CHAPTER I
INTRODUCTION

1.1 Background

Over the years, advances in technology have played a significant role in assisting people and organizations in carrying out their day to day activities, efficiently and effectively. In information technology (IT), such technological advances include the introduction of computer based information systems (CBIS), web technology and database management systems (DBMS). These advances have in one way or another contributed to improving the management of information resources, and also in improving the traditional transaction processing systems. People and organizations need information to make drastic decisions to achieve their goals, therefore the management of information is vital. Thus, these technological developments have been introduced to help them obtain the valuable and relevant information they will need for decision making.

Computer based information systems use computer resources (i.e. hardware, software, and communication networks) to store, process and transform data resources into useful information resources, and then disseminate these information resources wherever needed. The internet is a global system of interconnected computer networks that use the standard Internet protocol suite (TCP/IP) to link several billion devices worldwide. Most information systems today use the internet as a medium to deliver information and services to users or other information systems. These types of information systems are known as web-based information systems. An example of a web-based information system is the web-based academic information system. A web-based academic information system is an information system that uses internet technology to carry out the academic procedures of a school or college, such as student registration, student information management, online learning, etc. As the internet can be accessed by anyone, anywhere within range of an internet service provider, via

mobile devices, the web based academic information system has made academic procedures much more flexible for many students and academics. Therefore, many universities and colleges worldwide have adapted the web-based academic information system to carry out their academic procedures. In Papua New Guinea however, most universities and colleges are yet to implement the web-based academic information system.

The University of Papua New Guinea (UPNG), located in the National Capital District (N.C.D.) of Papua New Guinea, is one of the premier universities of PNG. The university has two main campuses for internal students, the main campus located at Waigani, N.C.D., and the Medical Faculty campus located at Taurama, N.C.D., next to the Port Moresby General Hospital. UPNG also has open campuses for external students, located throughout the country. Every year, UPNG enrolls an approximate total of 6,000 students (Year 1 through 4) from all over the country, and also from the neighboring Pacific island countries, such as Solomon Islands. UPNG has a total of 5 main schools or faculties. The School of Natural and Physical Science (SNPS), the School of Business (SOB), the School of Humanities and Social Sciences (SHSS), and the school of Law (SOL) are located at the main UPNG campus, while the School of Medicine and Health Sciences is located at the Taurama campus. Under these schools or faculties, UPNG has a total of 34 major study programs. Each of these study programs has an approximate total of 30 to 50 students per year of study. Every year the University of Papua New Guinea continues to expand, in terms of newer study programs being introduced to the university and also an increasing student capacity. As UPNG expands, it is certain that newer problems will be introduced to the university.

One such area in which UPNG will face problems is its academic system. The current academic system of UPNG is still run the traditional way, although now with the help of computers and other electronic devices for data storage and management. When we say traditional way, this means that most of the academic procedures at UPNG are still run manually, such as they still involve the “stand in line” process, or they still involve a lot of paper or hard copy file handling. The electronic method refers

to the electronic way in which a system's procedures are carried out, using electronic technology. For instance, the traditional way for student registration would be for the student to go to the campus, stand in line to receive a registration form, fill in the form, and submit it to the registrar's office. The electronic method for student registration would be to go online to the university's website, fill in a registration form, and submit it via the internet, saving the student much time and energy. By comparing the above methods of student registration, one could conclude that, the latter is more time and energy efficient. The academic system of a university covers areas such as student admission, finance, academics, student community, and alumni. Considering that the procedures under these areas are still run traditionally, and also that thousands of students undergo these procedures every year, it is obvious that this would be time and energy consuming for both the students and university staff. Some of the proposed problems of UPNG's current academic system will be discussed in the following paragraphs.

The student admission section of the academic system includes the student recruitment procedures of the university. At UPNG, there are two types of student recruitment procedures: the school leaver recruitment and the non-school leaver recruitment. The school leaver recruitment involves recruiting eligible recently graduated students from secondary schools around the country. Non-school leaver recruitment involves recruiting students via application. Of the two, the latter requires the applicant to do more, whereas for the former, everything is coordinated by the secondary school. With the non-school leaver recruitment, via the traditional way, the applicant has to go to and from campus to get an application form, fill in the application form, stand in line at the university accounts section to pay for the application fee, and then submit the application form. This is quite time and energy consuming for the applicant. In addition to that, it would be difficult for students living outside of Port Moresby, who would want to apply to UPNG, as they would need to go to the nearest UPNG open college branch to collect and submit application forms. Unlike if there was web based academic system for UPNG, the applicant could just go to the admissions

section, download the application form, fill the form up, and upload it with the other required document to the system, and pay for the application fee online.

The finance section of the academic system, involves the management of all the students' financial procedures and records at the university. Via the traditional method, payment procedures at UPNG involve the usual "stand in line" process at the university's accounts section. Taking into consideration the total population of students standing in line to make their payments, one would conclude that this procedure is time and energy consuming. In contrast, the finance section of a web based academic system would only require students to go online and make their payments, taking less than 10 minutes to complete the procedure. In addition to that, multiple number of students could log on to the system to make payments at the same time. In terms of student financial records, via the traditional system, student financial records are not normally made available for students. To obtain a financial record, a student would have to go to the accounts section and inquire for them to print out their financial records. Via the web based academic system, student financial records would be made aware for students to view, and updated every time a payment is made.

The academics section of the academic system includes student enrollment procedures, student information management, student learning, and student grading. In terms of student enrollment, when comparing the number of students to be registered to the limited university registration staff, it is obvious that the traditional enrollment method is time and energy consuming. In terms of student information management, by the traditional way, most of the student data are input into hard copy files, thus manually filing these hard copy files would take up a lot of time and hard work. In addition to that, these hard copy files are more likely to be damaged, which would result in students losing important data. In terms of student learning, one main problem with the traditional system is that it does not cater for cases where the lecturer has to be absent for certain purposes. In turn, this would result in the lecture being deferred to the next meeting, putting the class behind schedule. Via the web-based academic information system, on absence, the lecturer could upload course material to the specific class for the students download and read through. In terms of the student

grading procedures, via the traditional method, after the lecturers finalize students' grades, they submit them to the secretary to print out the students' transcripts. Students are then required to personally go to the secretary to collect their results. However, most times transcripts are not ready until the middle of the holiday period, when most students have gone home to their families. This makes it difficult for students living in other provinces to access their results. However, via the web-based academic system, students could just login to their accounts to access their academic results.

The alumni section of the academic system involves the management of graduated students' bio data and allows graduated students to keep in touch with their former course mates. The alumni section also acts to give general reports and statistics on the general performance of the university. This information is relevant for companies who will seek to employ students from the university. Via the current system, to seek graduated students bio data and other alumni reports, one must personally go to the school office and make an inquiry. However, via the web-based academic information system, alumni records and student bio data could just be input into the system and managed for students and other interested parties to access. In addition to that, via the web based academic system, the students could be able to create a network with their former course mates.

1.2 Problem Identification and Formulation

1.2.1 Problem Identification

From the background description, some of the issues identified in the current academic system of the University of Papua New Guinea are as follows:

i. For the admission of non-school leavers, the traditional application procedures require the applicant to go to and from campus, to pick up, fill out, pay for, and submit the application form, consuming a lot of time and energy. This is also quite difficult for applicants living in other provinces, as they have no access to the UPNG campus.

ii. Considering the total population of students compared to the limited number of accounts staff, the traditional payment method is definitely time and energy consuming. Also, because students have no or less access to their financial records, they are sometimes unaware of their financial status. Thus, they don't know that they are in credit or in debt of the university up until later.

iii. In terms of the academics, student enrollment procedures are sometimes very slow due to more students being enrolled by less staff. Also, student learning is sometimes disrupted whenever a lecturer is absent for some reason, thus resulting in the class being behind schedule. Student information is still being managed using the traditional filing methods, which takes time sorting out. Sometimes student results are late in coming out, thus when students return home for holidays, they are unable to access them.

iv. It is difficult for former or graduated students to access their university student records, when they return home to work in their home provinces.

1.2.2 Problem Formulation

Therefore based on the identified issues, the current problems of the system can be formulated as follows:

i. How to analyze the current academic information system of the University of Papua New Guinea, in areas of admission, finance, academics, and alumni management, to point out the associated problems.

ii. How to design a web-based academic information system to help solve the problems faced with the current academic information system.

iii. How to test the web-based academic information system at the University of Papua New Guinea so that it meets the user requirement for admission, finance, academics and alumni management.

iv. How to implement the web-based academic information system so that it becomes a ready-made application package at the University of Papua New Guinea.

1.3 Research Objectives

The main purpose and objectives for conducting this research are as follows:

1.3.1 Purpose

The main aim of this study is to design and develop a reliable web-based academic information system for the University of Papua New Guinea, which will cover procedures under the student admission, finance, academics, and alumni sections.

1.3.2 Objectives

i. To analyze the current academic information system of the University of Papua New Guinea, in areas of admission, finance, academics, and alumni management, to point out the associated problems.

ii. To design a web-based academic information system to help solve the problems faced with the current academic information system.

iii. To test the web-based academic information system at the University of Papua New Guinea to so that it meets the user requirements.

iv. To implement the web-based academic information system so that it becomes a ready-made application package at the University of Papua New Guinea.

1.4 Research Implications

It is expected this study will be useful by the following parties:

1.4.1 Practical Uses

The development of the web-based academic information system will be used by the University of Papua New Guinea, to improve the academic performance of the university. In addition to that, this system may also be implanted in other institutions in Papua New Guinea, who have similar issues faced by UPNG.

1.4.2 Academic Uses

1. Institutions

Hopefully, this research paper will be used as a reference journal for future students working on similar projects.

2. For Other Researchers

The ideas generated in this research may also be implemented by future researchers who wish to broaden their knowledge about information systems development.

1.5 Limitations of Study

Taking into consideration the time limit and ability of the researcher, the discussion of this study will be restricted to the following regarding the development of the web-based academic information system of UPNG:

1. The development of the student admission section of the UPNG web based academic information system. This section will cater for admission procedures, such as student applications, student recruitment, etc.
2. The development of the finance section of the UPNG web based academic information system. In this section, students can be able to make online payments for their tuition and other university fees, and view their payment records.
3. The development of the academics section of the UPNG web based academic information system. This section will cater for student enrollment, online student learning, student information management and student grading.
4. The development of the alumni section of the UPNG web based academic information system. This section will cater for the management of graduated students' information, and allow the students to keep in touch with their former course mates.

1.6 Time and Location

This research was conducted at the University of Papua New Guinea main campus, P.O. Box 320, University Post Office, National Capital District, Papua New Guinea. The duration of time allocated for this research was from March 1st 2015 through to the end of June 2015.

Table 1.1 Research Schedule

No	Time Table	2015															
		March				April				May				June			
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
1	Data Collection :																
	Interviewing																
	Observation																
2	**Prototyping**																
	a)Identify information system requirements (meet with clients):																
	Analysis																
	b) Development of initial prototype:																
	Coding																
	c) Use of Prototype by users:																
	Experimentation																
	d) Revision and enhancement of prototype																
	Revision																
3	Operation of Prototype																
	Operation																

1.7 Thesis Outline

CHAPTER I: INTRODUCTION

This chapter proposes the research background, problem identification, research objectives, research usability and the limitations of the research.

CHAPTER II: LITERATURE

This chapter contains the citing of literature and previous studies, related to the development of the web-based academic information system.

CHAPTER III: RESEARCH METHODOLOGY

This chapter basically discusses the research methodology and procedures used in the development of the web-based academic information system.

CHAPTER IV: SYSTEM ANLYSIS AND DESIGN

This chapter proposes the analysis and design of the web-based academic information system. It discusses the development of the proposed system, including processes, data interpretation, database design, coding and software testing.

CHAPTER V: CONCLUSION

In this chapter, a conclusion of the research will be made, and certain recommendations concerning the usability and maintenance of the developed system will be outlined.