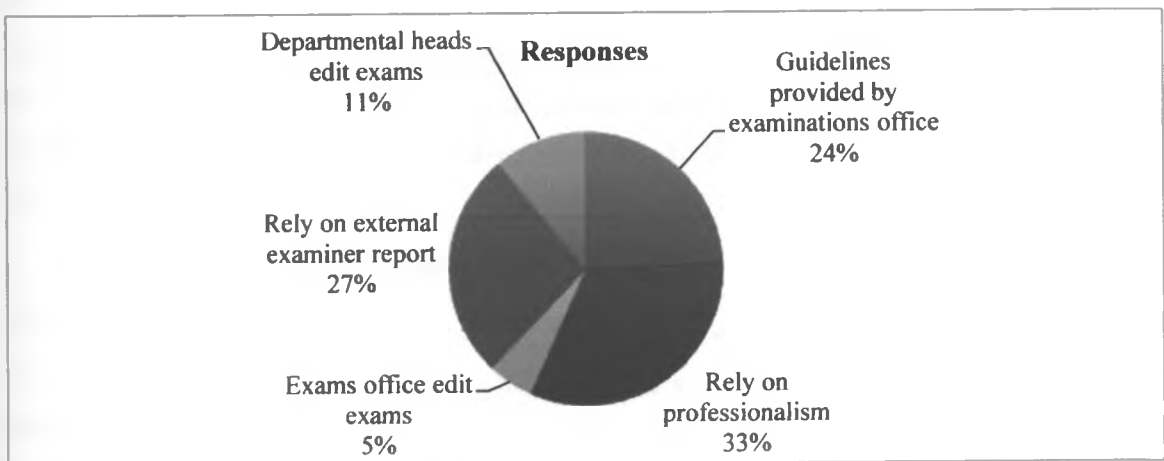


Figure 30: Common practices in handling examinations according to internal examiners

5.6. Discussions

This study has shows that examination recycling exists in academic programmes. The study has found that generally, both students and internal examiners are aware that examination questions are being recycled. The results from this study show that local universities in Kenya use two main methods of assessments; formative assessments in form of continuous assessment tests(CAT), assignments and summative assessment in form of end of semester examinations(see figure 16 and figure 17).

Secondly, the study has shown that there are no existing systems that can help internal examiners set examination questions. It was noted that the internal examiners do not have access to question banks (see figure 27).

Thirdly, the study found out that examinations office rely on external examiners report as well as internal examiners professionalism as there is no mechanism of finding which questions have been used before.

Finally, the study has shown that majority of the students, over 91% (see figure 22) belief that questions that appear in their examinations are familiar. Additionally, 58% of the students expect the examinations to be recycled (see figure 24). 54% of internal examiners acknowledge that examinations are being recycled (see figure 21). A review of the past examination papers from academic programmes showed that examination questions were either recycled wholly or partly (see figure 26).

5.7. Implications of the Study

The results of this study suggest that questions that appear in examinations are not new. If candidates have access to past examination papers, they can easily predict what to expect in the next examination. Lack of question banks can makes it difficult for examiners to know areas that were previously examined and this increasing chances of duplicating questions. The implication of this is the possibility that some students may access past examination papers which may be a source for a given examination thus giving them an advantage.

5.8. Significance of the findings

The study has made two main contributions, firstly to the existing literature regarding assessments in institutions of higher learning in Kenya. Secondly, the study has provided evidence on the extent of examination recycling in local universities in Kenya, particularly academic programmes.

5.9. Limitations of the study

This study was limited in three ways. Firstly, the study mainly focused on internal examiners and students. The study did not collect facts from the examination officers. Secondly, it was not possible to review all the past examination papers as in some universities filing was not up to date. In some cases, the

library attendants could not allow the papers to be photocopied. Thirdly, different universities have different calendars and so data collection cannot be done within a short time. For example, in one university students could be reporting back from vacation while in another university, students could be sitting for their examinations.

5.10. Recommendations for further work

Three recommendations have been proposed. Firstly, the need to investigate the impact of examination recycling on students study behavior in higher learning institutions. Secondly, the need to investigate factors informing examination recycling in institutions of higher learning. Thirdly, need to add functionality to the system so that the system can be used to create marking scheme for examination.

5.11. Conclusion

It is evident that academic programmes in the university use both formative and summative assessment methods. It is also noted that questions being used in these assessments can be accessed from past examination materials or from their class notes. Where the curriculums do not change so often and forms of assessment remain the same then there is likelihood of recycling assessment questions. Tracking all questions that have been examined before can be difficult if question banks are not available. It is on this basis that a computerized system was designed and implemented to aid examiners to set examination questions. Using this system, examiners can set new questions as they teach the course and store the questions in the question bank for use in the examination. Where questions are reused, examiners must ensure they do so carefully to avoid duplication of questions. Filing all the past examination questions and going through them item by item in order to find a suitable question can be time consuming and require storage space. Using a question bank for example can help a great deal; examiners can filter existing questions and select questions that test the topics, keywords, programmes they want. When selecting questions for examinations, the system helps the examiner find out available questions and how often they have been used.

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Appendix A: student questionnaire

Introduction

Assessment is an integral part of learning and teaching in higher education. This questionnaire is therefore intended to collect facts regarding the process of preparation of assessments.

PART A: Methods of assessments used in the university.

- a) Which academic programme are you pursuing?(Tick)
- Certificate
 - Diploma
 - Degree
- b) Have you done any form of assessment(s)
- Yes
 - No
- c) If your answer in (b) above is yes, tick against the method of assessment used.
- Assignment/ term paper
 - Presentations
 - Continuous assessment test(CAT)
 - End of semester examination
 - Practicals
 - Research/Project

Any other method of assessment(s) used? Please indicate

.....

PART B: Familiarity of the assessment question(s).

- a) Did you find any familiar question(s) in the assessment(s)?
- Yes
 - No
- b) If your response is yes in (a) choose where you had seen this/these questions.
- Past assignment/term paper
 - Past continuous assessment paper
 - End of semester examination
 - Internet
 - Not sure where I saw them

Any other source? Please indicate here

.....

- c) In your own opinion, how would you rate the questions in the assessment you did, in terms of originality(Not seen before).Please tick to rate the questions(**only one option is allowed**)

Questions were seen before?	No	Yes	Not sure
All the questions had never been seen before	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Some questions had been seen before	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Most of the questions had been seen before	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
All the questions had been seen before	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

PART C: Frequency in recycling examination questions

- a) How often do you find familiar questions in your examinations? Use the key below to select choice.
KEY: Never=1 Once=2 Rarely=3 Sometimes=4 Every time=5

Assessment method	Rate
Assignment/term paper	
Presentations	
Continuous assessment test(CAT)	
End of semester examination	
Practicals	
Research paper	

- b) Do always anticipate finding familiar question(s) in your assessment(s)?
 Yes
 No
- c) If your response in (b) above is yes, tick to select which materials(e.g. past examination papers, notes e.t.c), you use mostly when revising for this assessment and give a reason.

Material used	Tick	Reason
Past continuous assessment test(CAT)	<input type="checkbox"/>	
Past end of semester exam papers	<input type="checkbox"/>	
Online material	<input type="checkbox"/>	
Textbooks	<input type="checkbox"/>	
Class notes	<input type="checkbox"/>	

Any other? Please specify with a reason

.....

Appendix B: Questionnaire for lecturer

Questionnaire form for Lecturer

Assessment is an integral part of learning and teaching in higher education. This questionnaire is therefore intended to collect facts regarding the process of construction of the assessments.

Instructions:

Please answer all the questions truthfully. Indicate your comment(s) in point form where necessary. Do not write your name anywhere in this questionnaire.

Part A: Most commonly used form(s) of assessment(s) used in your university.

a) Fill the table below for the number of assessments done in the programme(s) you teach/examine.

Assessment	Number of assessments e.g. 1,2,3..	
	Diploma	Degree
Assignment		
Term paper		
Continuous assessment test(CAT)		
End of semester examination		
Project		
Practicals		
Presentations		

Others? specify

.....

Part B: Designing draft examination and marking schemes.

i. How long (in weeks) does it take for examiners to prepare and submit their draft exams and marking schemes?

Indicate here

ii. When designing the examinations what are some of the material you use for reference?

Material used	Tick
Text books	<input type="checkbox"/>
Lecture notes	<input type="checkbox"/>
Online material	<input type="checkbox"/>
Past examination papers	<input type="checkbox"/>
Past CAT papers	<input type="checkbox"/>
Past assignment papers	<input type="checkbox"/>
Discussions	<input type="checkbox"/>

Any other source(s)? Specify,

Any Discussions

other source(s)? Specify.

.....
.....

iii. What are some of the issues the external examiners raise about the draft exams submitted?

Material used	Tick
Text books	<input type="checkbox"/>
Lecture notes	<input type="checkbox"/>
Online material	<input type="checkbox"/>
Past examination papers	<input type="checkbox"/>
Past CAT papers	<input type="checkbox"/>
Past assignment papers	<input type="checkbox"/>
Discussions	<input type="checkbox"/>

Any other? Please specify.

.....
.....

iv. How often do the above issues arise? (Tick).

- Never
- Once
- Sometimes
- Very often
- Always

KEY

Never=1, once=2, sometimes=3, very often=4 and Always=5

Part C: Reusing of questions in university examinations.

i. Have you ever recycled an examination question(s)?

- Yes
- No

ii. Have you ever noticed recycled examination question(s) from other internal examiner(s)?

- Yes
- No

iii. If answer in i) or and ii). in part C is Yes, how often do you notice recycled examination questions. Please tick where appropriate.

- Never
- Once
- Sometimes
- Very often
- Always

KEY

Never=1, once=2, sometimes=3, very often=4 and Always=5

iv. Do the external examiners detect these recycled examinations?

- = Yes
- = No
- = Very often

Part D: Systems used to set examinations

a) What are the tools used by internal examiners in preparing examinations in the academic programmes? Please tick where appropriate.

Tools used when constructing assent?	Yes	No	Not Sure
The questions are handwritten and send to the office for consolidation	=	=	=
The handwritten draft exam and marking scheme is brought to exam room	=	=	=
Exams office staff types the assessment questions	=	=	=
Internal examiners have their own personal computers to set exams	=	=	=
There are lecturer workstations for typing examinations	=	=	=
Exam office provides a software to set examination	=	=	=
Exams office has a software for detecting duplicated questions	=	=	=
Internal examiners submit soft copies of draft exams physically	=	=	=
Exams office has question bank where questions can be retrieved	=	=	=
Exams office has online system for assessing students	=	=	=
Draft exams are submitted online to exams office	=	=	=

Any tool(s) used? Please specify:

.....
.....

b) What are some of the practices in handling examinations in the exams office you are aware of? Please tick where appropriate.

Practice	Yes	No	Not Sure
Exams office gives guidelines to examiners on standards required	=	=	=
Exams office rely on professionalism of examiners for quality exams	=	=	=
Exams office staff edit and consolidate exams from examiners	=	=	=
Exams office rely on external examiners report after moderation	=	=	=
Departmental heads assess examination before it is accepted	=	=	=

Any other practice? Please specify:

.....
.....

Appendix C: Past Examination Papers Review Form

Past Examination Papers Review Form

Pick one past examination paper as reference and use this paper to compare with other consecutive papers for the same unit course. Enter the observations in the form below.

Question keyword difficulty level details	Similarity of questions					
	Paper1	Paper2	Paper3	Paper4	Paper5	Paper6
Q1						
Q2						
Q3						
Q4						

KEY:

Whole question recycled =5

Most part of the question recycled=4

Part of the question recycled =3

Question modified=2

New questions =1

Appendix D: List of universities

a) Public universities

1. University of Nairobi
2. Kenyatta university
3. Moi university
4. Egerton university
5. Jomo Kenyatta university of agriculture and technology
6. Maseno university
7. Masinde muliro university of science & technology.

b) Chartered private universities

1. Kabarak university
2. Strathmore university
3. University of eastern African, Baraton
4. Catholic university of Eastern Africa
5. Daystar university
6. United states international university
7. Africa Nazarene university
8. Scott theological college
9. Kenya Methodist university
10. St. Paul's university
11. Pan Africa Christian university

c) Universities with letters of interim

1. Kiriri women's university of science and technology
2. Aga khan university
3. Greta university
4. Great lakes university kisumu
5. KCA university
6. Presbyterian university of Eastern Africa
7. Adventist university of Africa
8. Mt. Kenya university

d) Constituent colleges

1. Pwani university college
2. Chuka university college
3. Meru university college of science and technology
4. Mombasa polytechnic university college
5. Kimathi university college of technology
6. Kisii university college
7. Kenya polytechnic university college
8. Multi-media university college
9. The south Eastern university college
10. Narok university college

e) Registered universities

1. Kenya highlands bible college
2. East African school of theology
3. Nairobi Evangelical Graduate school of theology
4. Nairobi international school of theology

Adopted from: 7th Exhibition by Kenyan universities (march 2009).

Appendix E: Student population in Kenyan universities

INSTITUTION	2005/2006		2006/2007		2007/2008		2008/2009		2009/2010	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Public										
Nairobi	21,940	11,765	22,513	12,426	23,513	12,826	24,162	13,253	27,159	15,201
Full time	10,800	5,425	10,858	5,536	11,340	5,714	11,624	5,857	14,527	7,800
Part time	11,140	6,340	11,655	6,890	12,173	7,112	12,538	7,396	12,632	7,401
Kenyatta	10,896	4,787	8,845	7,891	10,172	8,425	10,652	8,713	15,615	10,876
Full time	4,356	2,947	5,066	3,285	5,826	3,507	6,176	3,647	12,566	8,444
Part time	6,540	1,840	3,779	4,606	4,346	4,918	4,476	5,065	3,049	2,432
Moi	6,831	5,314	8,604	6,059	8,674	6,158	8,982	6,379	13,600	6,699
Full time	4,311	3,200	5,654	3,554	5,700	3,612	5,928	3,756	7,587	4,024
Part time	2,520	2,114	2,950	2,505	2,974	2,546	3,054	2,622	6,013	2,675
Egerton	6,262	2,236	8,163	4,006	8,262	4,205	8,667	4,415	9,036	4,451
Full time	5,322	1,890	7,319	3,383	7,408	3,551	7,778	3,729	7,920	3,521
Part time	940	346	844	623	854	654	888	687	1,116	930
JKUAT	4,207	1,673	4,460	1,845	5,450	2,512	5,723	2,594	6,510	3,206
Full time	2,240	1,046	2,176	524	2,659	713	2,792	742	3,557	1,274
Part time	1,967	657	2,284	1,321	2,791	1,799	2,931	1,853	2,953	1,932
Maseno	2,826	1,878	2,778	1,937	3,487	2,199	3,603	2,257	3,331	2,176
Full time	2,106	1,420	1,888	1,277	2,370	1,450	2,441	1,494	2,097	1,351
Part time	720	458	890	660	1,117	749	1,162	764	1,234	825
Masinde Muliro	775	287	1,154	656	946	278	965	284	4,119	2,584
Full time	420	182	620	422	508	179	518	183	2,523	1,741
Part time	355	105	534	234	438	99	447	101	1,523	843
Kenya poly university college									6,721	4,211
Mombasa Poly university college									3,520	3,541
SUB-TOTAL	53,737	27,940	56,517	34,820	60,504	36,603	62,753	37,896	89,611	52,945
PRIVATE UNIVERSITIES										
Private accredited	4,215	4,624	8,975	6,973	9,688	10,469	10,172	10,992	16,728	12,300
Private unaccredited	853	947	2,853	2,091	583	392	618	416	3,989	2,162
SUB-TOTAL	5,068	5,571	11,828	9,064	10,271	10,861	10,790	11,408	20,717	14,462
TOTAL	58,805	33,511	68,345	43,884	70,775	47,464	73,543	49,304	110,328	67,407
GRAND TOTAL		92,316	112,229		118,239		122,847		177,735	

*Provisional

Source: Kenya statistical abstract (pp 52)

Table 6: Student enrolment by gender in universities, 2005/2006-2009/2010

Appendix F: Sample code

```
Imports System
Imports System.Data
Imports System.Data.OleDb
Imports System.Data.SqlClient
Public Class Globals
    '& Application.StartupPath & "\Bank.mdb")
    Dim strDatasource As String = GetDataSource()
    Public strConn As String = ("Provider=Microsoft.Jet.OLEDB.4.0;Data
Source=" & Application.StartupPath & "../databases/Exams.mdb")
    Public connetionString As String = "Data Source=" & strDatasource &
";Initial Catalog=Examination;Integrated Security=True"
    Public Shared examNo As String
    Dim oleReader As SqlDataReader
    Function GetDataSource() As String
        Dim Myconn As SqlConnection
        Try
            Dim MySQL As String = "Select SERVER_NAME FROM UNIVERSITY"
            Myconn = New SqlConnection(Me.connetionString)
            'MyConn = New SqlConnection(utility.strConn)
            Dim cmd As New SqlCommand(MySQL, Myconn)
            Myconn.Open()
            cmd.CommandType = CommandType.Text
            oleReader=
cmd.ExecuteReader(System.Data.CommandBehavior.CloseConnection)
            Dim list As ListViewItem
            While oleReader.Read()
                frmLogin.SERVER_NAME = oleReader(0)
            End While
            Myconn.Close()
        Catch ex As Exception
            Exit Function
        End Try
    End Function
End Class
```

```
Imports System
Imports System.Data.OleDb
Imports System.Data
Imports System.Data.SqlClient

Public Class Exams
    Dim utility As New Globals
    Dim oleReader As SqlDataReader
    Dim oleReader_data As SqlDataReader
    Dim strMessage As String
    Dim setQst As DataInfo
    Dim QNlevels As Integer
    Dim strParameter As String = ""
    Dim adp As SqlDataAdapter
    Dim Myconn As SqlConnection
```

```

Private Sub B3_Click(ByVal sender As System.Object, ByVal e As
System.EventArgs) Handles B3.Click
    Me.Hide()
    Main.Show()
    'Hide reports
    frmProgrammesRpt.Hide()
End Sub

```

```

Private Sub Programmes_Load(ByVal sender As Object, ByVal e As
System.EventArgs) Handles Me.Load
    T3.Text = Today()
    C1.Text = "PROGRAMME NUMBER"
    Call populatePrevExams()
    Call populateCourses()
    Call RS_SET_RIGHTS(frmLogin.USER_LEVEL)
    Call PopulateProgramme()
End Sub
Public Sub RS_SET_RIGHTS(ByVal level As Integer)

```

```

    Select Case level
        Case 1 ' Cordinator
        Case 2 ' External Examiner
            With Me
                .btnPrint.Enabled = True
                .btnSearch.Enabled = True
                .B2.Enabled = False
                .btnUpdate.Enabled = False
                .btnCancel.Enabled = False
            End With
        Case 3 ' Lecturer

            With Me
                .btnPrint.Enabled = True
                .btnSearch.Enabled = True
                .B2.Enabled = False
                .btnUpdate.Enabled = False
                .btnCancel.Enabled = False
            End With
        Case 4 ' Administrator

```

```

    End Select
End Sub
Private Sub btnSearch_Click(ByVal sender As System.Object, ByVal e As
System.EventArgs) Handles btnSearch.Click
    Call SEngine(txtSearch.Text)
    Call RS_SET_RIGHTS(frmLogin.USER_LEVEL)
End Sub

```

```

Public Sub SEngine(ByVal str As String)
    Dim strName As String = ""
    Dim intPno As Integer = 0
    strName = "%" & str & "%"
    Call ClearControls()
    Try
        If C1.Text = "" Then
            MessageBox.Show("Please specify search by key.", "Exam
System", MessageBoxButtons.OK, MessageBoxIcon.Information)

```

```

Else
    If Cl.Text = "EXAM NUMBER" Then
        intPno = CInt(str)
        ListView1.Items.Clear()
        Dim MySQL As String = "Select * FROM EXAMINATIONS where
Exam_No = @Num"
        Dim Myconn = New SqlConnection(utility.connetionString)
        'MyConn = New SqlConnection(utility.strConn)
        Dim cmd As New SqlCommand(MySQL, Myconn)
        Myconn.Open()
        cmd.Parameters.Add("@Num", SqlDbType.NVarChar)
        cmd.Parameters("@Num").Value = intPno
        cmd.CommandType = CommandType.Text
        oleReader =
cmd.ExecuteReader(System.Data.CommandBehavior.CloseConnection)
        Dim list As ListViewItem
        While oleReader.Read()
            list =
ListView1.Items.Add(UCase(oleReader(0).ToString))
                list.SubItems.Add(UCase(oleReader(1).ToString)) ' & "
                txtPno.Text = oleReader(0)
                txtYear.Text = oleReader(1)
                cboName.Text = Me.GetProgrammeName(oleReader(2))
        End While
        Myconn.Close()
    ElseIf Cl.Text = "EXAM YEAR" Then
        ListView1.Items.Clear()
        Dim MySQL As String = "Select * FROM EXAMINATIONS where
Exam_Year Like @Name "
        Myconn = New SqlConnection(utility.connetionString)
        'MyConn = New SqlConnection(utility.strConn)
        Dim cmd As New SqlCommand(MySQL, Myconn)

        Myconn.Open()
        cmd.Parameters.Add("@Name", SqlDbType.NVarChar)
        cmd.Parameters("@Name").Value = strName
        cmd.CommandType = CommandType.Text
        oleReader =
cmd.ExecuteReader(System.Data.CommandBehavior.CloseConnection)
        Dim list As ListViewItem
        While oleReader.Read()
            list =
ListView1.Items.Add(UCase(oleReader(0).ToString))
                list.SubItems.Add(UCase(oleReader(1).ToString)) ' & "
                txtPno.Text = oleReader(0)
                txtYear.Text = oleReader(1)
                cboName.Text = Me.GetProgrammeName(oleReader(2))
        End While
        Myconn.Close()
    End If
End If
Catch ex As Exception
End Try
End Sub
Sub ClearControls()

```

```

    txtPno.Text = ""
    txtYear.Text = ""
End Sub

Private Sub B2_Click(ByVal sender As System.Object, ByVal e As
System.EventArgs) Handles B2.Click
    On Error GoTo Handler
    ClearControls()
    Dim intPno As Integer
    Dim MySQL As String = "Select MAX (Exam_No) As NUM FROM Examinations"
    Myconn = New SqlConnection(utility.connetionString)
    Dim cmd As New SqlCommand(MySQL, Myconn)
    Myconn.Open()
    cmd.CommandType = CommandType.Text
    oleReader =
cmd.ExecuteReader(System.Data.CommandBehavior.CloseConnection)
    While oleReader.Read()
        txtPno.Text = oleReader(0) + 1
        'cboName.Text = oleReader(1)
    End While
    Myconn.Close()
    btnSave.Enabled = True
    btnCancel.Enabled = True
    B2.Enabled = False
    Exit Sub
Handler:
    txtPno.Text = 1
    btnSave.Enabled = True
    btnCancel.Enabled = True
    B2.Enabled = False
End Sub

Private Sub btnCancel_Click(ByVal sender As System.Object, ByVal e As
System.EventArgs) Handles btnCancel.Click
    Call RS()
End Sub

Sub RS()
    B2.Enabled = True
    btnSave.Enabled = False
    btnCancel.Enabled = False
    btnPrint.Enabled = False
    btnUpdate.Enabled = False
    Call ClearControls()
End Sub

Private Sub btnSave_Click(ByVal sender As System.Object, ByVal e As
System.EventArgs) Handles btnSave.Click
    Dim prog As String, courseno As String
    Dim SelectedData As DataInfo, SelectedData1 As DataInfo

    'VALIDATE CONTROLS
    If Me.txtPno.Text = "" Then
        strMessage = "Warning: Please Enter Exam Number"
        MsgBox(strMessage, MsgBoxStyle.Critical, "Invalid Entry")
        Exit Sub
    End If
    If Me.txtYear.Text = "" Then
        strMessage = "Warning: Please Enter Exam year"

```



```

        MsgBox(strMessage, MsgBoxStyle.Critical, "Invalid Entry")
        Exit Sub
    End If
    If cboName.Text = "" Then
        strMessage = "Warning: Please Choose program"
        MsgBox(strMessage, MsgBoxStyle.Critical, "Invalid Entry")
        Exit Sub
    End If
    If cboCourse.Text = "" Then
        strMessage = "Warning: Please Choose course"
        MsgBox(strMessage, MsgBoxStyle.Critical, "Invalid Entry")
        Exit Sub
    End If
    If QnsSelectedValidator() = "" Then
        strMessage = "Warning: Please Choose questions"
        MsgBox(strMessage, MsgBoxStyle.Critical, "Invalid Entry")
        Exit Sub
    End If
    If ExamNoValidator(txtPno.Text) <> "" Then
        strMessage = "Info: Exam No already used.Please enter another"
        MsgBox(strMessage, MsgBoxStyle.Critical, "Invalid Entry")
        Exit Sub
    End If
    prog = GetProgrammeNo(cboName.Text)
    courseno = GetCourseNo(cboName.Text)
    'On Error Resume Next
    Dim qn As Integer = 0
    Call ExamAdd(txtYear.Text, prog, courseno, qn)
    Call ExamQuestionsAdd(UCase(txtPno.Text))
    'Dim strParameter As String = ""
    utility.examNo = "" & txtPno.Text & ""
    Call populatePrevExams()
    frmExamsRpt.Show()
    End Sub
Private Sub ProgrammeAdd(ByVal Course_Name As String, ByVal Programme_NO
As Integer)
    Dim MySQL As String = "INSERT INTO Courses(Course_Name, Programme_No)
VALUES (@pa1,@pa2)"
    Myconn = New SqlConnection(utility.connetionString)
    Dim cmd As New SqlCommand(MySQL, Myconn)
    Try
        Myconn.Open()
        cmd.Parameters.AddWithValue("@pa1", Course_Name)
        cmd.Parameters.AddWithValue("@pa2", Programme_NO)
        cmd.CommandType = CommandType.Text
        cmd.ExecuteNonQuery()
        Myconn.Close()
    Catch ex As Exception
        'BRUTE FORCE TESTING
        MsgBox("ERROR: " & ex.Message, MsgBoxStyle.Critical, "Course
Entry")
        Exit Sub
    End Try
    Exit Sub
End Sub

```

```

Private Sub CourseEdit(ByVal Course_Name As String, ByVal Programme_NO As
Integer, ByVal Course_NO As Integer)
    'Dim MySQL As String = "INSERT INTO Courses(Course_Name,
Programme_No) VALUES (@pa1,@pa2)"
    Dim MySQL As String = "UPDATE Courses SET Course_Name =@pa1 ,
Programme_No = @pa2 WHERE Course_No = @pa3"
    Myconn = New SqlConnection(utility.connetionString)
    Dim cmd As New SqlCommand(MySQL, Myconn)
    Try
        Myconn.Open()
        cmd.Parameters.AddWithValue("@pa1", Course_Name)
        cmd.Parameters.AddWithValue("@pa2", Programme_NO)
        cmd.Parameters.AddWithValue("@pa3", Course_NO)
        cmd.CommandType = CommandType.Text
        cmd.ExecuteNonQuery()
        Myconn.Close()
    Catch ex As Exception
        'BRUTE FORCE TESTING
        MsgBox("ERROR: " & ex.Message, MsgBoxStyle.Critical, "Course
Entry")
    End Try
    Exit Sub
End Sub

```

```

Public Function ProgrammeNameValidator(ByVal str As String) As String
    Dim strName As String = ""
    Dim strParameter As String = ""
    strParameter = "%" & str & "%"
    Dim MySQL As String = "Select Course_Name FROM Courses where
Course_Name Like @Name "
    Dim Myconn = New SqlConnection(utility.connetionString)
    Dim cmd As New SqlCommand(MySQL, Myconn)
    Myconn.Open()
    cmd.Parameters.Add("@Name", SqlDbType.NVarChar)
    cmd.Parameters("@Name").Value = strParameter
    cmd.CommandType = CommandType.Text
    oleReader =
cmd.ExecuteReader(System.Data.CommandBehavior.CloseConnection)
    While oleReader.Read
        strName = oleReader.GetString(0)
    End While

    Myconn.Close()
    Return strName
End Function
Sub ShowAllProgrammes()
    ListView1.Items.Clear()
    Dim MySQL As String = "Select * FROM Programme order by Programme_No
Asc"
    Myconn = New SqlConnection(utility.connetionString)
    ' BRUTE FORCE MsgBox(utility.connetionString)
    'MyConn = New SqlConnection(utility.strConn)
    Dim cmd As New SqlCommand(MySQL, Myconn)
    Myconn.Open()
    cmd.CommandType = CommandType.Text

```

```

        oleReader =
cmd.ExecuteReader(System.Data.CommandBehavior.CloseConnection)
        Dim list As ListViewItem
        While oleReader.Read()
            list = ListView1.Items.Add(UCase(oleReader(0).ToString))
            list.SubItems.Add(UCase(oleReader(1).ToString)) ' & " " &
        End While
        Myconn.Close()
    End Sub
    Private Sub ListView1_DoubleClick(ByVal sender As Object, ByVal e As
System.EventArgs) Handles ListView1.DoubleClick
        Dim exam As Integer
        ' On Error Resume Next
        Myconn = New SqlConnection(utility.connetionString)
        Myconn.Open()
        Dim cmd As New SqlCommand("Select * FROM Examinations where Exam_No =
@Num", Myconn)
        cmd.Parameters.AddWithValue("@Num", T1.Text)
        cmd.CommandType = CommandType.Text
        oleReader = cmd.ExecuteReader
        If oleReader.Read = False Then
            Else

                exam = oleReader(0)
                utility.examNo = "'%'" & exam & "'%'"
                frmExamsRpt.Show()
            End If
            Call RS_SET_RIGHTS(frmLogin.USER_LEVEL)
        ' CODE END
    End Sub
    Private Sub ListView1_SelectedIndexChanged(ByVal sender As System.Object,
ByVal e As System.EventArgs) Handles ListView1.SelectedIndexChanged
        On Error Resume Next
        Me.T1.Text = Me.ListView1.FocusedItem.Text
    End Sub

```

```

Function GetProgrammeName(ByVal num As String) As String
    Dim MySQL As String = "Select Programme_Name FROM PROGRAMME where
Programme_No = @Num"
    Dim Myconn_data = New SqlConnection(utility.connetionString)
    Dim p_name As String = ""
    Dim cmd_data As New SqlCommand(MySQL, Myconn_data)
    Myconn_data.Open()
    cmd_data.Parameters.Add("@Num", SqlDbType.NVarChar)
    cmd_data.Parameters("@Num").Value = num
    cmd_data.CommandType = CommandType.Text
    oleReader_data = cmd_data.ExecuteReader
    While oleReader_data.Read()
        p_name = oleReader_data(0)
    End While
    Myconn_data.Close()
    Return p_name
End Function
Function GetProgrammeNo(ByVal str As String) As Integer
    Dim strName As String = ""

```

```

    strName = "%" & str & "%"
    Dim MySQL As String = "Select Programme_No FROM PROGRAMME where
Programme_Name LIKE @Num"
    Dim Myconn_data = New SqlConnection(utility.connetionString)
    Dim p_no As Integer = 0
    Dim cmd_data As New SqlCommand(MySQL, Myconn_data)
    Myconn_data.Open()
    cmd_data.Parameters.Add("@Num", SqlDbType.NVarChar)
    cmd_data.Parameters("@Num").Value = strName
    cmd_data.CommandType = CommandType.Text
    oleReader_data = cmd_data.ExecuteReader
    While oleReader_data.Read()
        p_no = oleReader_data(0)
    End While
    Myconn_data.Close()
    'MsgBox("DATA= " & p_name)
    Return p_no
End Function
Private Sub btnSearchNo_Click(ByVal sender As System.Object, ByVal e As
System.EventArgs) Handles btnSearchNo.Click
    If T1.Text = "" Then
        strMessage = "Warning: Please Enter Exam Number"
        MsgBox(strMessage, MsgBoxStyle.Critical, "Invalid Entry")
        Exit Sub
    End If
    Call ClearControls()
    Call OtherSearch(T1.Text)
    Call RS_SET_RIGHTS(frmLogin.USER_LEVEL)
End Sub
Sub OtherSearch(ByVal str As String)
    Dim intCno As Integer
    intCno = CInt(str)
    Dim MySQL As String = "Select * FROM EXAMINATIONS where Exam_No =
@Num"
    Dim Myconn = New SqlConnection(utility.connetionString)
    Dim cmd As New SqlCommand(MySQL, Myconn)
    Myconn.Open()
    cmd.Parameters.Add("@Num", SqlDbType.NVarChar)
    cmd.Parameters("@Num").Value = intCno
    cmd.CommandType = CommandType.Text
    oleReader =
cmd.ExecuteReader(System.Data.CommandBehavior.CloseConnection)
    While oleReader.Read()
        txtPno.Text = oleReader(0)
        txtYear.Text = oleReader(1)
        cboName.Text = GetProgrammeName(oleReader(2))
        cboCourse.Text = GetCourseName(oleReader(2))
    End While
    Myconn.Close()
End Sub
Private Sub btnUpdate_Click(ByVal sender As System.Object, ByVal e As
System.EventArgs) Handles btnUpdate.Click
    If txtPno.Text = "" Then
        strMessage = "Warning: Please Enter Course Number"
        MsgBox(strMessage, MsgBoxStyle.Critical, "Invalid Entry")

```

```

        Exit Sub
    End If
    If txtYear.Text = "" Then
        strMessage = "Warning: Please Enter Course Name"
        MsgBox(strMessage, MsgBoxStyle.Critical, "Invalid Entry")
        Exit Sub
    End If
    If cboName.Text = "" Then
        strMessage = "Warning: Please Choose Programme Name"
        MsgBox(strMessage, MsgBoxStyle.Critical, "Invalid Entry")
        Exit Sub
    End If
    If ProgrammeNameValidator(txtYear.Text) <> "" Then
        strMessage = "Info: Course Name already used. Please enter
another"
        MsgBox(strMessage, MsgBoxStyle.Critical, "Invalid Entry")
        Exit Sub
    End If
    Call CourseEdit(txtYear.Text, GetProgrammeNo(cboName.Text),
txtPno.Text)
    strMessage = "Info: The Course updated successfully"
    MsgBox(strMessage, MsgBoxStyle.Information, "Course Entry")
End Sub

```

```

Private Sub btnPrint_Click(ByVal sender As System.Object, ByVal e As
System.EventArgs) Handles btnPrint.Click
    Dim I As Integer
    For I = 0 To ListView1.SelectedItems.Count - 1
        MsgBox(ListView1.SelectedItems(I).Text)
    Next
End Sub

```

```

Public Sub REPINFO()
    Try
        Dim rpt2 As New PRO
        Dim fbuk As New RPRO
        Dim cmd As SqlCommand
        Dim dat As New DataSet
        dat.Clear()
        Myconn = New SqlConnection(utility.connetionString)
        Myconn.Open()
        cmd = New SqlCommand("Select * from Courses where Course_No='" &
Me.txtPno.Text & "'", Myconn)
        adp = New SqlDataAdapter(cmd)
        adp.Fill(dat, "Courses")
        rpt2.SetDataSource(dat)
        fbuk.CrystalReportViewer1.ReportSource = rpt2
        fbuk.CrystalReportViewer1.Dock = DockStyle.Fill
        Dim frm2 As New Form()
        With frm2
            .Controls.Add(fbuk.CrystalReportViewer1)
            .Text = "KENYAS KENYAS"
            .WindowState = FormWindowState.Maximized
            .ShowDialog()
        End With
    Catch ex As Exception

```

```

        MessageBox.Show(ex.Message, "Kenya Kenya", MessageBoxButtons.OK,
        MessageBoxIcon.Information)
    End Try
End Sub

```

```

Private Sub T1_TextChanged(ByVal sender As System.Object, ByVal e As
System.EventArgs) Handles T1.TextChanged
End Sub

```

```

Private Sub Label63_Click(ByVal sender As System.Object, ByVal e As
System.EventArgs) Handles Label63.Click
End Sub

```

```

Private Sub Panel2_Paint(ByVal sender As System.Object, ByVal e As
System.Windows.Forms.PaintEventArgs) Handles Panel2.Paint
End Sub

```

```

Private Sub Label5_Click(ByVal sender As System.Object, ByVal e As
System.EventArgs) Handles Label5.Click
End Sub

```

```

Private Sub txtCourseName_TextChanged(ByVal sender As System.Object,
ByVal e As System.EventArgs) Handles txtYear.TextChanged
End Sub

```

```

Private Sub Panell1_Paint(ByVal sender As System.Object, ByVal e As
System.Windows.Forms.PaintEventArgs) Handles Panell1.Paint
End Sub

```

```

Private Sub Label4_Click(ByVal sender As System.Object, ByVal e As
System.EventArgs) Handles Label4.Click
End Sub

```

```

Private Sub Label11_Click(ByVal sender As System.Object, ByVal e As
System.EventArgs) Handles Label11.Click
End Sub

```

```

Private Sub C1_SelectedIndexChanged(ByVal sender As System.Object, ByVal
e As System.EventArgs) Handles C1.SelectedIndexChanged
End Sub

```

```

Private Sub txtSearch_TextChanged(ByVal sender As System.Object, ByVal e
As System.EventArgs) Handles txtSearch.TextChanged
End Sub

```

```

Private Sub GB2_Paint(ByVal sender As System.Object, ByVal e As
System.Windows.Forms.PaintEventArgs) Handles GB2.Paint
End Sub

```

```

Private Sub txtPno_TextChanged(ByVal sender As System.Object, ByVal e As
System.EventArgs) Handles txtPno.TextChanged
End Sub

```

```

Private Sub T3_TextChanged(ByVal sender As System.Object, ByVal e As
System.EventArgs) Handles T3.TextChanged
End Sub

```

```

Private Sub cboName_SelectedIndexChanged(ByVal sender As System.Object,
ByVal e As System.EventArgs) Handles cboName.SelectedIndexChanged
End Sub

```

```

Private Sub Panel3_Paint(ByVal sender As System.Object, ByVal e As
System.Windows.Forms.PaintEventArgs) Handles Panel3.Paint
End Sub

```

```

Private Sub Label2_Click(ByVal sender As System.Object, ByVal e As
System.EventArgs) Handles Label2.Click
End Sub

```

```
Private Sub Label3_Click(ByVal sender As System.Object, ByVal e As
System.EventArgs) Handles Label3.Click
End Sub
```

```
Sub populateCourses()
    Dim MySQL As String = "Select * FROM Courses"
    Dim Myconn = New SqlConnection(utility.connetionString)
    Dim cmd As New SqlCommand(MySQL, Myconn)
    Myconn.Open()
    cmd.CommandType = CommandType.Text
    oleReader =
cmd.ExecuteReader(System.Data.CommandBehavior.CloseConnection)
    cboName.Items.Clear()
    cboName.Items.Insert(0, "")
    While oleReader.Read
        cboCourse.Items.Add(New DataInfo(oleReader.GetString(1),
oleReader.GetInt32(0)))
    End While
    Myconn.Close()
End Sub
```

```
Function GetCourseName(ByVal num As String) As String
    Dim MySQL As String = "Select Course_Name FROM Courses where
Course_No = @Num"
    Dim Myconn_data = New SqlConnection(utility.connetionString)
    Dim p_name As String = ""
    Dim cmd_data As New SqlCommand(MySQL, Myconn_data)
    Myconn_data.Open()
    cmd_data.Parameters.Add("@Num", SqlDbType.NVarChar)
    cmd_data.Parameters("@Num").Value = num
    cmd_data.CommandType = CommandType.Text
    oleReader_data = cmd_data.ExecuteReader
    While oleReader_data.Read()
        p_name = oleReader_data(0)
    End While
    Myconn_data.Close()
    Return p_name
End Function
```

```
Function GetCourseNo(ByVal str As String) As Integer
    Dim strName As String = ""
    strName = "%" & str & "%"

    Dim MySQL As String = "Select Course_No FROM Courses where
Course_Name LIKE @Num"
    Dim Myconn_data = New SqlConnection(utility.connetionString)
    Dim p_no As Integer = 0
    'MyConn = New SqlConnection(utility.strConn)
    Dim cmd_data As New SqlCommand(MySQL, Myconn_data)

    Myconn_data.Open()
    cmd_data.Parameters!Add("@Num", SqlDbType.NVarChar)
    cmd_data.Parameters("@Num").Value = strName
    cmd_data.CommandType = CommandType.Text
    oleReader_data = cmd_data.ExecuteReader
    While oleReader_data.Read()
        p_no = oleReader_data(0)
    End While
```

```

    Myconn_data.Close()
    Return p_no
End Function

```

```

Sub PopulatePrevExams()
    ListView1.Items.Clear()
    Dim MySQL As String = "Select * FROM EXAMINATIONS"
    Dim Myconn = New SqlConnection(utility.connectionString)
    Dim cmd As New SqlCommand(MySQL, Myconn)
    Myconn.Open()
    cmd.CommandType = CommandType.Text
    oleReader =
cmd.ExecuteReader(System.Data.CommandBehavior.CloseConnection)
    Dim list As ListViewItem
    While oleReader.Read
        list = ListView1.Items.Add(UCase(oleReader(0).ToString))
        list.SubItems.Add(UCase(oleReader(1).ToString)) ' & " " &
    End While
    Myconn.Close()
End Sub

```

```

Sub PopulateQNS()
    ' MsgBox("CALLING AT ")
    Dim MySQL As String = "Select * FROM Questions ORDER by Qn_No ASC"
    Dim Myconn = New SqlConnection(utility.connectionString)
    Dim cmd As New SqlCommand(MySQL, Myconn)
    Myconn.Open()
    cmd.CommandType = CommandType.Text
    oleReader =
cmd.ExecuteReader(System.Data.CommandBehavior.CloseConnection)
    lst.Items.Clear()
    Dim list2 As ListViewItem
    While oleReader.Read
        list2 = lst.Items.Add(UCase(oleReader(0).ToString))
        list2.SubItems.Add(UCase(oleReader(1).ToString)) ' & " " &
        list2.ToolTipText = oleReader(1).ToString
        list2.SubItems.Add(UCase(GetQnFrequency(oleReader(0)).ToString))
        list2.SubItems.Add(UCase(GetQnDifficulty(oleReader(2)).ToString))
        list2.SubItems.Add(UCase(GetTopic(oleReader(3)).ToString))
        list2.SubItems.Add(UCase(GetLastDateUsed(oleReader(0)).ToString))
        list2.ShowItemToolTips = True

    End While
    Myconn.Close()
End Sub
Sub PopulateProgramme()

    Dim MySQL As String = "Select * FROM Programme"
    Dim Myconn = New SqlConnection(utility.connectionString)
    Dim cmd As New SqlCommand(MySQL, Myconn)

    Myconn.Open()
    cmd.CommandType = CommandType.Text
    oleReader =
cmd.ExecuteReader(System.Data.CommandBehavior.CloseConnection)
    cboName.Items.Clear()
    cboName.Items.Insert(0, "")

```



```

While oleReader.Read
    cboName.Items.Add(New DataInfo(oleReader(1), oleReader(0)))
End While
Myconn.Close()
End Sub
Public Function ExamNoValidator(ByVal str As String) As String


---


    Dim strName As String = ""
    Dim MySQL As String = "Select Exam_No FROM Examinations where Exam_No
= @NO"
    Dim Myconn = New SqlConnection(utility.connetionString)
    Dim cmd As New SqlCommand(MySQL, Myconn)

    Myconn.Open()

    cmd.Parameters.Add("@NO", SqlDbType.NVarChar)
    cmd.Parameters("@NO").Value = str
    cmd.CommandType = CommandType.Text
    oleReader =
cmd.ExecuteReader(System.Data.CommandBehavior.CloseConnection)
    While oleReader.Read
        strName = oleReader(0)
    End While
    Myconn.Close()
    Return strName
End Function


---


Sub ExamQuestionsAdd(ByVal str As String)
    Dim I As Integer, qnNum As String
    For I = 0 To lst.SelectedItems.Count - 1
        MsgBox(lst.SelectedItems(I).Text & " " & str)
        qnNum = lst.SelectedItems(I).Text
        Call ExamQnsAdd(str, qnNum)
    Next
End Sub


---


Public Function QnsSelectedValidator() As String
    Dim strName As String = ""
    Dim I As Integer
    For I = 0 To lst.SelectedItems.Count - 1
        MsgBox(lst.SelectedItems(I).Text & " " & str)

        strName = lst.SelectedItems(I).Text
    Next
    Return strName
End Function


---


Private Sub ExamAdd(ByVal Exam_Year As String, ByVal Program_No As
Integer, ByVal Course_No As Integer, ByVal Levels As Integer)
    Dim MySQL As String = "INSERT INTO Examinations(Exam_Year,
Program_No, Course_No, Study_Level) VALUES (@pa1, @pa2, @pa3, @pa4)"
    Dim MyConn = New SqlConnection(utility.connetionString)
    Dim cmd As New SqlCommand(MySQL, MyConn)
    Try
        MyConn.Open()
        cmd.Parameters.AddWithValue("@pa1", Exam_Year)
        cmd.Parameters.AddWithValue("@pa2", Program_No)
        cmd.Parameters.AddWithValue("@pa3", Course_No)
        cmd.Parameters.AddWithValue("@pa4", Levels)

```

```

        cmd.CommandType = CommandType.Text
        cmd.ExecuteNonQuery()
        MyConn.Close()
    Catch ex As Exception
        Exit Sub
    End Try
    Exit Sub
End Sub

```

```

Private Sub ExamQnsAdd(ByVal Exam_No As String, ByVal Qn_No As String)
    Dim MySQL As String = "INSERT INTO EXAMQUESTIONS(Exam_No, Qn_No)
VALUES (@pa1, @pa2)"
    Dim MyConn = New SqlConnection(utility.connetionString)
    Dim cmd As New SqlCommand(MySQL, MyConn)
    Try
        MyConn.Open()
        'cmd.Parameters.AddWithValue("@pa1", Exam_Qn_No)
        cmd.Parameters.AddWithValue("@pa1", Exam_No)
        cmd.Parameters.AddWithValue("@pa2", Qn_No)
        cmd.CommandType = CommandType.Text
        cmd.ExecuteNonQuery()
        MyConn.Close()
    Catch ex As Exception
        Exit Sub
    End Try
    Exit Sub
End Sub

```

```

'EXAMINATION ADD END
'GET FREQUENCY
Public Function GetQnFrequency(ByVal qn As Integer) As Integer
    Dim qnCount As Integer = 0
    'Dim MySQL As String = "Select Course_Name FROM Courses where
Course_Name Like @Num "
    Dim MySQL As String = "Select Count (Exam_No) As NUMS FROM
ExamQuestions WHERE Qn_No = @Num" ' GROUP BY QN_No"
    Dim Myconn = New SqlConnection(utility.connetionString)
    Dim cmd As New SqlCommand(MySQL, Myconn)
    Myconn.Open()
    cmd.Parameters.Add("@Num", SqlDbType.NVarChar)
    cmd.Parameters("@Num").Value = qn
    cmd.CommandType = CommandType.Text
    oleReader_data =
cmd.ExecuteReader(System.Data.CommandBehavior.CloseConnection)
    While oleReader_data.Read
        qnCount = oleReader_data(0)
        'MsgBox("TEST : Count IS: " & qnCount)
    End While
    Myconn.Close()
    Return qnCount
End Function

```

```

Public Function GetQnDifficulty(ByVal qn As Integer) As String
    Dim qnLevel As String = ""
    'Dim MySQL As String = "Select Course_Name FROM Courses where
Course_Name Like @Num "
    Dim MySQL As String = "Select Level_Name FROM DIFFICULTY_LEVEL where
Level_No = @Num" ' GROUP BY QN_No"

```

```

Dim Myconn = New SqlConnection(utility.connetionString)
Dim cmd As New SqlCommand(MySQL, Myconn)
Myconn.Open()
cmd.Parameters.Add("@Num", SqlDbType.NVarChar)
cmd.Parameters("@Num").Value = qn
cmd.CommandType = CommandType.Text
oleReader_data =
cmd.ExecuteReader(System.Data.CommandBehavior.CloseConnection)
While oleReader_data.Read
    qnLevel = oleReader_data(0)
    'MsgBox("TEST : Count IS: " & qnCount)
End While
Myconn.Close()
Return qnLevel
End Function

```

```

Public Function GetTopic(ByVal qn As Integer) As String
Dim qnLevel As String = ""
Dim MySQL As String = "Select Topic_Name FROM Topics where Topic_No
= @Num" ' GROUP BY QN_No"
Dim Myconn = New SqlConnection(utility.connetionString)
Dim cmd As New SqlCommand(MySQL, Myconn)
Myconn.Open()
cmd.Parameters.Add("@Num", SqlDbType.NVarChar)
cmd.Parameters("@Num").Value = qn
cmd.CommandType = CommandType.Text
oleReader_data =
cmd.ExecuteReader(System.Data.CommandBehavior.CloseConnection)
While oleReader_data.Read
    qnLevel = oleReader_data(0)
    'MsgBox("TEST : Count IS: " & qnCount)
End While
Myconn.Close()
Return qnLevel
End Function

```

```

'LAST DATE USED
Public Function GetLastDateUsed(ByVal qn As Integer) As String
Dim qnLevel As String = "N/A"
Dim MySQL As String = "Select Date_Used FROM EXAMINATIONS where
Exam_No in (SELECT Top 1 Exam_No from ExamQuestions Where Qn_No = @Num)"

Dim Myconn = New SqlConnection(utility.connetionString)
Dim cmd As New SqlCommand(MySQL, Myconn)
Myconn.Open()
cmd.Parameters.Add("@Num", SqlDbType.NVarChar)
cmd.Parameters("@Num").Value = qn
cmd.CommandType = CommandType.Text
oleReader_data =
cmd.ExecuteReader(System.Data.CommandBehavior.CloseConnection)
While oleReader_data.Read
    qnLevel = oleReader_data(0).ToString
    'MsgBox("TEST : Count IS: " & qnCount)
End While
Myconn.Close()
Return qnLevel
End Function

```

```
Private Sub Button1_Click(ByVal sender As System.Object, ByVal e As
System.EventArgs) Handles Button1.Click
    Dim I As Integer
    For I = 0 To lst.SelectedItems.Count - 1
        MsgBox(lst.SelectedItems(I).Text)
    Next
End Sub
End Class
```

Appendix G: User manual

1. Launching the application

Locate file named EXAMINATIONS

C:\KENGA\EXAMINATIONS\EXAMINATIONS\obj\Debug
as follows

- Open drive C
- Open folder named KENGA
- Locate and open EXAMINATIONS
- Locate and open a folder named EXAMINATIONS
- Open folder named obj then click to open Debug folder
- Double click the icon named EXAMINATIONS. See figure 29.
- A splash screen appears to indicate that the program is loading

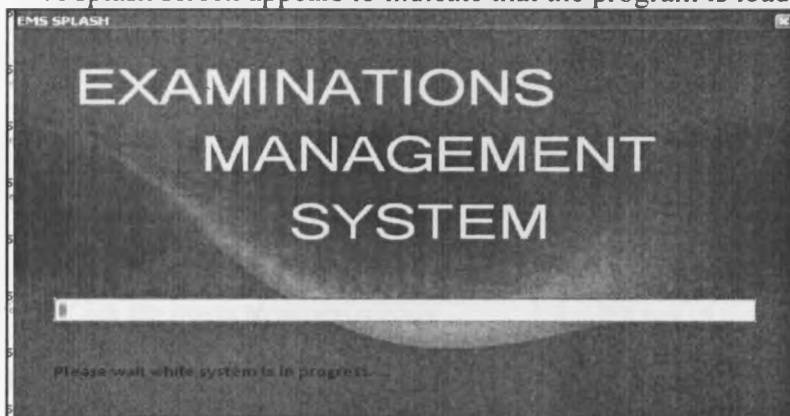


Figure 31: splash screen

- A login screen appears

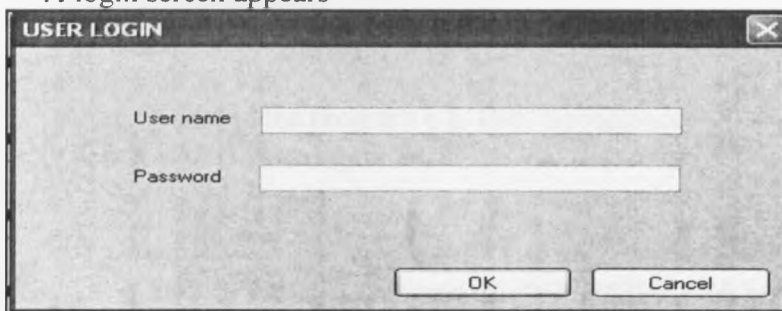


Figure 32: Launching the program

- The examiner logs in using the correct user name and password

2. Using the system.

- After a successful log in, the following interface display. See figure 33.
- You can click on the tabs: programme, course, topic, difficulty level, keyword, question, examinations and report.

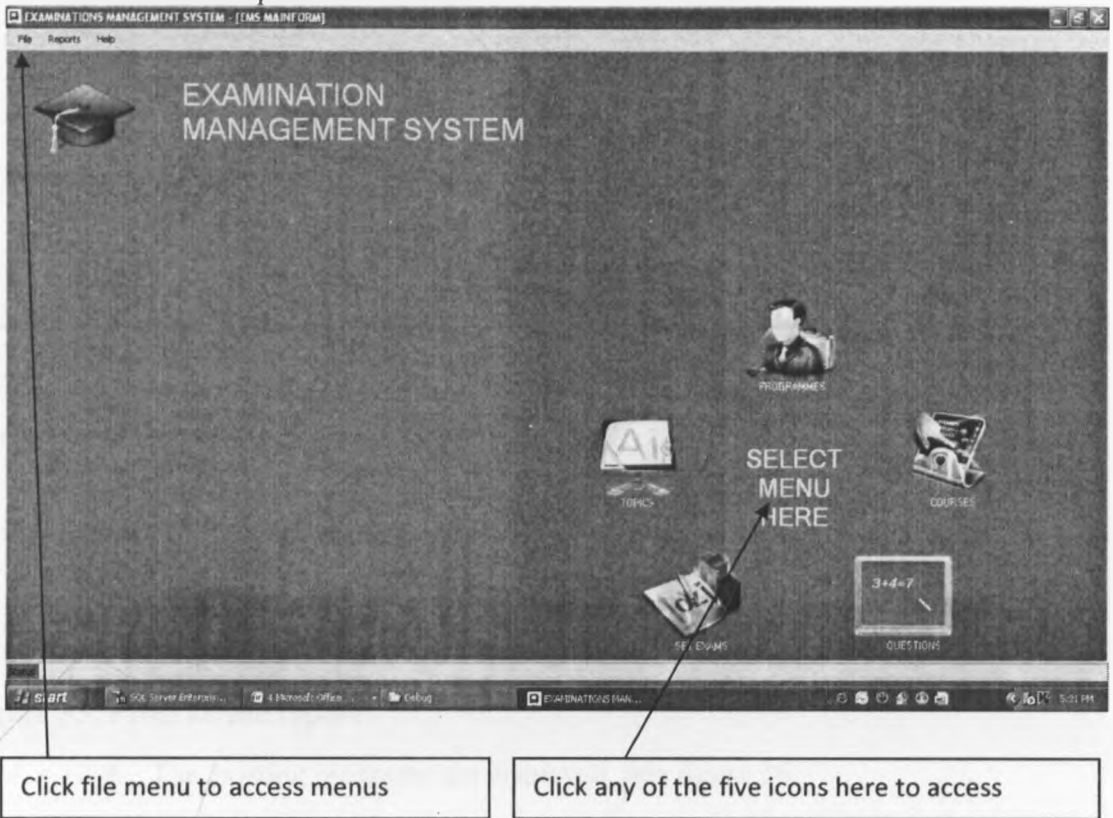


Figure 33: User interface

3. Updating program details.

- When the application is running, click **PROGRAMME** menu.
- Click **NEW** tab
- Enter name of the program e.g. Bsc. Geoscience
- Click **SAVE**. See figure 34.

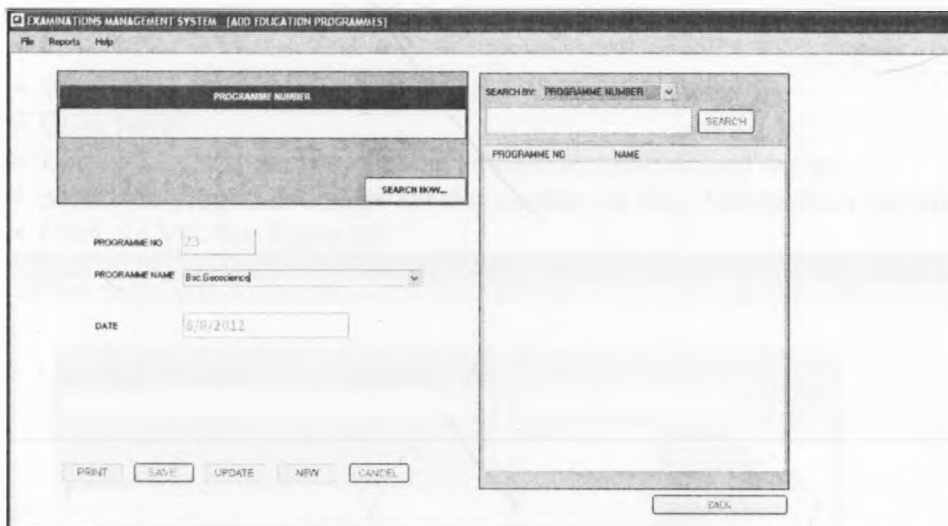


Figure 34: Creating new programme

NB: If the programme already exists, the program returns an error

4. Producing report for existing programmes

Procedure;

- When the program is running , click **REPORT** menu
- Click All Programmes .

Figure 35: Programme report

- The existing programs are displayed. See figure 36.

Programme No	Programme Name
1	Bsc information Systems
2	Bsc Information science
3	Bsc Information technology
4	Bsc Computer science
5	Bsc Statistics
6	Bsc Bioinformatics
7	Bsc Science
8	Bsc Nursing
9	Bsc Medicine
10	Bsc Health sciences
11	Bsc Geographic Information system
12	Bsc Surgery
13	Bsc Botany
14	Bsc Horticulture
15	Bsc Architecture
16	Bsc Mechanical engineering
17	Bsc Civil engineering

Figure 36: Programme report

5. Updating course details.

- When the application is running, click **COURSE** menu
- Click **NEW**
- Enter the course name e.g. Object Oriented Analysis and design
- Select the programme name for that course e.g. Bsc. Information technology
- Click **SAVE**. See figure 36.

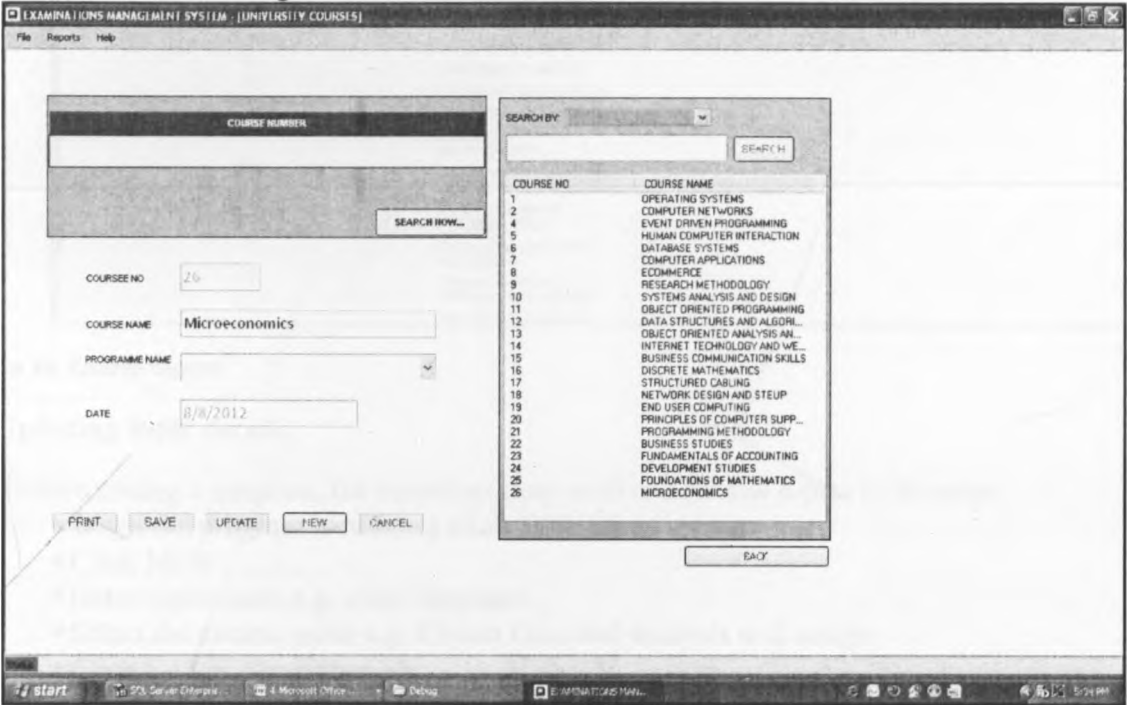


Figure 37: Courses dialog

- In the dialog that appears, click ok to confirm .See figure 36.
- NB: The application does not allow course name to be duplicated

6. Producing report of existing courses

Using the system one can print out existing courses

Procedure

- When the application is running, click the **REPORT** menu
- In the drop menu click All courses. See figure 37


 University of Nairobi EXAMINATIONS MANAGEMENT SYSTEM University Programmes Report	
	8/8/2012
<u>Course No</u>	<u>Course Name</u>
2	Operating systems
4	Computer networks
5	Event driven programming
6	Human computer interaction
7	Database systems
8	Computer applications
9	Ecommerce
10	Research methodology
11	Systems analysis and design
12	Object Oriented Programming
13	Data structures and algorithms
14	Object oriented analysis and design
	Internet technology

Figure 38: Course report

7. Updating topic details

Before setting a question, the examiner may wish to add new topics to be tested

- When the program is running click TOPICS Menu
- Click NEW
- Enter topic name e.g. class diagrams
- Select the course name e.g. Object Oriented analysis and design
- Click SAVE. See figure 38

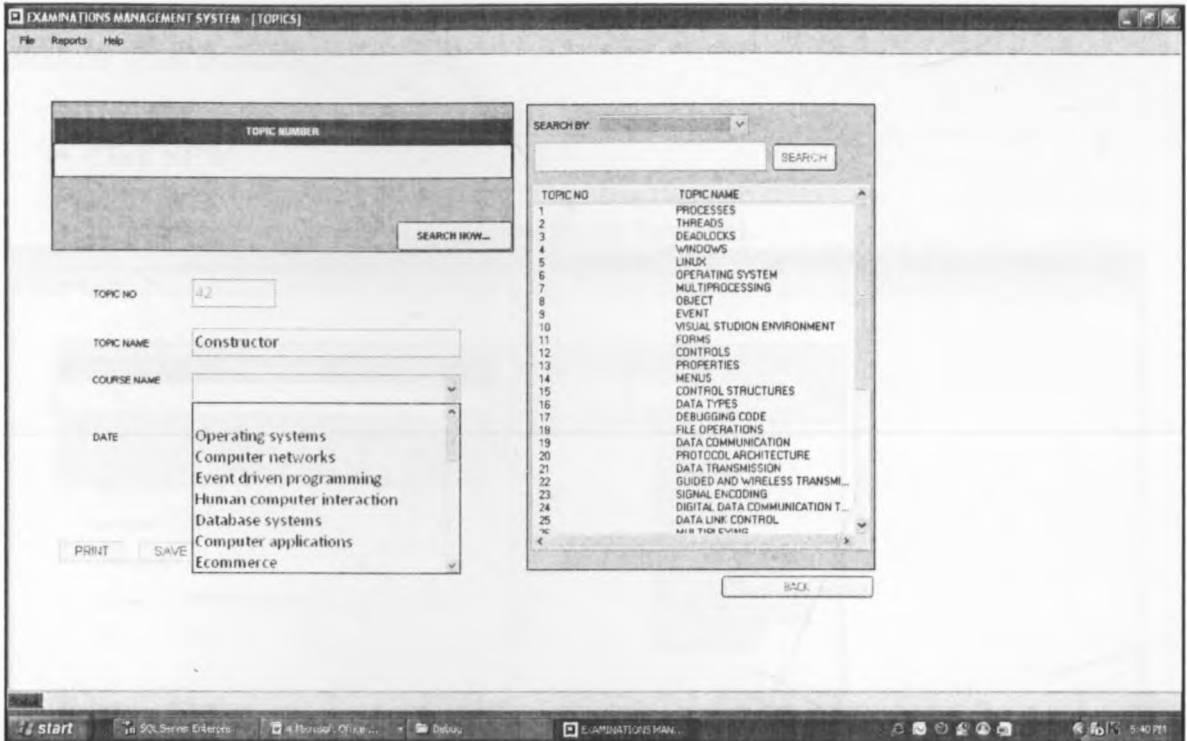


Figure 39: Creating topics

8. Producing difficulty level report

To print difficulty level report

- When the program is running, click **REPORT** menu
- Click Difficulty levels. See figure 45.

University of Nairobi	
EXAMINATIONS MANAGEMENT SYSTEM	
University Programmes Report	
8/8/2012	
<u>Level No</u>	<u>Level Name</u>
1	Knowledge
2	Comprehension
3	Application
4	Analysis
5	Synthesis
6	Evaluation

Figure 40: difficulty level report

When setting a question one may choose to include a keyword, these keywords are important for students when answering questions

- When the program is running, click **KEYWORD** menu
- Click **NEW**
- Enter keyword name e.g. elements of a class diagram
- Select the topic number associated with the keyword.

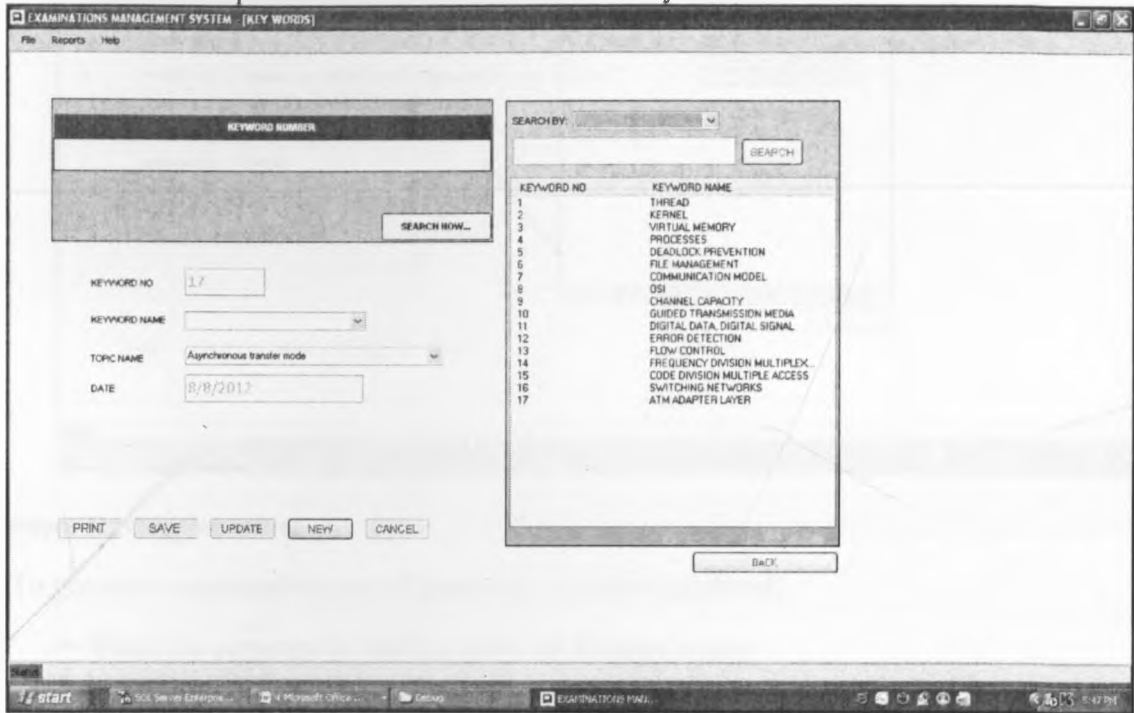


Figure 41: Creating keywords:

9. Setting the question

When typing a new question;

- The examiner may wish to set a new question
- When the program is running, click **QUESTION** menu
- In the dialog that appear, click **NEW**
- In the question detail, type the question details e.g. “state and explain any three elements of a class diagram as used in object oriented analysis and design”.
- Select the topic
- Select difficulty level associated with the keyword

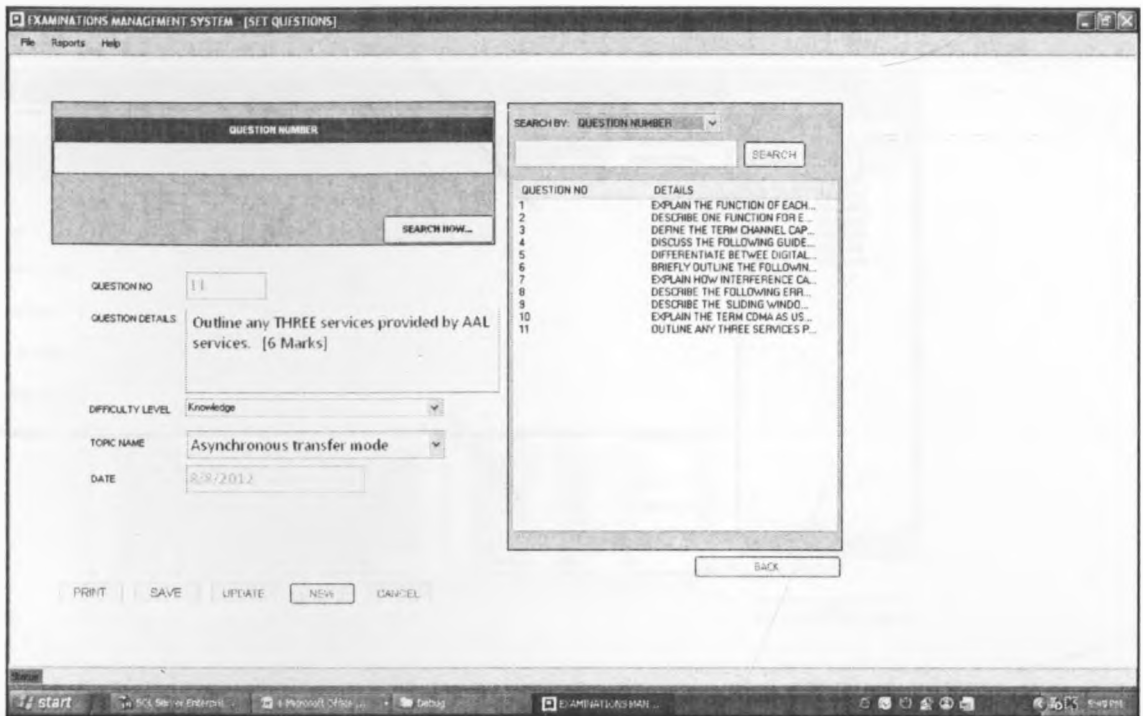


Figure 42: Question setting

To generate examination (set of questions to be administered)

- When the program is running click **set Exams** menu
- In the dialog that appear do
- Select programme name e.g. Bsc. information technology
- In the course name , you must select the course name e.g. Object oriented analysis and design
- Enter level of study e.g . 4th.Year
- Enter academic year e.g. 2000/2001
- In the question preview window: press CTRL key as you click questions to be in the exam.

NB: Before selecting the questions, make sure you observe how many times it has been used before (FQ), Its difficulty level, topic, and last time it was used. This information helps the user to select the right question(s) for the test.

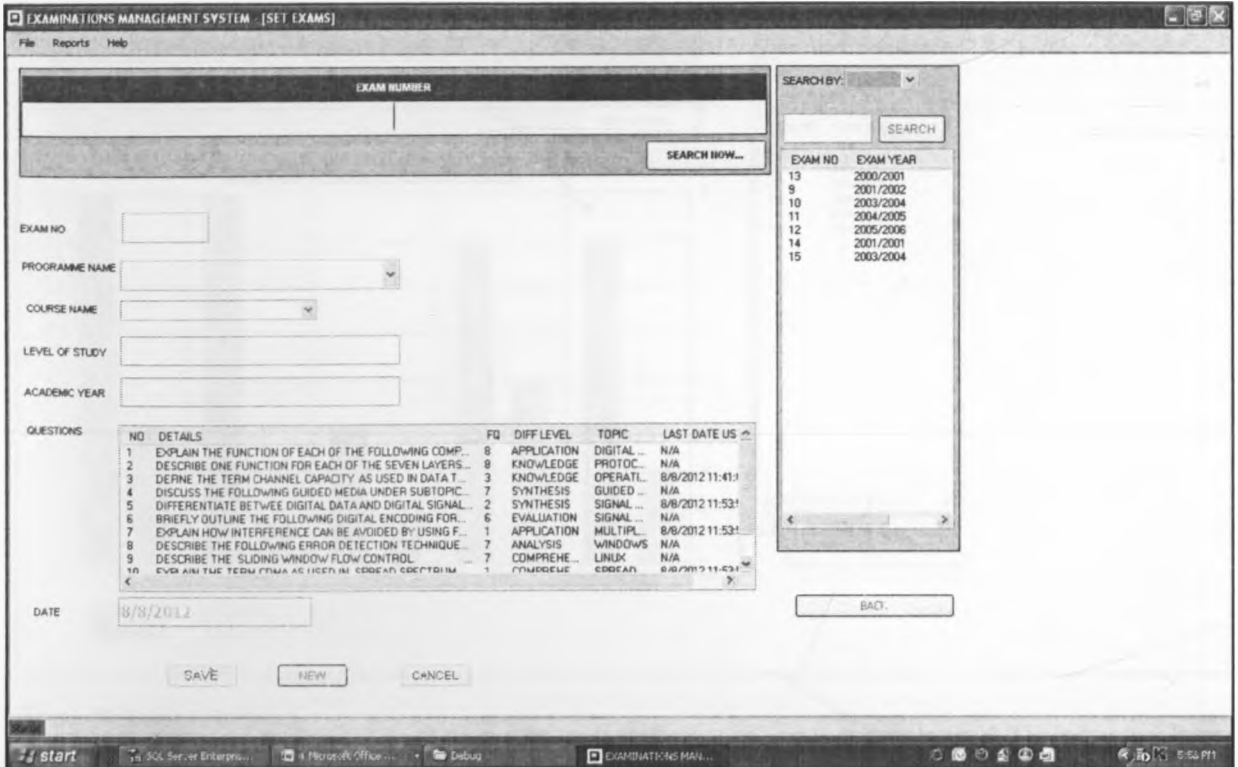


Figure 43: Setting examination

NB: The examination created can be printed or store in the database for future use. See figure 43

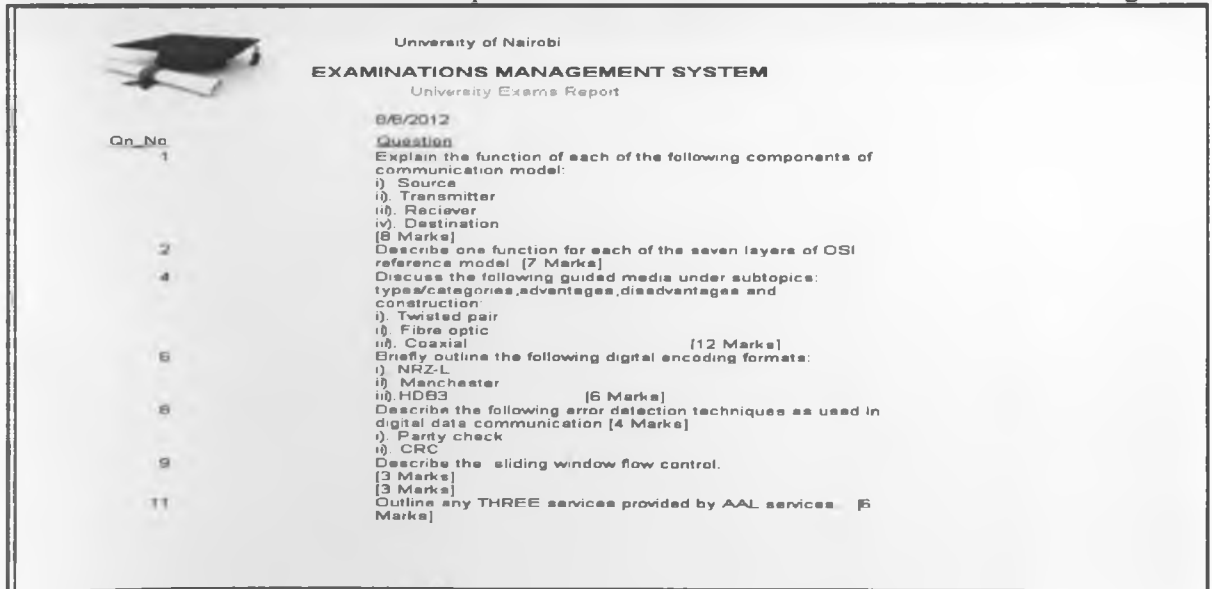


Figure 44: Examination

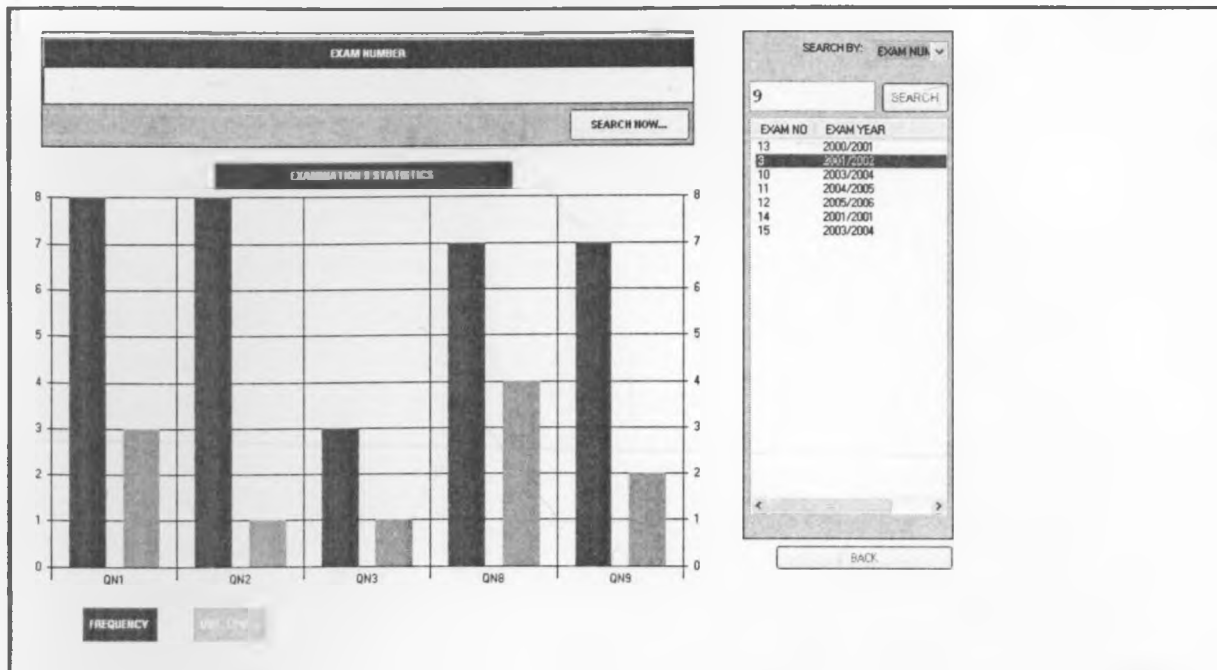


Figure 45: Exams statistics

Remark: Often the draft examination will be send to external examiner. The examiner may need a statistical chart that indicates the questions examined, difficulty levels (1-6) tested and how many times each question has been used. To see the statistical summary for each exam, click report menu. Then click exams statistics. Double click the exam year (see figure 44).