AN OPTIMIZED SECURE E-CENSUS SYSTEM FOR UNIVERSITY ALUMNI

CASE STUDY: KAMPALA INTERNATIONAL UNIVERSITY

BY

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A GRADUATION RESEARCH REPORT SUBMITTED TO THE SCHOOL OF COMPUTER STUDIES IN PARTIAL FULFILMENT FOR THE AWARD OF A BACHELORS DEGREE IN INFROMATION SYSTEMS MANAGEMENT OF KAMPALA INTERNATIONAL UNIVERSITY

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DECLARATION

I, *Khevali Lydia, BIS/20004/82/DU* do declare that this is my original work and has not been presented by a degree in any other university.

Signature: .....

Date :.....22/11/2011.....

KHEVALI LYDIA

APPROVAL

This is to certify that this research proposal entitled was conducted under my supervision and guidance and is now ready to be submitted to the School of Computer Studies for examination with my approval as the University Supervisor.

Signature :.....

Date : 22/11/14

DR. MIKE CONRAD MUBARAKA

DEDICATION

I dedicate this work to the Almighty God for giving me the strength, courage and health to be able to complete my studies successfully.

A special dedication to my friends; Mr. Ng'ang'a Ngige Josiah, Mrs. Kansiime M. Grace, Carol Ajambo and Mr. Lemayian Mbugua among others for their support in each and every way. Thank you and may God bless you.

Finally but not least, to my aunt Phena Shimaka, thank you, may God bless you and to my dear sister Rose Shimaka and cousin Ruth Shimaka, thank you for your love and prayer. I can always count on you.

ACKNOWLEDGEMENT

I acknowledge my family for giving me the opportunity to study and also the support they granted me. All my friends and colleagues, thanks for your support in every way.

I salute the institution for allowing me to undertake my course from here, plus the resources they offered me to uplift my career.

I appreciate my supervisor, *Dr. Mike Conrad Mubaraka* for all the guidance and support throughout my research.

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ACRONYMS AND ABBREVIATIONS

AI..... Artificial Intelligence
CMC ..... Computer-Mediated Communication
SNS ..... Social Network Sites
GUI ..... Graphical User Interface
DBMS ..... Database Management Systems
JAD ..... Joint Application Design
GHz ..... Giga Hertz
RAM ..... Random Access Memory
QoS ..... Quality of Service
TCP/IP..... Transmission Control Protocol/Internet Protocol
KU ..... Kenyatta University
DBMS ..... Database Management System

This is for my dear Papa and Mama, Mama Rest in eternal peace, thanks for your inspiration.

CHAPTER ONE

INTRODUCTION

1.0 Background of the study

Alumni are former students of a college or university which is an institution of higher learning. In essence, it is after university that these alumni are required to face life after school. Whatever happens to these alumni should therefore be of concern to their former universities. Traditionally, universities have been considered to be primarily part of an educational system (Barblan, A., *et al.*, 1987). Their role has been, over the centuries, to transmit the knowledge from the teachers to the students. However, in the 19th century, Humboldt developed in Germany a new paradigm of university, where not only teaching, but also research, was performed. The view point of the institution itself in terms of the single university is preferred. Recognizing the individuality of each institution leads to differentiation between universities. This differentiation should be promoted stressing the individuality of each institution allowing for the respect of the identity and history of each university and its ambition and ability to achieve academic excellence. The way by which the differences between universities should be revealed, we argue, is through the results of the activities that are performed at the universities.

Intense competition is expected in the electronic information networking arena over the next couple of years. As the competition increases, it is essential for institutions to position themselves appropriately to take advantage of their core institutions and to prepare for the emerging electronic communication environment. In this competitive environment, mergers, alliances and the onslaught of new entrants into the market have institutions struggling to find innovative ways to retain the most lucrative academicians. Today's universities are striving to differentiate themselves within these expanding competitive landscape by searching for ways to brand and strategically position themselves in relation to their competition. Thus many universities are looking for means to plan for the most lucrative strategies in the academic field.

This study aims to analyze background leading up to e-census for alumni and benefits derived from the interactive collaboration of alumni and therefore the resulting impacts to the academic arena with the goal to observe what technical, regulatory and social recommendations can be derived to ensure that academic institutions continue to play a constructive role in wealth creation and moral value in society.

The truth is that there have always been social conflicts irrespective of the chronological age of the concepts involved. It was therefore the view of this research project that what constitutes traditional census and collaboration systems was not necessarily a matter of age, civilization or

technology, conflicting with change but rather a system which could be viewed within an e-census continuum of the type suggested by Ray Browne and reported by Michael Rael (1977). Browne refers to this continuum as the Cultural Lens' where culture is viewed from a focal perspective.

Social network sites are defined as web-based services that allow individuals to (1) construct a public or semi-public profile within a bounded system (2) articulate a list of other users with whom they share a connection, and (3) view and traverse their list of connections and those made by others within the system. I chose not to employ the term "networking" for two reasons: emphasis and scope. Networking emphasizes relationship initiation, often between strangers. While networking is possible on these sites, it is not the primary practice on many of them, nor is it what differentiates them from other forms of computer-mediated communication (CMC). The social network sites allow individuals to meet strangers, but rather that they enable users to articulate and make visible their social networks. This can result in connections between individuals that would not otherwise be made, but that is often not the goal, and these meetings are frequently between latent ties (Haythornthwaite, 2005) who share some offline connection. On many of the large SNSs, participants are not necessarily "networking" or looking to meet new people; instead, they are primarily communicating with people who are already a part of their extended social network. To emphasize this articulated social network as a critical organizing feature of these sites, they are labeled "social network sites."

As educators and their institutions ponder the effect of technology on their ability to teach the generations, they must also examine how technology changes the ways in which they interact with other constituents, including alumni. In late 2002, World Learning, including The Experiment in International Living, the School for International Training (SIT), and the Study Abroad, found such a state. The organization, which provides study abroad opportunities for high school and college students and offers masters degrees at its campus in Vermont, has thousands of alumni engaged in international, intercultural, and social justice work in nearly every country in the world, but had little contact with this pool of alumni. As a result, World Learning was missing out on two fronts: the opportunity to advance the institution by encouraging alumni to support its efforts financially and to act as advocates for World Learning, and the opportunity to further the organization's mission of increasing intercultural understanding by connecting its diverse alumni with one another. It was crucial to find a way to connect with alumni and to connect alumni with each other.

Young, globally dispersed, and highly mobile. Since they live in nearly every country on the globe and move frequently, they are nearly impossible to reach in conventional ways. Alumni staff may have parents' mailing addresses, but rarely have current addresses or phone numbers

for the students themselves. Keeping up with former students once they have been out of a World Learning program for more than one year is nearly impossible.

1.1 Background

Kampala International University is a liberal Arts and Sciences University located in central Kampala, Uganda, East Africa. It is among the largest universities in Uganda with several campuses outside Kampala and parts of East Africa. KIU being an international institution admits foreign students from various nationalities. Therefore, this implies that KIU has a large number of alumni which is sometimes unaccounted for. It is necessary to put in place a system through which the alumni census can be tallied.

Their top mission-critical indicators provide a good example of the balanced and strategically focused perspective of the performance framework. In a preamble focus to their performance indicators KIU notes: Mission-oriented thinking requires objectivity: an honest assessment of how an institution is doing, where it is heading, and its alignment with its mission. All these can be achieved through an alumni system which allow for interactive collaboration and therefore e-census.

1.2 Statement of the problem

Universities play a big role in training and mentoring candidates into resourceful persons in future. However the universities fail to keep track of their alumni after university. Many if not all universities today have failed to evaluate their performance on the job market due to lack of clear record track of alumni. The constant balance between performance, cost, reliability, security and scalability would always be an issue to all IT managers. Therefore, basing on Kampala International University tradition record system, this problem would be minimized if they seek to find how their products; alumni are fairing on in the world after university by providing for a window to interact with them. In the process, they would able to tally the alumni census and come up with accurate figures useful for decision making. Operational and management based on restrictive systems with limited interruptible system running over the internet that serves as a medium for all services and also with characteristics such as, service transparency, service availability and service quality.

1.3 General objective

The objective of the study was to enhance the alumni system by employing the new e-census functionality that would allow for interactivity, collaboration and running over the internet.

Specific Objectives

They were as follows:

1) To assess the current alumni record system and service delivery of KIU.
2) To identify requirements leading to the design of the proposed system.
3) To design and develop the proposed system.

1.4 Scope of the Study

The scope of this study was divided into three aspects namely; time scope, geographical scope and content scope. The project was done within a period of three months as required by the School of Computer Studies. During this period the proposal was submitted. The final report was also ready. The study majorly focused on KIU main campus located in Kampala along Ggabba road. The research was restricted to enhance the current alumni record system and service delivery by employing the new technology of e-census functionality that now allows for online-based interactivity and collaboration for KIU alumni.

1.5 Significance of the study

The study has transformed record system service of universities into experts by enabling them to deliver the connected life. Those expert universities are adding new revenue opportunities with a reduced time to market by delivering new and differentiated voice, video, data and mobility services.

This study has delivered an importance to the ever- increasing expectations of institutions, alumni and investors. Alumni are no longer willing to accept limits on types of interaction and collaboration services. Empowered alumni are defining what they want from the internet and when, how and where they will access it. On the other hand, enlightened institutions are working towards keeping up the pace of ever growing technology and knowledge expansion.

It can now be a reference point. Those who are interested in using this type of e-census interactive and collaboration technology can use this research as reference device to their work.

CHAPTER TWO

LITERATURE REVIEW

2.0 Background

A message management computer system includes a memory for storing a current alumni list based on the requirements of alumni information needs. An electronic invasion of information recipe, including newly-joining alumni list for existing alumni, is sent from the client stations to the server computer where it is used to update the current newly-joining alumni list by addition of new alumni joining the site.

As recognition grows, that outreach and engagement are significant aspects of a university's responsibility. Universities must now document their overall performance and that of academic units and faculty in outreach efforts. Such documentation would be useful in many ways. Social network sites (SNSs) are increasingly attracting the attention of academic and industry researchers intrigued by their affordances and reach. This special theme section of the *Journal of Computer-Mediated Communication* brings together scholarship on these emergent phenomena. Time in memorial, learning institutions all over the world has put in place interaction systems for alumni.

This chapter focused on the various types of websites designed by other programmers. It helped in identifying some other good dynamic website that helped in designing the new alumni system. Alumni e-census system is now an integrated package of software and hardware that is used for alumni and university operations and activities. Review of related literature on the question under study was in this chapter. The problem under study was to enhance the alumni system by employing the new e-census functionality that now allow for interactivity, collaboration and online communication including messaging and email services.

2.1 Ideas and Opinions of Experts

Ways Universities are Using Social Media to Engage Alumni-Document Transcript How to Engage Alumni Using Social Media Alumni Development Board, Crummer Graduate School of Business Universities use social media tools to engage alumni and build a network of graduates with a shared affinity for the institution. Former students staying connected why universities are turning to social media; fundraising is another etc. In an alumni communication study, college & graduate school alumni were asked how they preferred to be communicated

with. 83% of alumni responded that they would prefer to be contacted about general alumni matters via interactive methods such as email, social networks, and alumni web sites & blogs.

Below is a detailed look at how higher education is harnessing the power of social media to engage alumni. (i) Helping Alumni Find Jobs. Though a lot of schools offer their own database of jobs online, many universities are finding LinkedIn to be an effective tool to provide alumni with career resources. Using LinkedIn means the process is often very hands-off for the schools. In many cases universities create the group and allow the networking magic to take place, with alumni sharing job opportunities by posting information to the group and creating subgroups that are focused to specific career or regional alumni chapters. Keidra Chaney, an emerging media specialist at DePaul University said LinkedIn is by far the school's biggest success with 5,500 members currently in their alumni network on the site, and about 100 new members joining weekly. Chaney said the community has active job postings for alumni on the hunt for work, and that most jobs are posted by other alumni. Michigan State University uses both LinkedIn and Twitter to share job leads with alumni, said Dave Isbell, alumni career services coordinator at the school. Isbell said recruiters often contact him with quick advice or job information that he shares with his followers. The school's Career Resources Network also uses YouTube to give students and recently graduated alumni advice on their job search. Schools like Emory University meanwhile, host a "Coach Chat," where alumni can phone in and share ideas, tools and career resources. Alumni can also e-mail in questions and those that miss out on a chat can download it as a podcast.

(ii) Collaboration and connecting with students universities are using social media to smooth the transition from being a student to becoming an alumnus by helping the two groups connect and collaborate with each other. Stanford University law school created its own Facebook-like social network for alumni and students that includes legal wikis that they can collaborate on for specific practices, said Lisa Farris, associate director of web communications and identity at the Stanford law school. The wikis include overviews of different practices, key skill sets and more information that students and alumnus can share together. Though there is a lot of alumni-to-alumni conversation that takes place on the network, the collaboration between students and alumni is key in positioning the students for their careers, Farris said. M.I.T. alumni has had similar results with its LinkedIn alumni group, which it allows students to join before they graduate so that they can network with alumni, said Christine Tempesta, director of strategic initiatives at M.I.T. Caltech alumni offers its students similar access to its LinkedIn group. Instead of sending out generic mass e-mails, the challenge is moving to personal, one-to-one forms of communication to make it more effective. Shaindlin thinks that social media can achieve that, but alumni who are the recipients of the message have to be ready to accept it through such a new medium.

iii) Alumni-Generated Content as a way of interactive communication is a way through which schools are engaging alumni. They are allowed to produce their own content, including things like the wikis at Stanford and photo sharing with the alumni network at other schools. The University of Texas at Austin built its own photo sharing site that allows alumni to share their photos thus the school's gesture, along with a brief bio. The idea is to allow people to get reconnected to the school and their fellow classmates by sharing where they are now and what they are doing. Oregon State University uses Flickr and encourages alumni to post photos of a cutout of Benny, the school's mascot, taken in various locales. Colgate University uploads photos to its Flickr account and lets people interact with them, including this set from an alumni reunion.

Kenyatta University

Kenyatta University has deemed it important to pay tribute to one of her most important stake holders; her alumni. As part of the Annual Alumni Reunion Day and KU Alumni Traditions, Kenyatta University through the KU Alumni Association, honors alumni and friends of KU who have made outstanding contributions towards humanity, community service, development in Kenya and the advancement of Kenyatta University and her programmes. Five categories of awards, two for each category have been proposed.

Since its inception as a university college in the early 1970's and its eventual acquisition of a full university status in 1985, Kenyatta University has developed an alumni base of over 60,000 professionals. Past attempts to bring together this huge human resource base in order to support the programs and activities of the institution have had mixed fortunes. However, with the appointment of Professor Mugenda (herself an alumnae of the University) two years ago, the alumni programs have been invigorated at the university.

Webaloo Design and Website Technologies

The Alumni Builder brings classmates together by providing one place where they can exchange information and ideas and stay connected with each other and with their university. Virtually all of the information can be added or updated by the alumni/ae through secure pages. The alumni satisfaction is completely guaranteed.

This is because of the following features: (i) Alumni Class Page is a directory of alumni names by graduation year with links to individual profiles and email addresses. (ii) Alumni Profile is controlled by individual users and displays only the information that he/she wants displayed. (iii) Alumni Search allows users to search by name, graduation year, occupation, address, etc. (iv) Alumni Forum offers alumni a way to stay in touch with classmates and friends from other graduation years (v) Alumni Notes allows classmates to communicate by posting on a notes page. (vi)Secure Login blocks sensitive alumni information from other campus constituents. (vii) Profile Change Reports allow university campuses to keep track of the personal information (address, phone, etc.) that alumni can update. This data is exportable to other programs. (viii)

Missing Alumni Page helps the university reconnect with graduates whose personal information is outdated.

Database

Database is an organized collection of data. The term originated within computer industry, but its meaning has been broadened by popular use, to the extent that the European database directive (which creates intellectual property right for database) includes non-electronic database within its definition. This article is confined to a more technical use of them though even amongst computing professional, some attach a much wider meaning to the word meaning to the database.

To be able to have an e-census alumni system, there must be a database which can keep track and display all information about the activities made hence the census of the alumni.

Williams Sawyer Hutchison, 2000, urges that a database is an organized collection of integrated files and *Kenneth Loudon, 2003,* also urges that it is a collection of data in an organization or institution to service many applications at the same time by storing and managing data so that they appear to be in one location. In this case, this will be the server hosting the alumni e-census system.

Therefore, alumni's information from the website will be stored in the database. Each alumnus will have his or her own functionality view, for example those signing up for new accounts will have their own view, those with updates, and those searching for existing friends will also have their own view.

(Gerald V Post, 2002) argued that every area of management uses database system for instance marketing professional uses it to analyze sales data, human resources managers use it to evaluate employees, operational managers use it to track and improve quality, accountants use it to integrate data across the enterprise, financial to analyze firm performance and school use it to improve services to students.

Hansen W Gary et al, 2000, defines a DBMS as a system software that facilities the management of a database. According to *Date C.S, 2001,* a DBMS is the software that handles all access to the database.

Database management systems (DBMS) like MySQL allows one to use a computer to create a database add, change, and delete data in a database, sort the data in the database, retrieve data in the database, and create forms and reports using the data in the database.

2.2 Benefits of using computerized system.

According to *acumens data system. Inc*, automation is one of the key features to realizing the return on investment. When alumni are availed with information they need relating to services offered by the e-census system, they can access it much faster and request whatever they need promptly. The following are some of these benefits:

Time saving. Computerized system provides information much quickly than manual system and it updates its data at any time to aid in management decision. In online registration system position is performed automatically by the computer and thus time saving *(B Susan, 1992).*

Security. Computers offer security that is important as a means of preventing misleading information and maintains adequate control *(Kalugayi, 1996).*

Filling and Retrieval Lacey, 1996, files are maintained on some type of disc storage and associated software. Files handling system permit rapid updating, amendments; cross referencing and retrieval of huge amount of data, computer backing systems are becoming physically cheaper and permit faster access.

CHAPTER THREE

METHODOLOGY

3.0 Introduction

Methodology refers to the methods or organizing principals underlying a particular art, science, or other area of study. It could also refer to the study of organizing principals and underlying rules. This chapter explains the step-by-step approaches that were used in developing the project and at the same time satisfying user requirements. The various research methods techniques were used, background reading where data was obtained from journals, internet, reports etc. another one was the questionnaire.

3.1 Research Design

The study used both quantitative and qualitative research methods. Under *Quantitative method,* a cross-sectional survey research approach was applied because the sample size was large and varied, and was also spread over a large area, which required some self report methods such as questionnaires. Basically, in this method, interview schedule and focus group discussions were applied. The other approach was the case study. This was used concurrently with the cross sectional survey. Because of limited time and resources, this method was most appropriate to use in particular cases to investigate the issue in question. Library research and review of documents pertaining to the issues under investigations (desk research) was done. This method was very necessary in order to analyze the existing literature on the variables in the study. It was the approach to be used in conducting focused group discussions. In this method, interview, observations and content analysis were used. *(Kenneth H and Margaret E,* 1990. *Standards for Qualitative (and Quantitative) Research: A Prolegomenon*

3.2 Study Area

The study mainly focused on Kampala International University which is located along Ggabba Road and with a population of up to 6,000 students and about 300 staff members. This study targeted the university staff and IT specialists totaling to 50 out of the population which is 100, the sample size was derived at by use of sampling technique that ensured that each university staff and IT specialist got a chance of participating in the study.

3.3 Sampling Technique

In this case, a combination of Simple Random Sampling and Panel Sampling was used. Whereby, in simple random sample-SRS of a given size, all the subsets of the frame were given an equal probability. Each element of the frame then had an equal probability of selection: the frame was not subdivided. Furthermore, any given pair of elements had the same chance of selection as any other such pair (similarly for triples e.t.c.). This minimized bias and simplified analysis of results. In particular, the variance between individual results within the sample was a good indicator of variance in the overall population, thus it was relatively easy to estimate the accuracy of results. While Panel sampling was the method of first selecting a group of participants through a random sampling method and then asking that group for the same information again several times over a period of time. Therefore, each participant was given the same survey or interview at two or more time points; each period of data collection was called a "wave". This longitudinal sampling-method allowed estimates of changes in the population.

3.3.1 Sample Size

The researcher collected information from the following sources at random;

a) *Marketing staff:* they connect the university with the outside world on a daily basis. In addition they also handle those alumni who come with different kinds of enquiries. They therefore provided requirement-related information for the system.

b) *IT head* : they provided assistance and advice on the technical requirements of the system to be successful.

c) *Students* : they provided related requirements for the system since they had an idea of what to expect after their graduation. Such information helped in the success of the proposed system.

d) *Alumni* : they provided necessary functional requirements for the proposed system to be put in place.

3.4 Research Instrument

The researcher used some tools to make the research proposal a success below is a breakdown of some of these tools that were used.

3.4.1 Data Collection Tools

The researcher employed several data collection techniques which included both qualitative and quantitative methods in order to come up with meaningful information.

Interviews

This technique involved the questioning of interviewees (users of the current system, potential users of the proposed system, and providers of data to the proposed system or those who will be affected by the system).

The researcher used formal interview method by arranging interviews with the marketing staff, IT heads, alumni and students. This method collected some of the main areas of concern.

Reason for interviews

Interviews provided rich information of the subject under study which equipped the researcher with reliable information regarding the proposed system. This information was well confirmed using other data collection methods. This technique gave reliable information as the researcher was directly involved in the study and easily observed and reactions from the interviewee.

Questionnaire

The researcher prepared pre-determined questions and issues them out to the marketing staff, IT heads, alumni and students. The questionnaires received back were analyzed and results recorded.

The questionnaire technique provided the researcher with a chance to randomly ask likely questions. It reduced doubts and confirmed facts about findings by other techniques on the same.

Reason for Questionnaires

Questionnaire helped the researcher get relatively correct information since it allowed for anonymity of the respondents. Therefore in the researcher's quest to confirm findings by other data collection methods, doubts were erased and even new information found.

Document review and analysis

The existing records and documents which related to the system being investigated often proved to be a useful starting point. Relevant documents were;

1. Graduation lists
2. Graduation booklets
3. Graduation publications and magazines

Here the researcher went through already existing documents and publications to get information regarding to the research topic.

Reason for document review and analysis

This provided the researcher with information on the kind of documents that involved parties exchange, their downfalls and other missing relevant information.

3.4.2 Design and Development Tools

Design tools

Table 1: The appropriate design tools used were as follows:

Design tool	**Use**
Class diagrams	To identify case scenarios interactions and interfaces
Data flow diagrams	To show the flow of data from one point to another
Entity Relationship Diagrams	To describe database entities
Architectural domains reference models	To determine business, software, technology, system and network architectures.

Development tools

Table 2: The following are the most appropriate development technologies

Appropriate technology	**Applicable Use**
Programming language eg PHP 5.0	A server side scripting language which provided database connectivity
Component Based Development Life cycle model	To identify new components that were created and components that were reused
Relational Database Management System e.g. MySQL server	A database tool that offered data storage
Text Editor e.g. Adobe Dreamweaver CS3	Was used to create, edit, manage and update created WebPages, site files and folders
Windows XP	Operating system to offered user interface and other software platform
Wired and wireless network	As a communication means amongst users
UTL Internet Service providers	Provided internet connection and domain hosting
Mozilla Firefox, internet explorer	Web browser used by users to send and retrieve information from the database through the internet

3.4.3 Procedure

Before the research
The researcher collected relevant information about the topic under study. Thus she: i) consulted relevant authorities at the university to seek permission for carrying out the research ii) assembled relevant tools necessary for the research iii) drew a plan of activities to be involved in carrying out the research.

During the research
The researcher; i) took notes on findings ii) compared findings from different fact collection methods iii) processed findings from the comparisons and made conclusions.

After the research

The researcher; i) put the findings into the development of the project ii) verified findings with the development of the project.

3.5Validity and Reliability

The validity and reliability of the collected information was determined in the following ways:
The validity of the information would be ascertained using the following means;

- *Peer debriefing* – the official questioning of peers after a questioning session after interviews.
- *Prolonged engagement* – considerations of personal experiences at the study area.
- *Negative case analysis* – analyzed the negative comments given about the existing system.
- *Conformability* – the reality of the case was confirmed physically from the study area.
- *Balance* – balanced the positive and negative comments from the data collected to strike a balance.

With regard to the researchers experience in the study area we can conclude that most of the data she collected from the sample population was reliable to make conclusive judgments for the development of the new system.

3.6 Ethical Considerations

The researcher had to adhere to the following ethical standards:
Security: this was paramount in all the stages of the study. First, the researcher had to provide security measures for the data being offered by correspondents during the proposal study which was used for the report.

Privacy: the researcher had to provide measures for protection of collected information against malicious modification.
Personal identity: since every individual has a right to identity, the researcher recognized everyone in every way.
Anonymity: the researcher allowed correspondents to provide information anonymously in order to give them confidence to give reliable information.

3.7 Limitations

These are the setbacks the researcher encountered when carrying out the research:

Reluctant correspondents: some of the sample population deliberately refused to provide necessary information important for the study of the problem at hand.
Lack of proper coordination from respondents: would have led to collection of inaccurate information from the sample population which would mislead the researcher.
Hostile correspondents: The researcher faced some unwelcoming people who were unwilling to offer information and react violently.

The following are the solutions that were undertaken to solve the limitations:
Reluctant correspondents: the researcher ignored the reluctant correspondents and only worked with those willing to provide information.
Lack of proper coordination from respondents: would have led to collection of inaccurate information from the sample population which would mislead the researcher. However, the researcher rectified this in time by use of phone communication like text messages.
Hostile correspondents: The researcher faced some unwelcoming people who were unwilling to offer information and react violently. However she remained calm and patient.

CHAPTER FOUR

SYSTEM DESIGN

4.0 Introduction

This section presents the requirements of the new system. The researcher evaluated the new system and looked at the real design and usage of the new system, the tools used to develop the system, processing and output the e-census system in terms of common man.

4.1 Business Process Model

This is concerned with the conversion of logical record structures of a data model supported by a database management system, identifying entities and their matching attributes and the relationship types determining the attributes domain.

Alumni Registration into the system

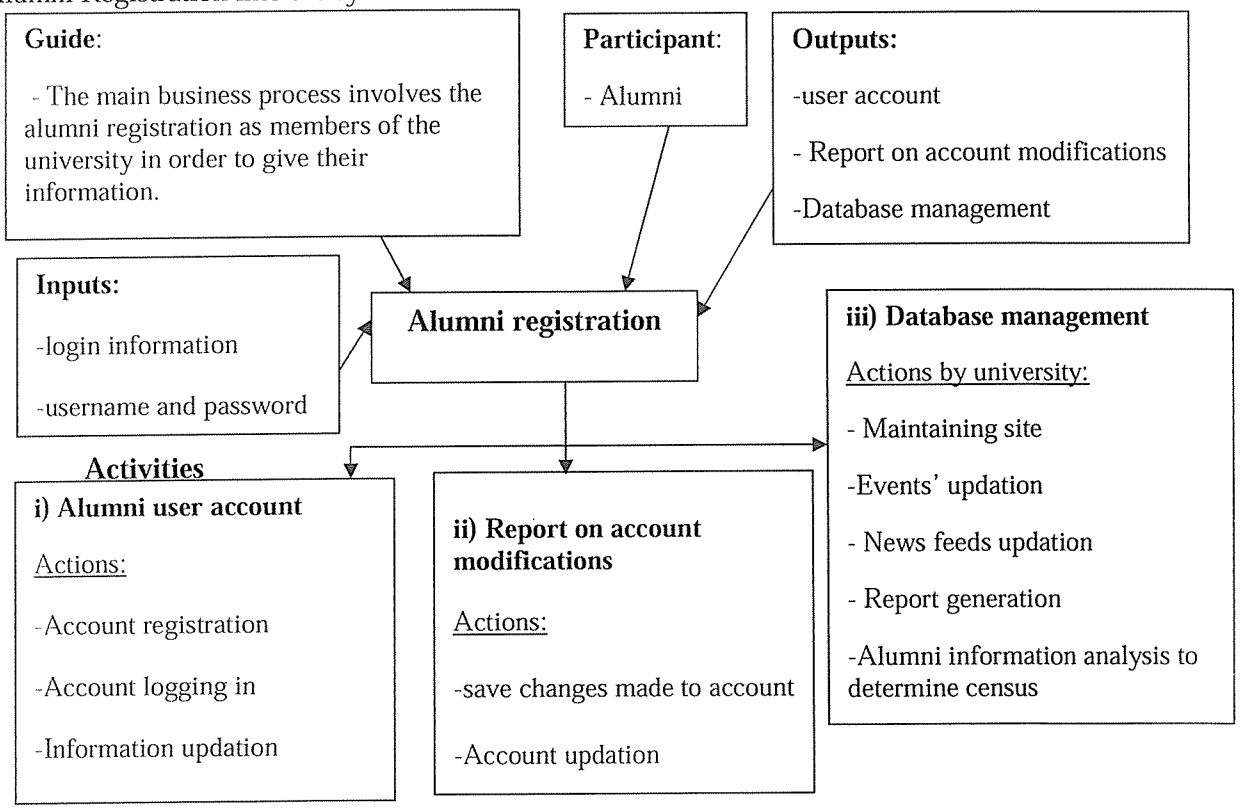

Figure 1: Alumni Registration Process

4.1.2 Business Process and its Triggers

Business processes represent the main activities that are automated by the new system. The following diagram shows how these activities behave after the actor initiates the triggers. The alumnus who is an actor initiates the whole process.

Main processes triggered

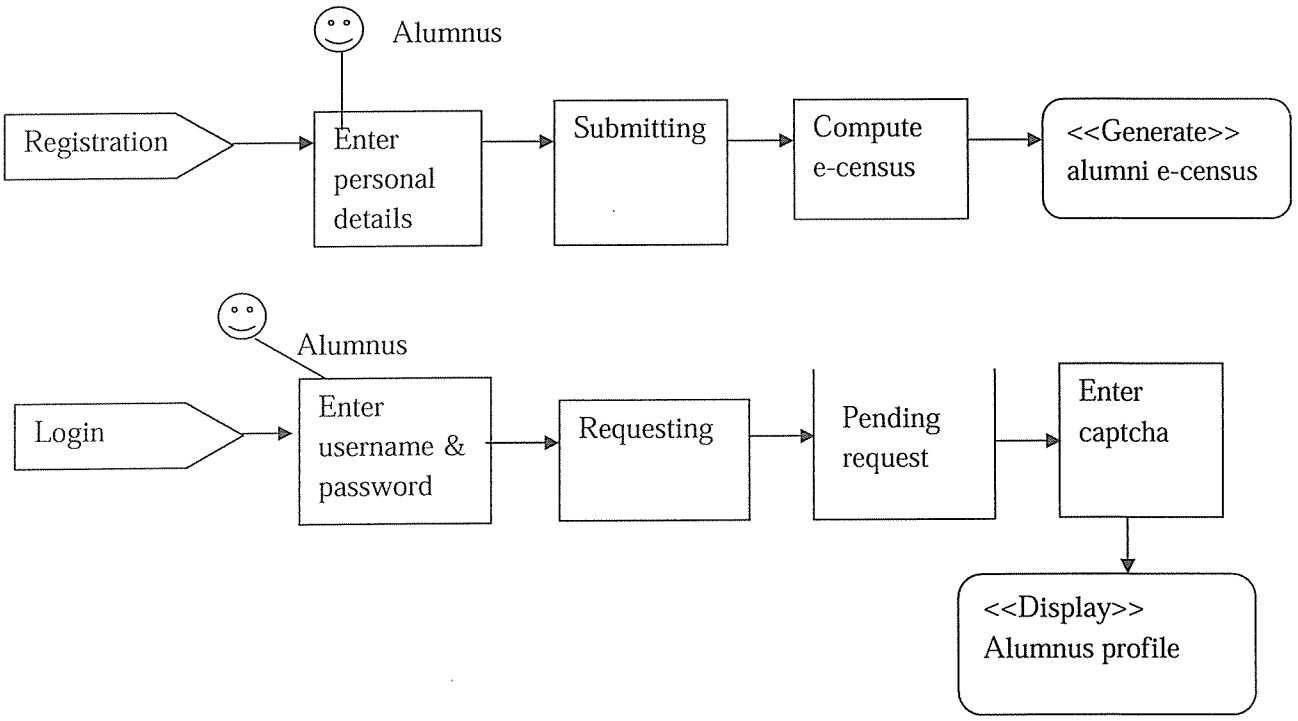

Figure 2: A representation of the business process triggers

4.1.3 Software Architecture

Software is based on client-server architecture where users of the website have a front-end application with all the tools and functionalities to fully utilize the system. Their requests are processed from the web server and responses sent back to them and availed to them via the application interface.

The following presents the key software architecture layers for the process centric alumni system

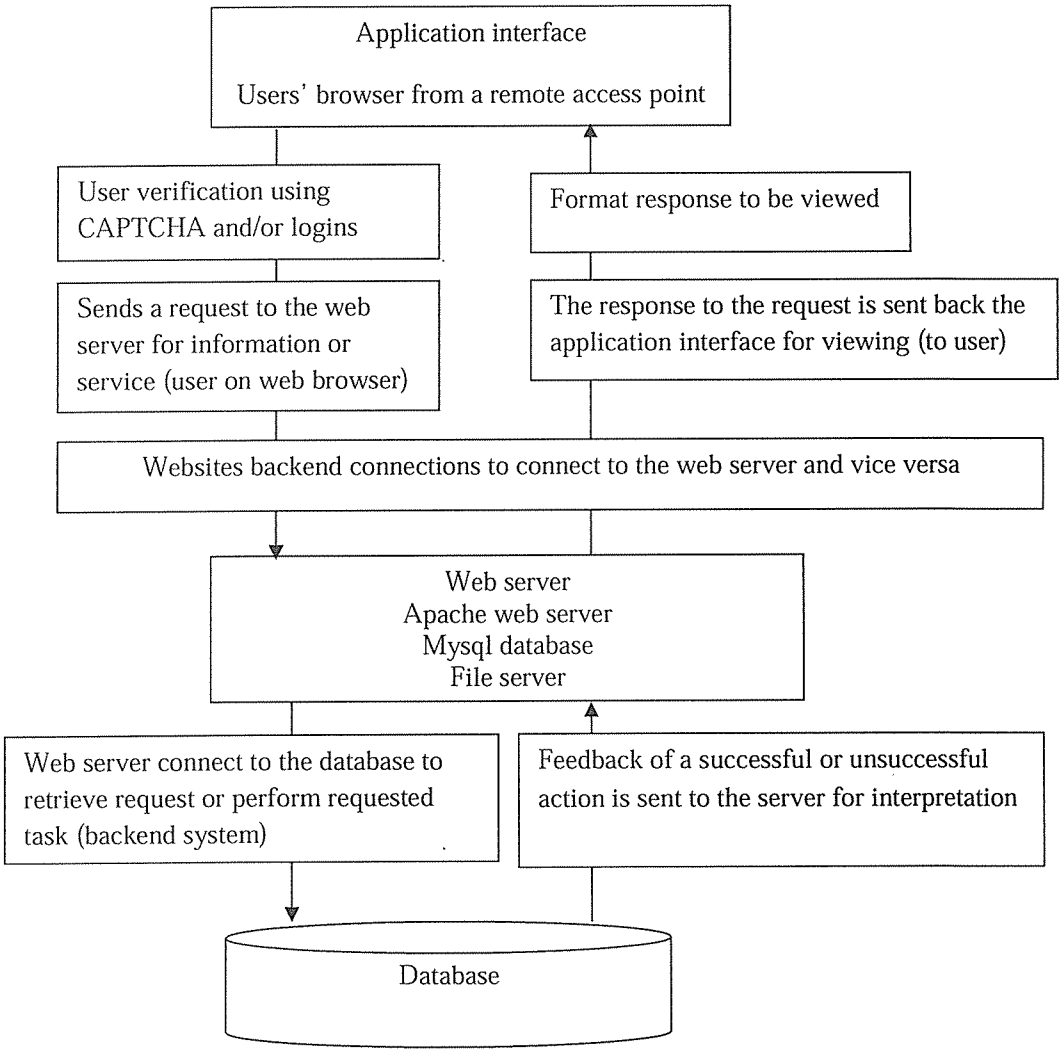

Figure 3: Illustration of the layout and the key layers, components and interface of the system

4.1.4 Technology Architecture

List of protocols, network models, programming languages, databases, operating systems and other support software that were used to develop the intended application to completion.

Table 3: A list of Technologies that were used and their uses

Technology	Use
Programming language (e.g. PHP 5.0)	Server side scripting language to provide database connectivity to web pages
HTML and HTML 5.0	Hypertext markup language for writing web pages
Database (e.g. MySQL version 5.0)	RDBMS to provide database tool to the application
Text editor (e.g. Dreamweaver CS3)	Edit web pages
Operating system (e.g. Windows 7)	Provide a platform for programming
Web browser (e.g. Firefox)	An application to view web pages
HTTP	Protocol that uses hypertext links to share files and data
FTP	File transfer protocol for file upload to the web server
WWW	Network of computers that share information via the HTPP protocol
FTP client (e.g. Filezilla)	Used for multiple file upload to a web server after feeding it with FTP details.
CSS	Cascading style sheets used for formatting the web pages independent of the data used
CAPTCHA	A system of auto-generated codes to prevent spamming and for authentication that its human using the system not malware

4.1.3 System Architecture

This maps component-based approach which is software architecture to a network architecture (for deployment) using technological framework for building information systems thus MySQL tool, Windows 7, PHP 5.0, Dreamweaver CS3 among others.

System architecture

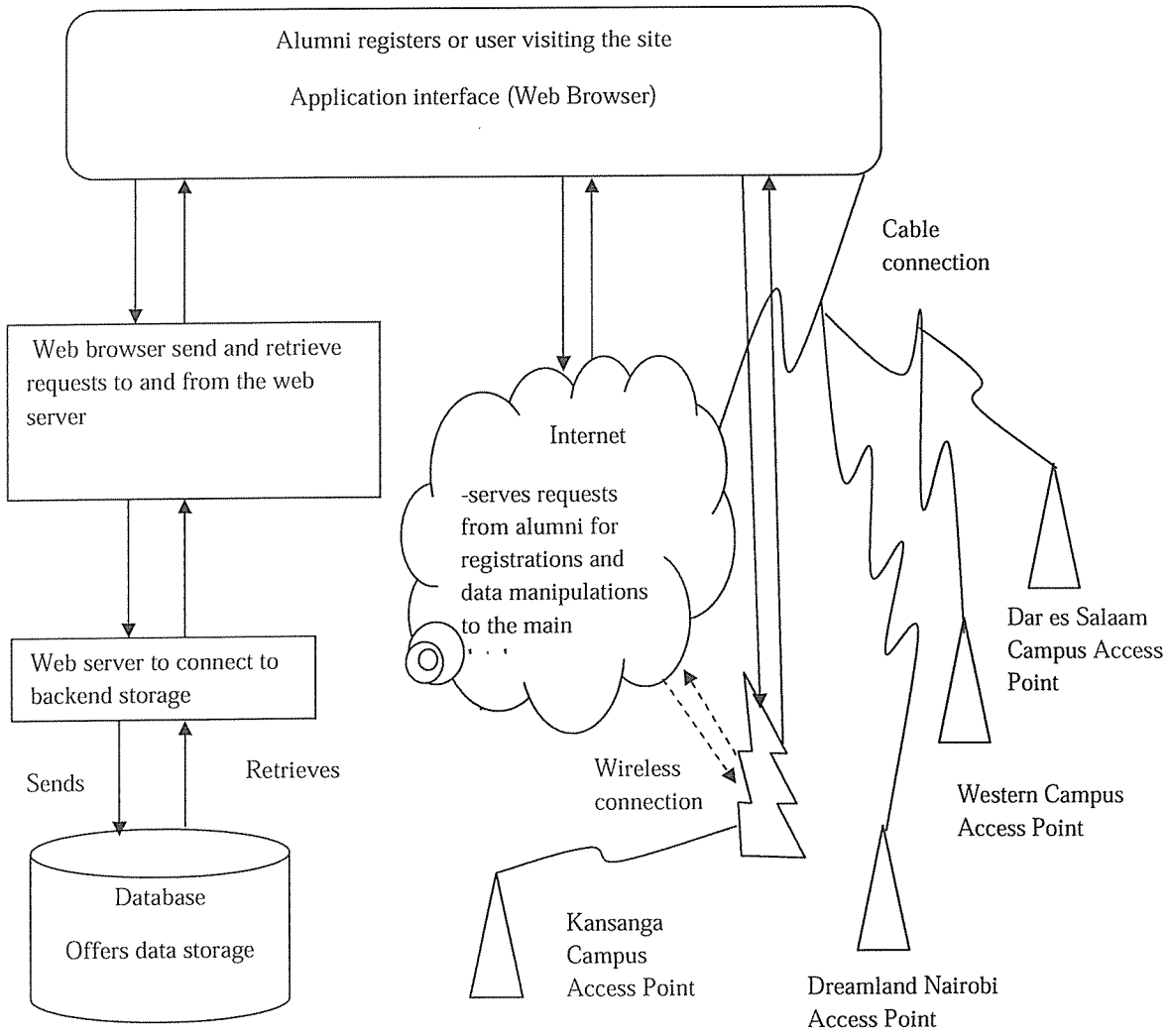

Figure 4: Illustration of operation of different aspects of the system using the system architecture

4.2 Conceptual Design

This is the general flow of events in the system. Class diagram demonstrates the flow of the system in terms of a set of integrated ideas and concepts about capabilities, behaviors and look appealing to the by the users as intended.

The diagram below illustrates the main objects that make up the system and their interactions.

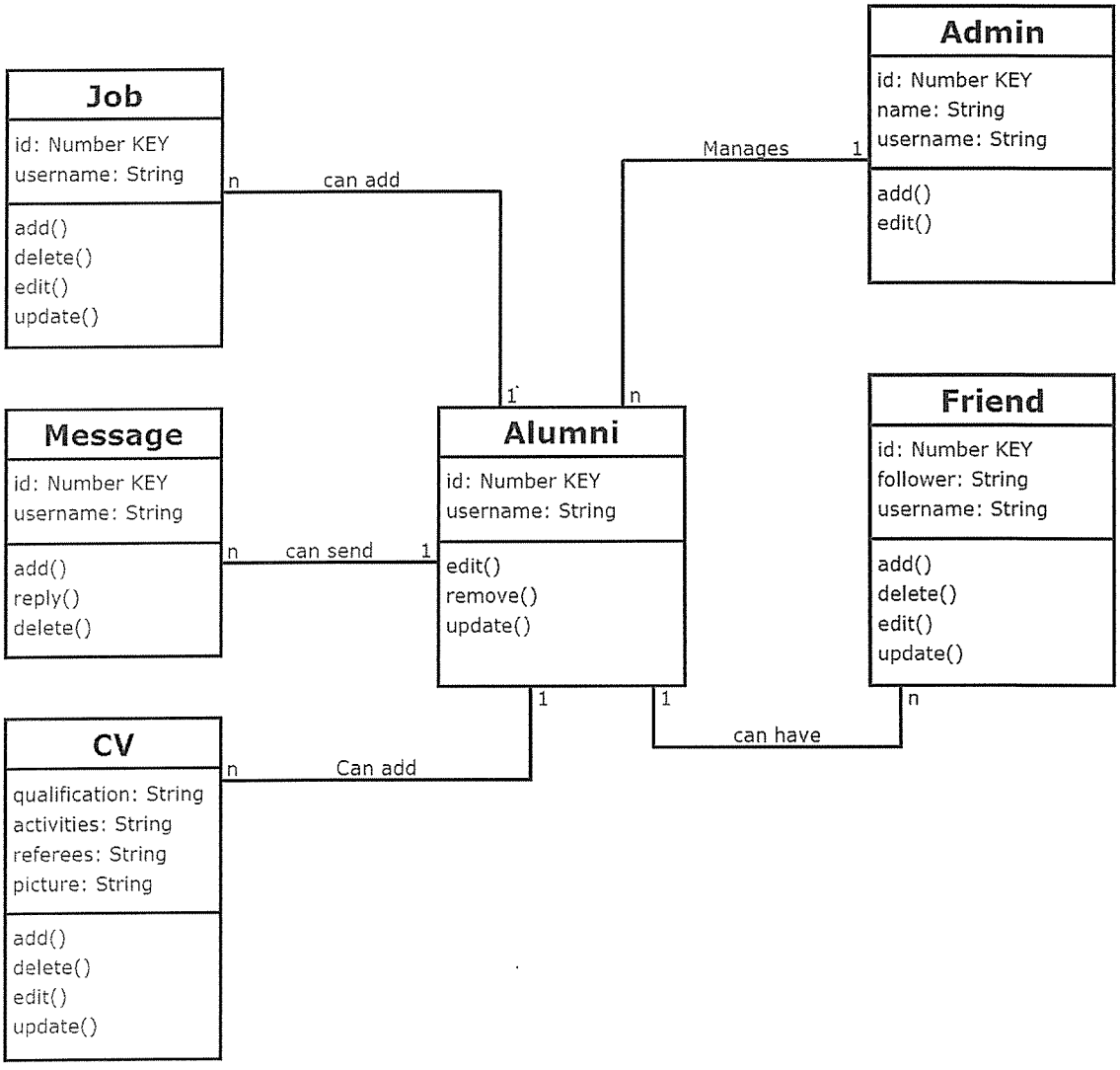

Figure 5: An Illustration of a Class Diagram and object relationships for the new System

4.9 Logical Design

This is an illustration of the logic of the flow of activities in the system.

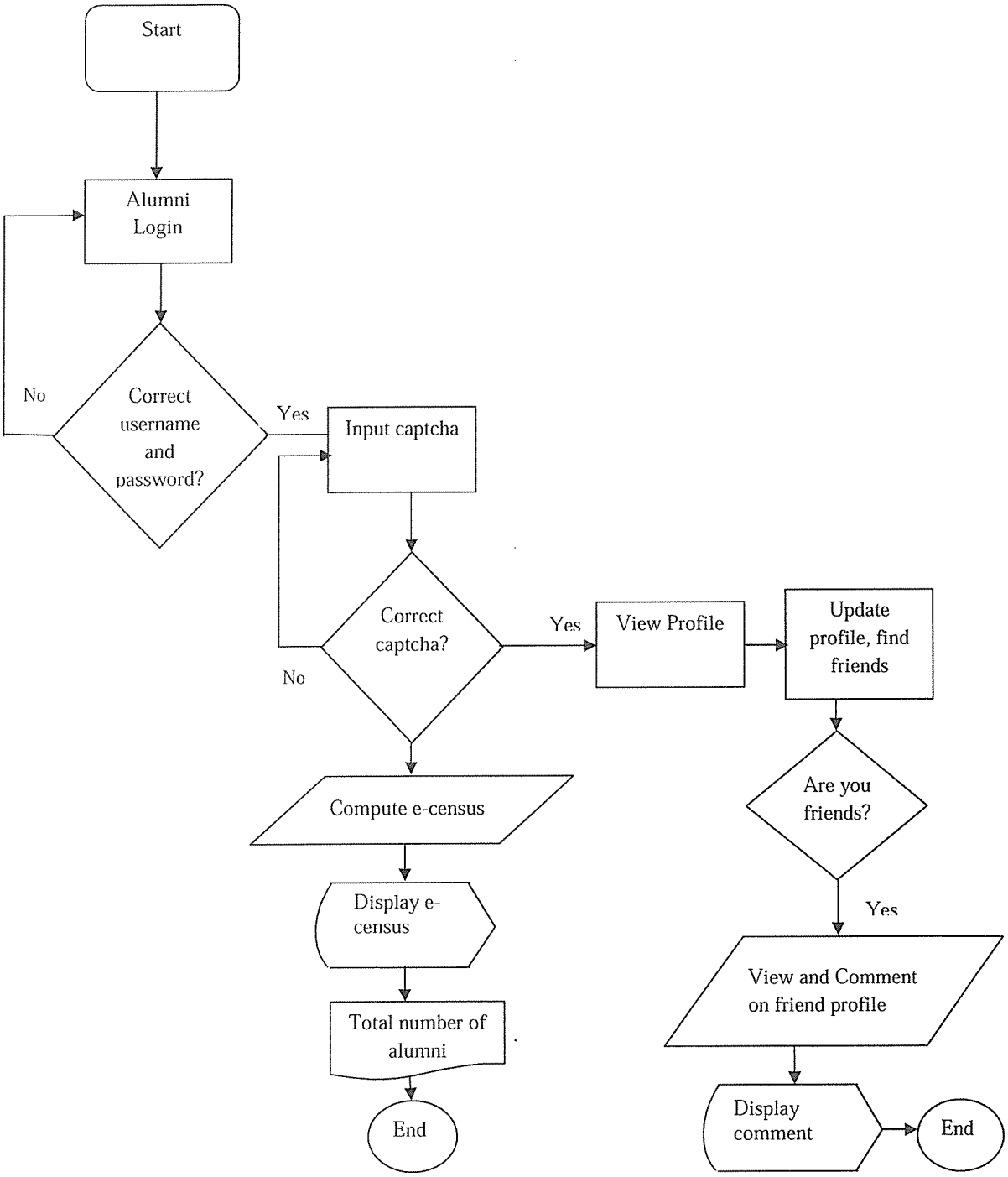

Figure 6: Flowchart to indicate the system logic of activities

The system logic was indicated by use of a flowchart as a tool for analyzing processes. A flowchart being a diagrammatic representation that illustrates the sequence of operations to be performed to get the solution of the problem allowed the programmer to break down processes into individual events or activities and to display these in shorthand form. It was drawn in the early stages of formulating the solutions. Hence, it is correct to say that a flowchart was essential for the better documentation of the complex system.

4.9 Physical Design

This section highlights the physical aspects of the system. Database name is alumni and is made up of the following tables as shown below.

Table 4: User (Alumnus)

Field	**Datatype**	**Length**	**Description**
id	int	11	Alumni identification number
names	varchar	-	Names of the alumnus
gender	varchar	10	Gender of the alumnus
dob	varchar	50	Date of birth of the alumnus
username	varchar	50	Username of alumnus profile account
password	varchar	-	Password of alumnus profile account
datein	date	-	Date when profile record was created
lastedit	date	-	Date when profile was last edited
secqsn	varchar	50	Login verification question
secans	varchar	50	Login verification answer
org	varchar	100	Place of employment of alumnus
email	varchar	100	Email address of the alumnus
tel	varchar	50	Telephone number of the alumnus
profimg	varchar	200	Filename of the alumnus picture
town	varchar	50	Current town of alumnus

Table 5: Education

Field	Datatype	Length	Description
id	int	11	Education identification
award	varchar	50	Academic qualification of alumnus
year	varchar	50	When qualification was attained
school	varchar	50	Where qualification was attained
course	varchar	50	Name of course attained
userid	varchar	50	Alumnus identification number
datein	date	-	Date when record was created

Table 6: Activity

Field	Datatype	Length	Description
id	int	11	Activity identification number
award	varchar	50	Activity award attained
post	varchar	50	Position held at campus
year	varchar	50	Year when in position
userid	varchar	50	Alumni identification number
activity	varchar	50	Type of activity participated
datein	date	-	Date when profile activity was posted
name	varchar	50	Name of activity participated

Table 7: AjaxCountries

Field	Datatype	Length	Description
id	int	11	AjaxCoutries identification
countryName	varchar	50	Country of alumnus

Table 8: EventList

Field	Datatype	Length	Description
id	int	11	EventsList identification
schdate	varchar	50	Scheduled date of upcoming event
schtime	varchar	50	Scheduled start of upcoming event
end	varchar	50	Scheduled end of upcoming event
author	varchar	50	Name creator of event
datein	date	-	Date when profile event was posted
topic	varchar	50	Topic of event

Table 9: Friends

Field	Datatype	Length	Description
id	int	11	Friends identification
initiator	varchar	50	Name of inviter
follower	varchar	50	Name of common friend
created	date	-	When friend was added
status	varchar	50	Current status of friend

Table 10: Job

Field	Datatype	Length	Description
id	int	11	Job identification
post	varchar	50	Job position held
startdate	varchar	50	Date of employment
enddate	varchar	50	Date of job termination
firm	varchar	50	Name of Employer company

status	varchar	50	Current status of job
datein	date	-	Date when profile job was created/updated
userid	varchar	50	Alumni identification number

Table 11: Message

Field	**Datatype**	**Length**	**Description**
id	int	11	Message identification
author	varchar	50	Name of message sender
receiver	varchar	50	Name of message receiver
msg	varchar	-	Message body
datein	date	-	Date when message was sent
status	varchar	-	Message status
topic	varchar	-	Topic of message

Table 12: MessageReply

Field	**Datatype**	**Length**	**Description**
id	int	11	MessageReply identification
rid	int	11	Receiver user identification
author	varchar	50	Name of message sender
receiver	varchar	50	Name of message receiver
msg	varchar	-	Message body
datein	date	-	Date when message was replied
status	varchar	50	Message reply status
topic	varchar	-	Topic of original message

Table 13: Pictures

Field	Datatype	Length	Description
id	int	11	Education identification
userid	varchar	50	Alumni identification number
img	varchar	100	Picture file name
datein	datetime	-	Date when picture was uploaded

Table 14: Testimonial

Field	Datatype	Length	Description
id	int	11	Testimonial identification
names	varchar	50	Owner's names
email	varchar	50	Owner's email address
body	varchar	-	List of testimonials
created	date	-	Date when testimonial was created

Table 15: Thoughts

Field	Datatype	Length	Description
msg_id	int	11	Thought identification
msg	varchar	-	The body of thought
created	date	-	Date when thought was created
userid	varchar	50	Identification of creator

Table 16: ThoughtsReply

Field	Datatype	Length	Description
id	int	11	Education identification
msg_id	int	11	Message
msg	varchar	200	The thought reply body
userid	varchar	50	Alumnus identification number
created	date	-	Date of thought reply

Table 17: Country

Field	Datatype	Length	Description
id	int	11	Country identification
country	varchar	50	Alumnus country of origin

CHAPTER FIVE

SYSTEM TESTING AND IMPLEMENTATION

5.0 Introduction

This section highlights the main aspect of system testing which is to demonstrate that there are no defects and or detect any defects available.

5.1 System Implementation

Main page: A welcome page of the alumni e-census system.

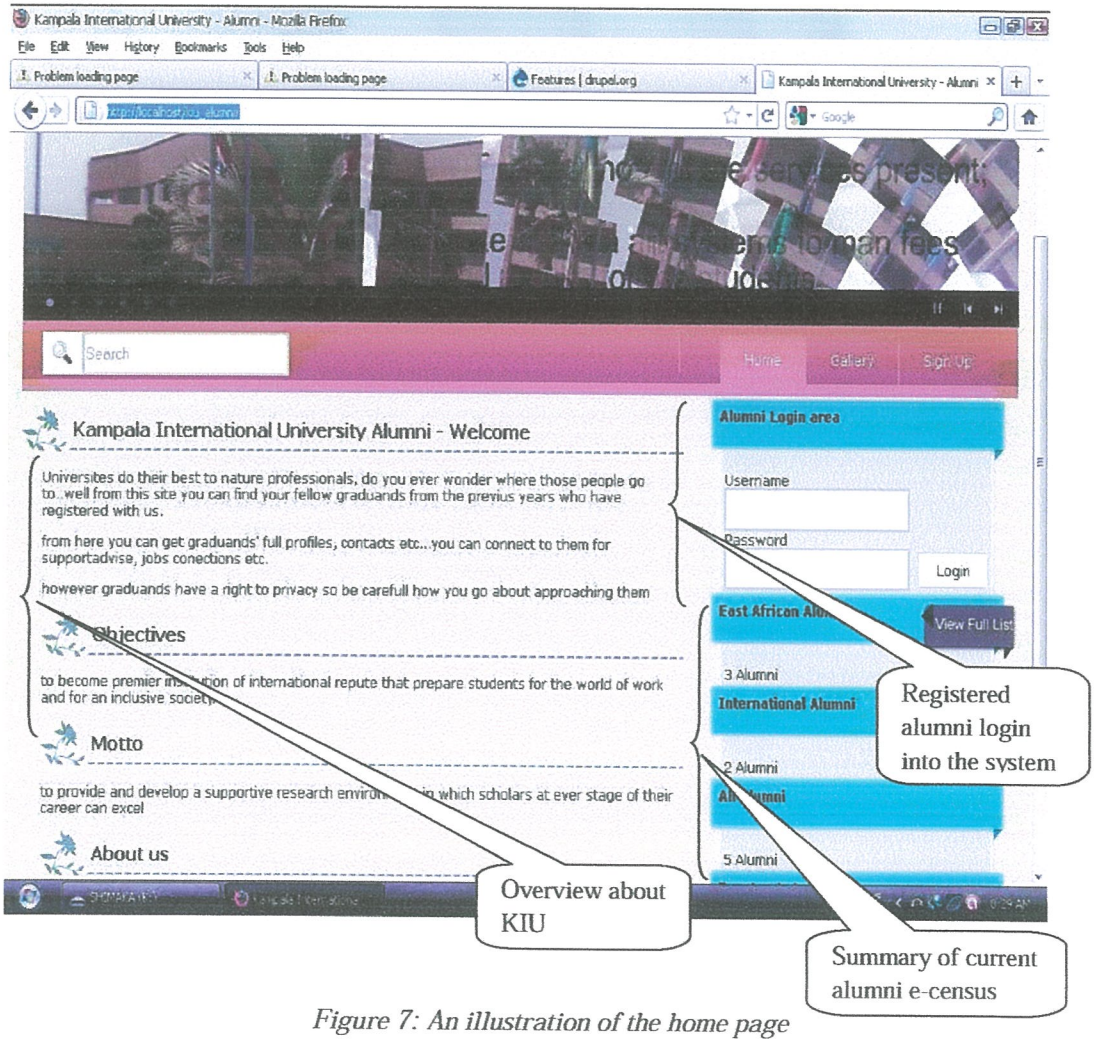

Figure 7: An illustration of the home page

E-census tallied by the system from the home page availed to every visitor of the site.

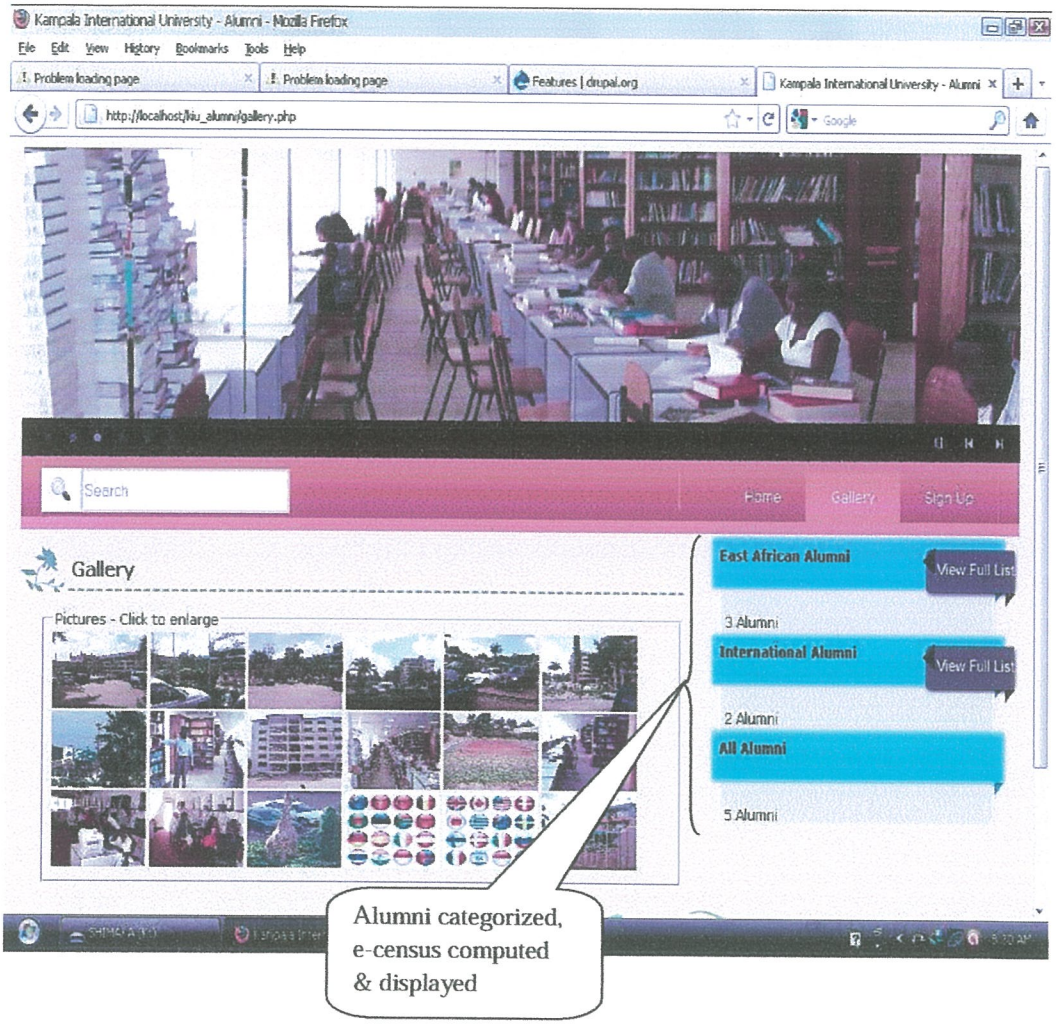

Figure 8: Illustration of different categories of alumni e-census automatically tallied and displayed on the home page

The interface a user account sign up

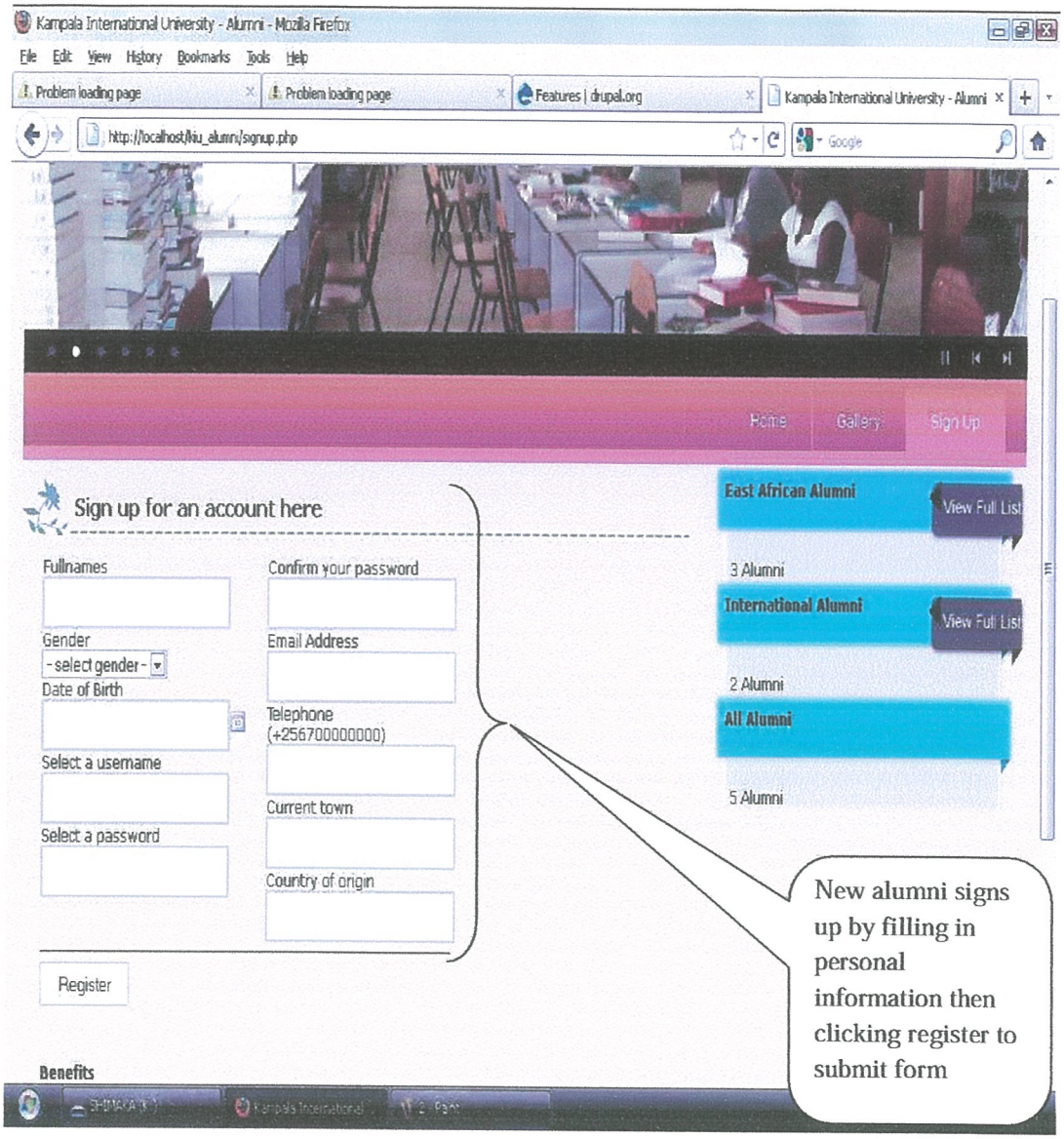

Figure 9: Illustration of how a new user signs up for a new account

The interface below shows a summary of alumni

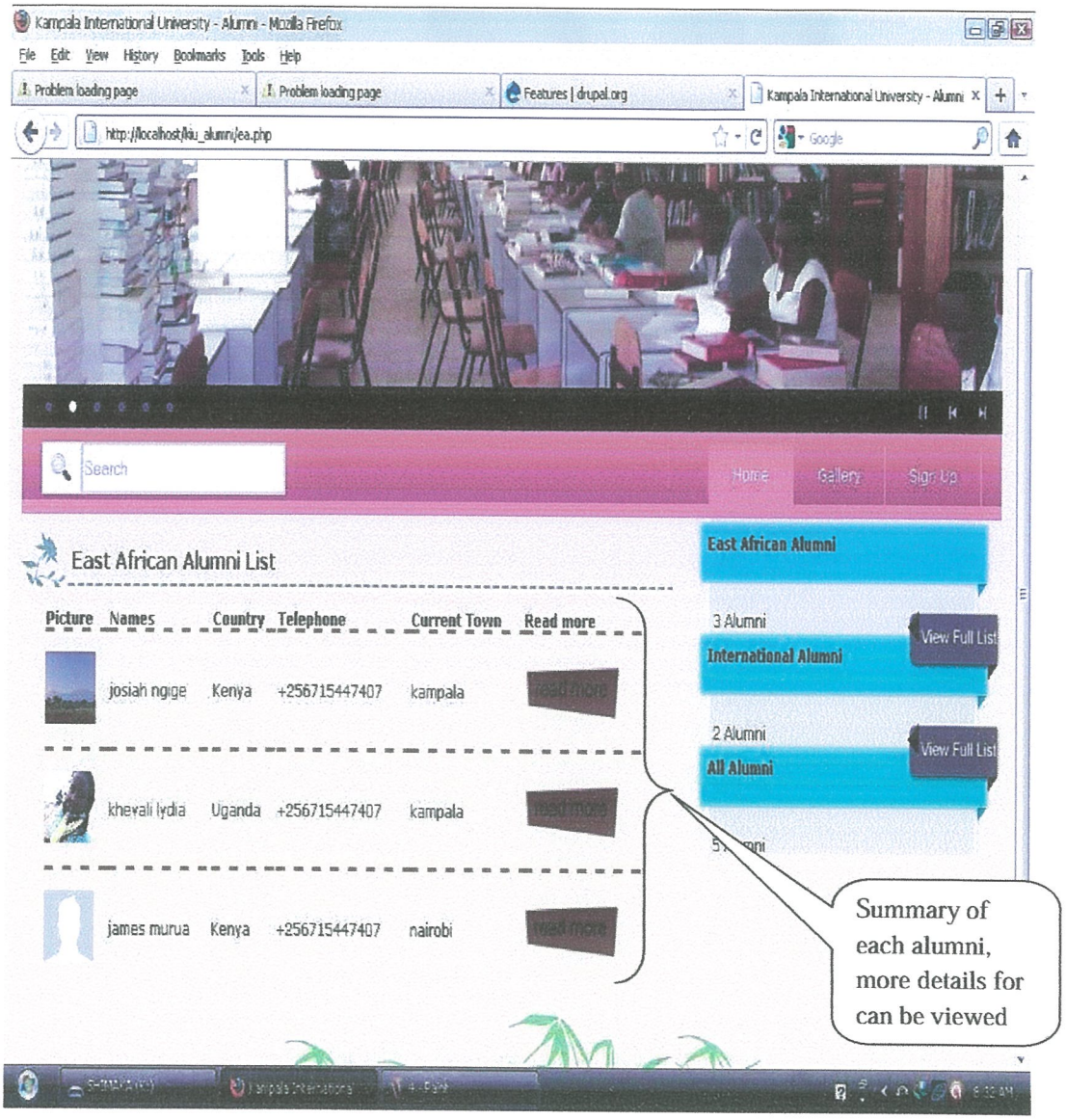

Figure 10: An illustration to show summary of existing alumni, users can click to see more about each alumnus

The interface below shows individual alumnus profile created

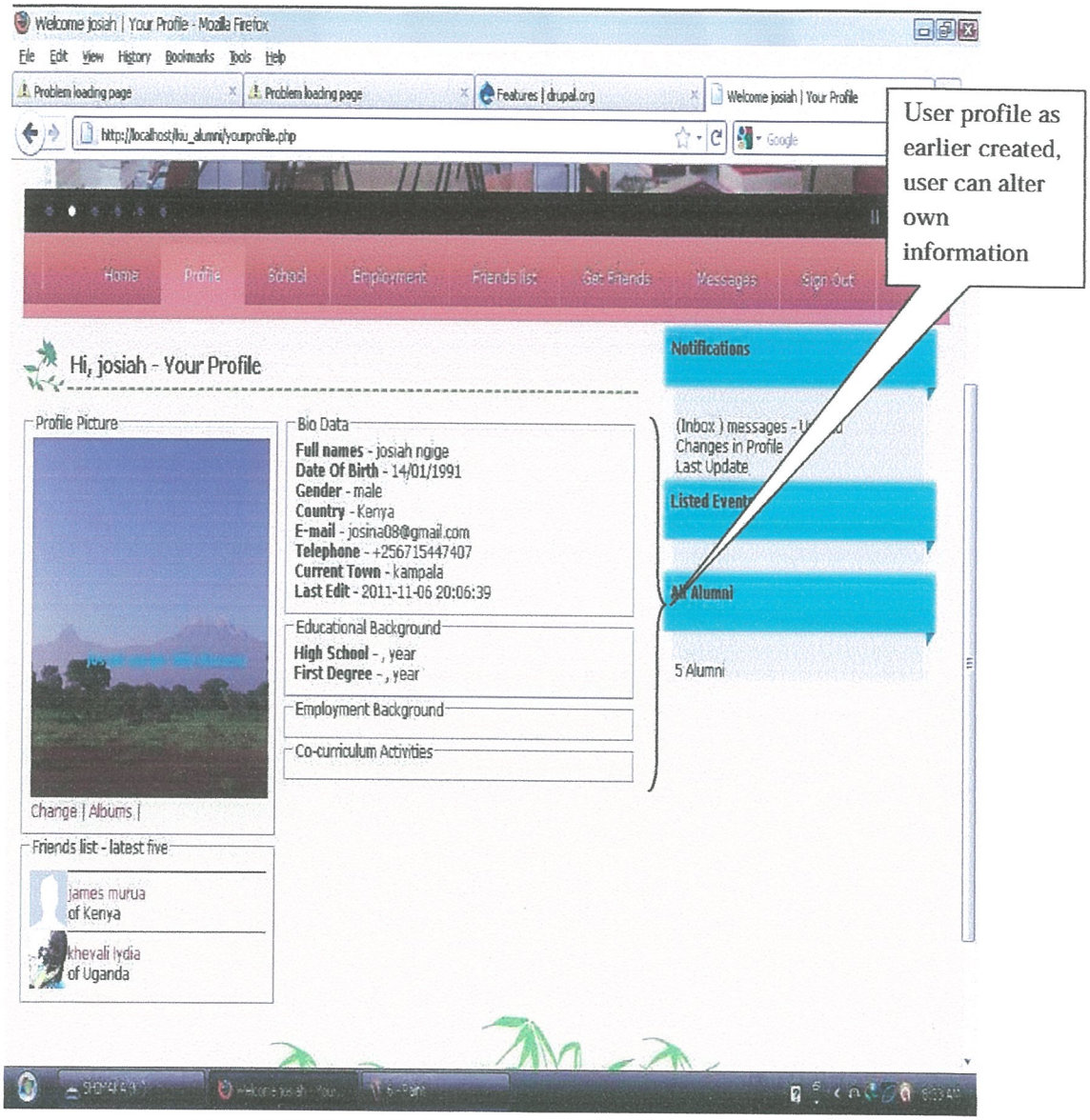

Figure 11: Illustration of how alumnus can view their created profile

The interface below shows how to get friends

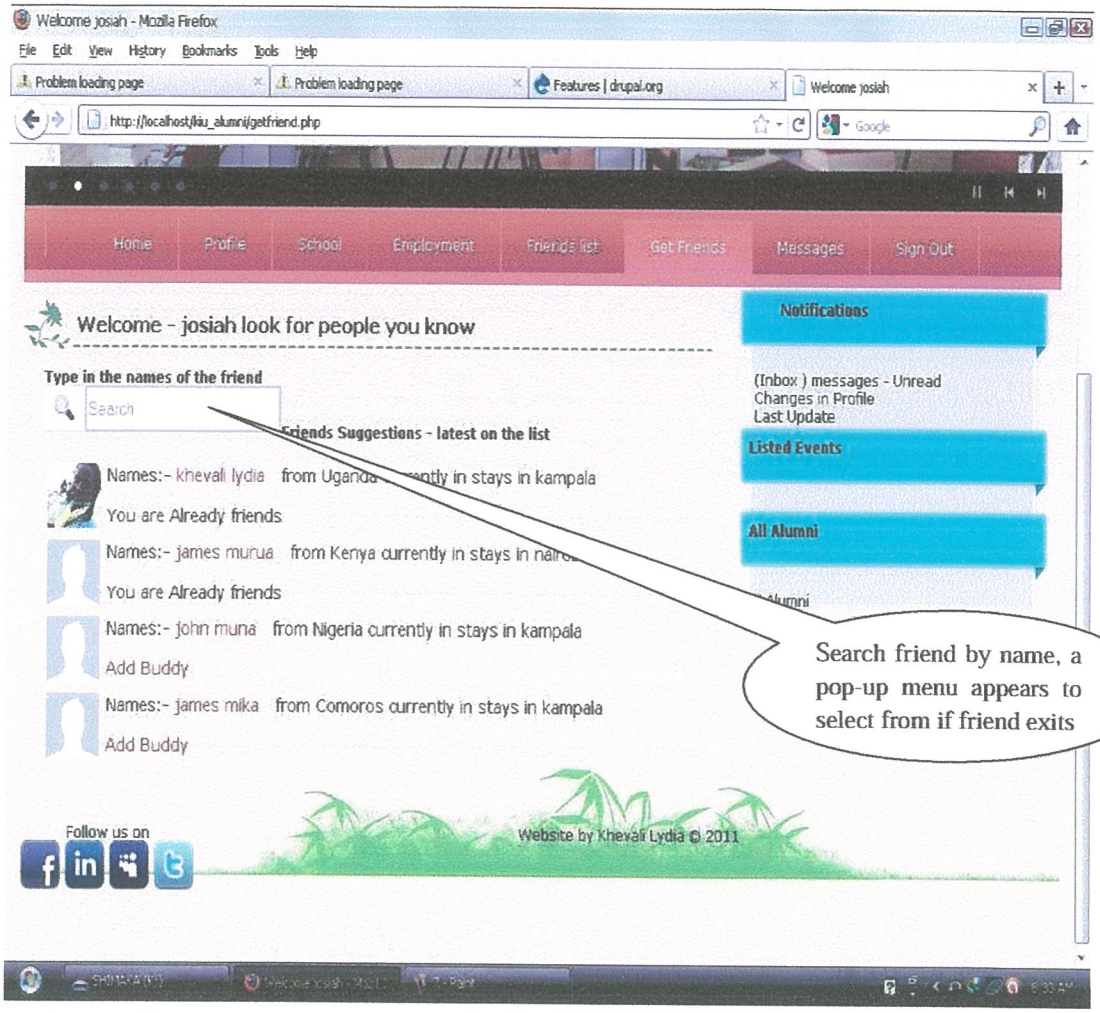

Figure 12: Illustration of how alumnus can get and invite friends (fellow alumni)

The interface below shows how to use search criteria to easily find friends

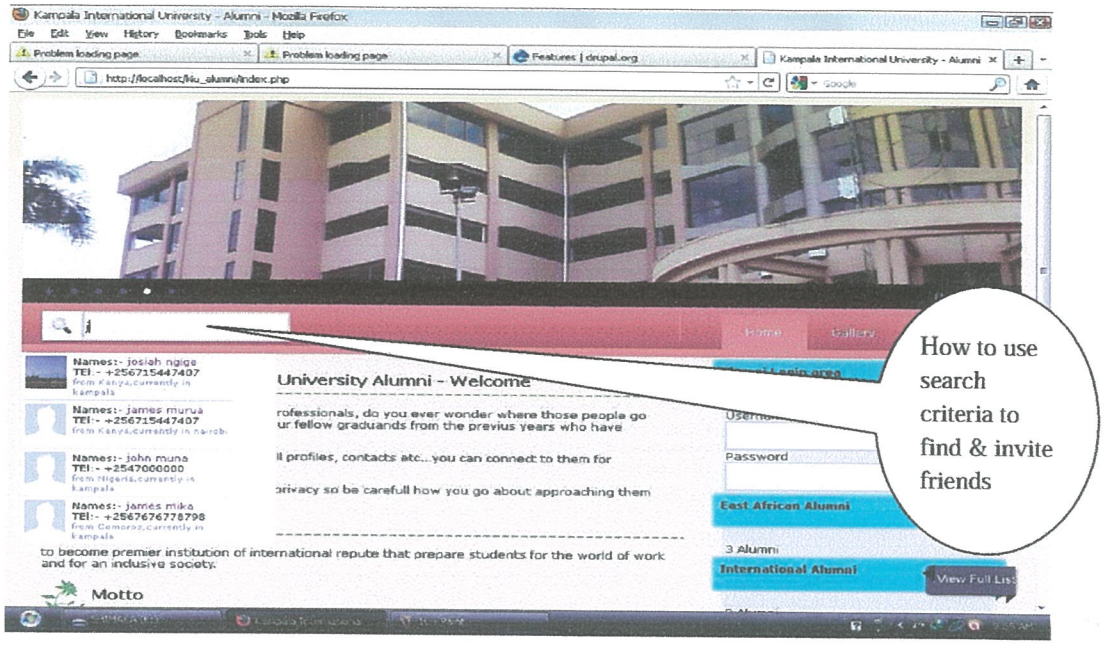

Figure 13: Illustration of how alumnus can use search criteria to easily find their friends

The following shows a user exiting out of the system.

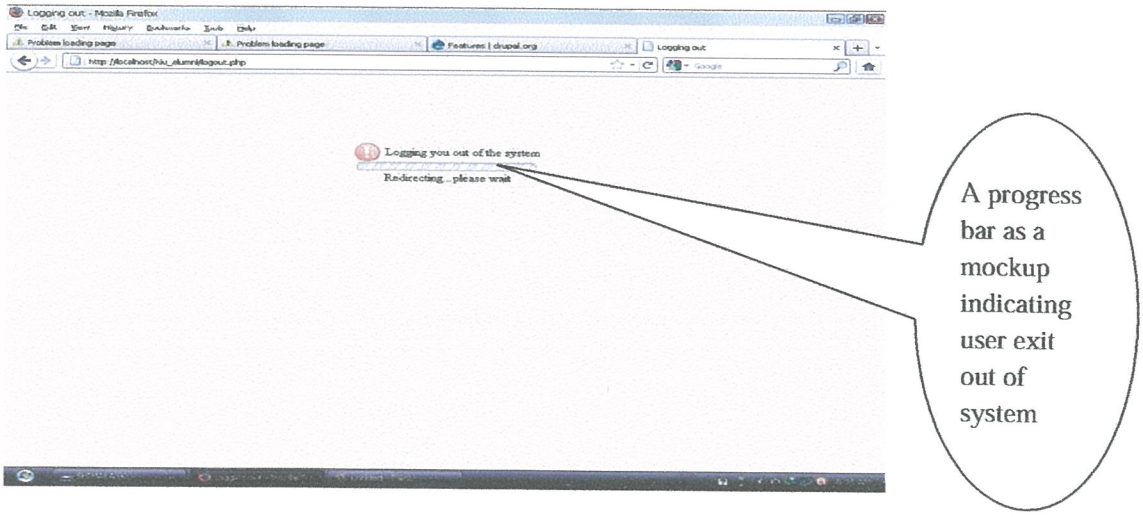

Figure14: An illustration of a user exiting the system

5.2 System Testing

The water fall model was adopted because it is easy to implement especially in both small and mid-sized projects that are hindered by time constraints. Another advantage was that it had clearly defined methods and phases from which the user gets deliverables thus definite outputs at the end of every stage. It delayed the detection of errors till the end but offered good project management. Demerits like little user participation and late deliverables were overcome by involving the stakeholders; their feedback helped in coming up with a satisfactory system. This was verified by use of acceptance testing.

Table 18: Illustration of test types used during system testing

Test Type	**Area Case**	**Input**	**Output**	**Expected Output**
Unit Testing Test a single unit behavior	New user account creation	User data with missing fields	Notification of unsuccessful registration	Notification of unsuccessful registration
Function testing	Complain registration	User data, complain details	Notification of successful complain	Notification of successful activity
Integration testing Check interfaces between units	Navigation	Move through the application (clicking)	Redirection to link location	404 error for missing file or redirection to the link location
Installation testing	Checking of installation process	Application files	Successful installation for MySQL databases above version 2.5.0	Successful installation
Coexistence testing	Identifying problems caused by coexistence of the application with other applications in the environment	Application in such environment	Successful coexistence	Successful coexistence

Volume testing	Data volume - identify volume levels beyond which the application cannot work	Data into the tables	Dependant on the applications used for development ie MySQL tables handles 3MB - MySQL database save more data	Accepting full data without data limitation

CHAPTER SIX

DISCUSSION, RECOMMENDATIONS AND CONCLUSION

6.0 Introduction

This chapter presents the conclusion and recommendations that the researcher made to Kampala International University about the new designed alumni e-census system. It further presents, the area of further research, and the limitations of the study.

6.1 Discussion

This was a pace setter that allows for further modification in future since scalability is one of its strong points. It is user friendly due to its use of dynamic web pages for interfaces which allow for easy navigation by users who interact with the e-census system and scalable whose needs keep growing. By doing so it caters for a wide variety of alumni.

Due to the fact that a simple approach was adopted in the development process of the system, it let the current alumnus get easily accustomed to its operation. In so doing there is no training cost incurred therefore experiencing a collateral decrease in operational and development costs. Moreover, it can be easily monitored and maintained and in case of a failure, troubleshooting will not be a major issue. The physical storage space freed can also be used to facilitate other activities of greater importance.

6.2 Conclusion

The new system also reduced time and resource consumption, more so during storage, retrieval and maintenance. As a result, efficiency was greatly enhanced. In the long run the e-census system achieved its desired results of pleasure during leisure time. And in trying to advance or develop subsequent versions or even to literally troubleshoot one will be furthering their skills. In the process, the e-census of alumni was then captured for the various purposes.

6.3 Recommendations

The researcher recommends that;

1. The new system should adopt the use of more advanced Database Management Systems such as Oracle, SQL et cetera which have unlimited capabilities unlike MySQL Database that may develop performance problems.
2. Incorporate enhanced accessibility features that will enable our physically challenged users to actively participate and enjoy the site.

3. Make intensive research in the fields of intelligent (A.I) collaborative systems and interactive systems and try to integrate the same into a more advanced version of the e-census system.
4. Integrate online help facilities as well as regular updates in case new versions or releases are available as well as develop and incorporate a help system that will give assistance to alumni.
5. Develop interactive websites and online forums as well as discussion groups that can be integrated with the system so as to expand the horizon or scope of interaction amongst the alumni and respective institutions.
6. Include links to other social sites and e-business sites thus making it a diversified social site, academic site as well as a business site.
7. Adjusting of the mechanics of future alumni e-census functionalities so as to fine-tune the system's overall dynamics. In so doing, help lagging alumni by including incentives like competitive simple games and respective tokens for less interested alumni.

6.4 Further Research

The following are some of the suggestions made after a detailed diagnosis of the alumni e-census system and should be considered in future so as to guarantee the well-being of the subsequent versions or releases of the same:

1. Develop a robust version of the e-census system that is versatile and compatible with the current version whilst keeping in mind the aspect of scalability and availability.
2. Integrate the aspect of real-time environment thus alumni can interact from different locations through video conferencing thus besides messages.

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APPENDIX

QUESTIONNAIRE

Preamble

Dear respondent,

I am a student pursuing a Bachelor's degree in Information Systems Management at Kampala International University. I am conducting a research study on *"Alumni E-census System"* The information sought is needed for this academic research and will be treated with confidentiality and will be solely for the purpose of this research.

1. What is your preference? (Check the appropriate box)
   Online interactive alumni system ☐
   Traditional way of meeting alumni ☐
2. Please explain the reason(s) for the preference you chose above.
   .....
   .....
3. Do you have prior knowledge of computer applications and/or internet tecnnology?
   YES ☐ NO ☐

4. What is your age bracket?

5-10	☐	26-30	☐
11-15	☐	31-40	☐
16-20	☐	41-50	☐
21-25	☐	Above 50	☐

5. Do you often meet people you graduated with from the same university?
   .....
   If yes how convenient?
   .....
6. For how long have you been using social networks?
   .....
7. How have social networks influenced your life?
   .....

THANK YOU.