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SYSTEM ANALYSIS AND DESIGN

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WEB - BASED TEST BANKING SYSTEM FOR AMA COMPUTER COLLEGE – CAVITE CAMPUS "COLLEGE DEPARTMENT"

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CHAPTER I

INTRODUCTION

1.1 Background of The Study

The structure of every test determines the levels of skills and knowledge that the examinee got from the certain assessment that the professors have made for them. Little do they know that the professor experiencing and facing some problems and difficulties. Aside from the academics, producing bulk of test papers and questionnaires is also one of their problems.

The primary concern of the professor regarding the students' exam paper for every term of the semester is efficiency and security. Since a professor holds more than one subject per semester, it is given that the professor is in need of proper organization of examination papers, whether it is in the desk, folder or cabinet. It is just not the organization of the papers an educator assures of, but also the security that none of his students can see the questions before the examination date.

As an alternative to the manual process of writing and organizing the examination papers, the proponents have come to introduce their ***Web-Based Test Banking System*.** The system lets the faculty members bank questions in the database and helps generate questions for next time usage in the respective subjects. With its features, it would bring efficiency to the college professors in organizing the soft copy of each exam.

1.2 Conceptual Framework

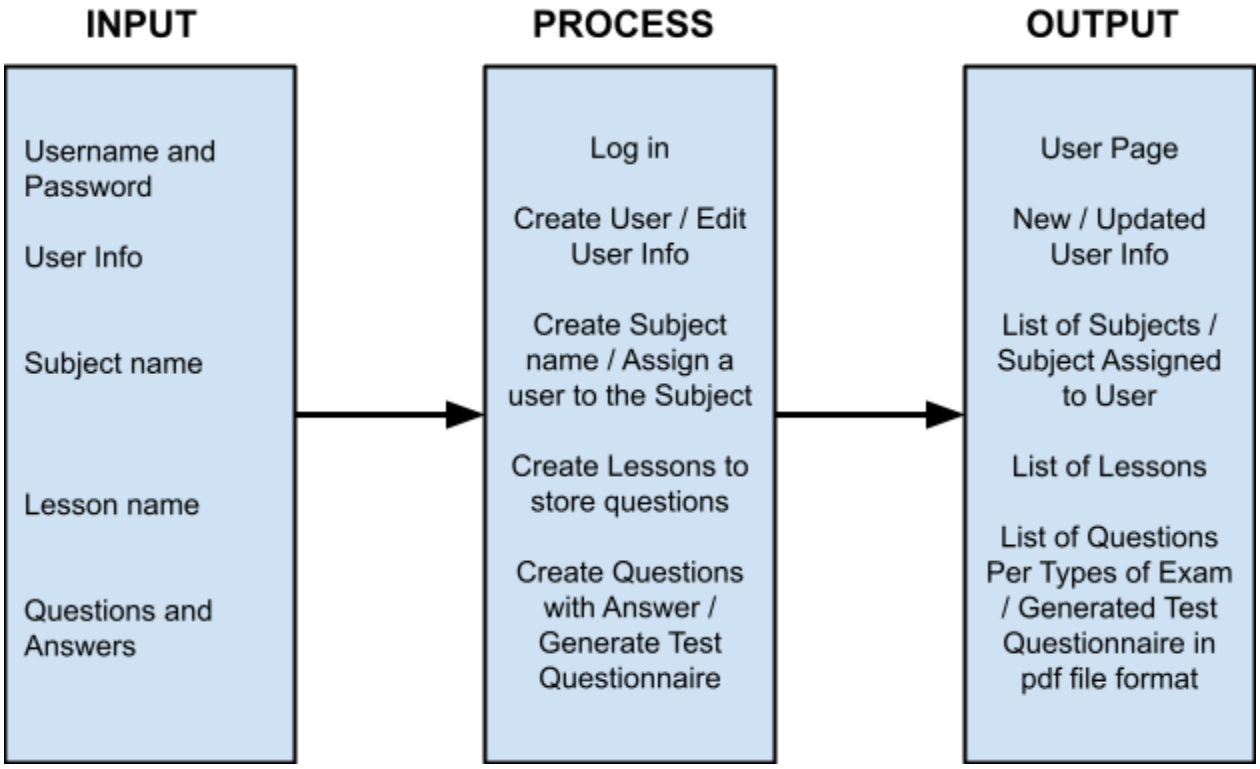

Figure 1.1: IPO (Input Process Output) of AMA Test Banking System

The correlational study was based on the concept of how our proposed system can operate based on the inputs of the user in the system, how it will be processed in the system, and what will be the output of these data. The figure below shows its relationship to each other, from putting the questions and answers as an input, once it has been input, the process will be to show these questions and answers and ready to be generated as a test questionnaire, once it has been generated, the system will show the generated test questionnaire as an output.

1.3 Statement of The Problem

1.3.1 General Problem

Through thorough research, the proponents have decided to list the problems of the faculty in terms of making an examination questionnaire. The statement of the problem includes the general problem and specific problem.

The general problem researchers have encountered is the school still relies on manually creating the exams for all the students, and the faculty members are somehow having a hectic work that contributes to complicating their work on doing the exams. Hence, the system proposed is not existing.

1.3.2 Specific Problem

Specifically, this research is performed to search for answers to the following questions which are as follows:

- To determine what program can help in a faster way of preparing exam questionnaires aside from the typical way.
- What possible program that can organize questions based on the given subjects?
- To know what program can filter examination to avoid repetition of questions

1.4 Objectives of The Study

1.4.1 General Objectives

Through further studying the gathered data, proponents have come to state the possible ways to address the given problem of the faculty in making examination questionnaires. The general objective of this study is to propose a system that will help the professors in the College department on making test questionnaires exam to be systemized, organized and reusable.

1.4.2 Specific Objectives

This study is in search of the following specific objectives:

- To create a program that will prepare the exam faster than the typical way of making test questionnaires.
- To organize questions based on the given subject.
- Filter out examinations for avoidance of repetition.

1.5 Significance of the Study

Manual encoding of test papers is an example of the general problem that the faculty encounters as a difficulty, however, as technology develops; they can ease the teaching experience of faculties. To show the point, faculty members follow a school's prescribed format/template of encoding; the test papers are also prone to errors such as typo errors. In this case where errors and difficulty in encoding arise for every faculty in creating a test, there is a necessity for easement of workload and process of creating a test.

With the use of this web-based system as a test generator, the test is generated randomly and assures no errors since it is stored on the web and checked by the one in charge. The sole authority of accessing this system is only accessed by the dean and the faculty in charge of creating the test thus excluding the fact of accidental exposure of the exam to the students before the exam or intentional peaking in the exam prepared in the faculty since it is secured and accessed only by the assigned personnel.

The possible beneficiaries of the proposed project: Web Based Test Banking System.

- **The User**

The user may benefit because the study's implementation will bring convenience by generating random tests for the teachers and excluding errors/typo errors.

- **The Researchers**

Researchers may benefit because the study's development helps develop their skills and prepare for the future working environment they soon face.

- **The Future Researchers**

The future researchers may benefit because this study serves as a reference to further enhance the study or support future studies.

1.6 Scopes and limitations

Scopes

The study for the said system is about to stock a lot of questions that will be used in examinations. Once it is needed, all the questions will be generated randomly as a test questionnaire exam. In computer science, a generator is a routine that can be used to control the iteration behavior of a loop.

The proposed system composed of five main Web pages which are the Login page where users will put username and password to login, Registration page where users will create an account, Account page where the users of this page are the faculty and dean, Add Question page where this page will get the questions inputted by the user, and the Generate Test Page where it will generate a test once the user use this page.

The programming language that will be used in developing the Web-Based Test Banking System is PHP and JavaScript using the editor called notepad++. It is a text editor and source code editor used for programming, scripting and markup languages. Along the development of the system, within the software called XAMPP, Apache is the server that will be usewher as MYSQL is the database the PhpMyAdmin will be used in accessing MYSQL.

Limitations

The proponents will develop the system only for the fast, efficient and secure capability of creating a test for the students. The proponents haven't seen the system capability as capable of directly answering the generated test within the system, an online learning system, attendance, and grading system.

The system only focuses on the faculty of the college department. The proponents chose the college department to be the beneficiary of the system over the senior high department because the proponents are college undergraduate and know some of the operations inside of a college department. The system is a Web-Based System, it requires only to be accessed via localhost. The coverage of the system is only inside of the school area.

The users may only need a browser to access the system.All kinds of browsers are suitable for the system to be viewed, especially Chrome and the new version of Microsoft Edge. The faculty cannot create their account. The Dean has the authority to create an account due to the monitoring of the existing and incoming number of faculty.

Also adding a search function to the page of assigning a subject to a user is also our limitation. We have limited time to fix these issues since it requires a lot of time. We are recommending this to be the future target to fix for future researchers.

1.7 HIPO

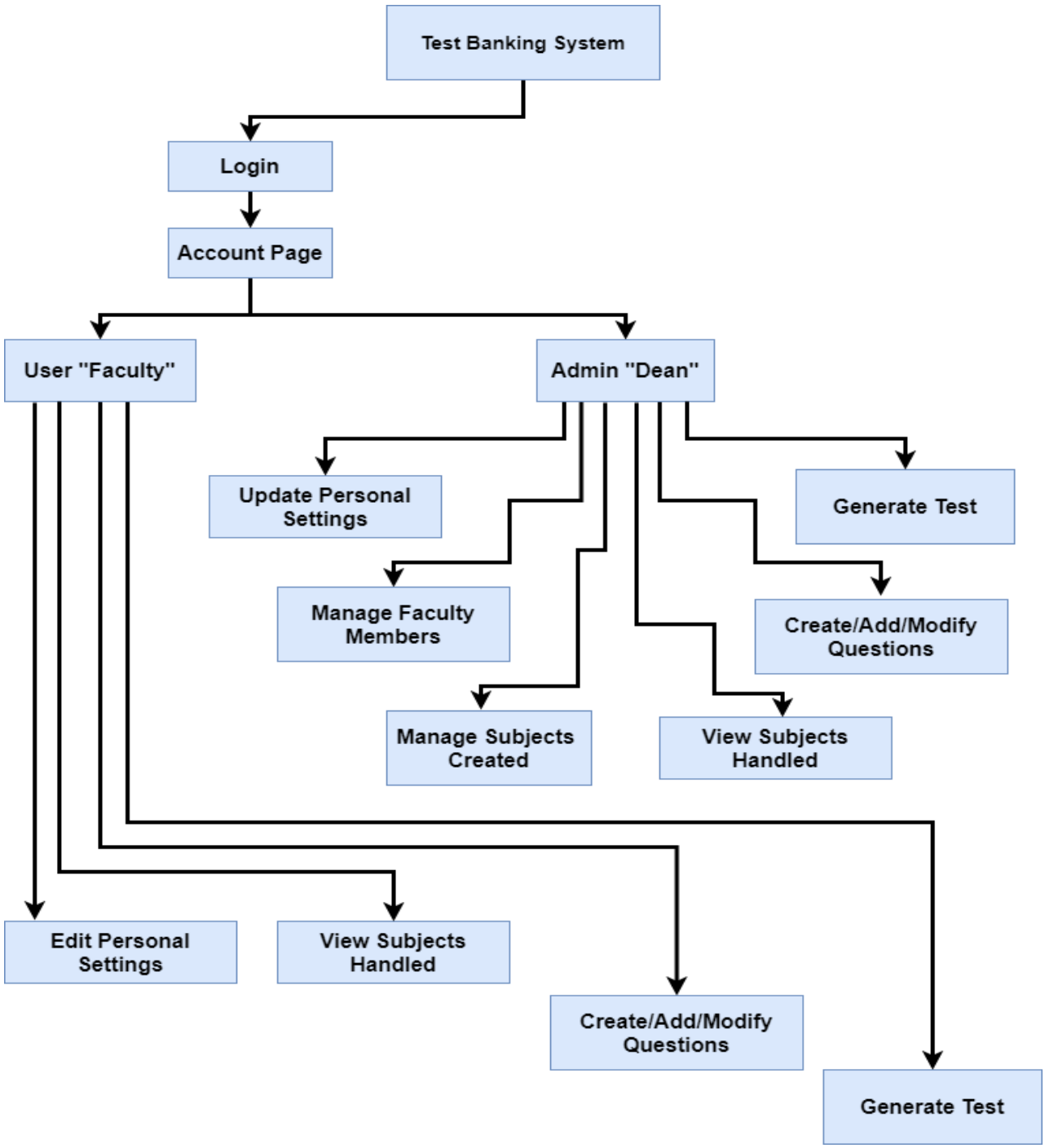

Figure 1.2: Hierarchical Input and Process Output of AMA Test banking System.

Used Terminology

Localhost: is a hostname that means this computer. It is used to access the network services that are running on the host via the loopback network interface.

Generate: produce (a set or random or sequence of items) by performing specified mathematical or logical operations on an initial set.

Web-Based: In computing, a web-based or web-based application or web app is a client–server computer program that the client runs in a web browser. Common web applications include webmail, online retail sales, online banking, and online auctions.

Javascript: often abbreviated as JS, is a high-level, just-in-time compiled, multi-paradigm programming language that conforms to the ECMAScript specification. JavaScript has curly-bracket syntax, dynamic typing, prototype-based object-orientation, and first-class functions.

MYSQL: is an open-source relational database management system. Its name is a combination of "My", the name of co-founder Michael Widenius's daughter, and "SQL", the abbreviation for Structured Query Language.

XAMPP: is a free and open-source cross-platform web server solution stack package developed by Apache Friends, consisting mainly of the Apache HTTP Server, MariaDB database, and interpreters for scripts written in PHP and Perl programming languages.

CHAPTER II

THEORIES USED IN THE STUDY

2.1 Descriptive Research Approach

Descriptive research approach is a type of research that describes what exists and may help to uncover new facts and meaning. According to McCombes (2020), descriptive research aims to describe, and document the aspects of a situation as it naturally occurs, to answer what, where, when and how questions, but not why questions to be used in any research methods to investigate one or more variables. This involves the collection of data that will provide an account or description of individuals, groups or situations. The proponents used instruments to obtain data in descriptive studies including questionnaires, interviews and observations. This method involved ranges from the survey which describes the status quo.

In this study, the proponents conducted a research by interviewing using the survey questionnaires to gain information and to have an idea on how the faculty of the college department of AMA Computer College - Cavite Campus, manage and produce exams for their students. It also helped in identifying the difficulty in using their manual procedure of making an exam. This is necessary and integral in the study for the information the proponents were able to acquire will be the backbone and the basis of the proposed system.

2.1.1 Survey Method

A basic type of Descriptive approach wherein the Dean and the college department - faculty members of AMA Computer College - Cavite Campus answers questions prepared by the proponents through interviews and questionnaires. After the clients answer the questions,

proponents describe the responses. To ensure that the survey to be both reliable, acceptable and valid, it is important that the questions are constructed properly. Questions should be written so they are clear and easy to understand.

Another consideration that the proponents have seen is when constructing questions is whether to choose or include open - ended (qualitative), closed - ended (quantitative), partially open - ended, or rating - scale questions. They have used both open - ended and closed - ended in designing questions but the most they have used is the open - ended style to be able for them to gather deep of what they need to research and analyze before they proceed on building the proposed system.

2.1.2 Data Gathering Instrument

The instrument used in gathering the needed data is through a questionnaire. The questionnaire includes thirteen statements with same choices and eleven questions for pre development survey and 5 categories along with 5 questions for system testing survey that are answerable by:

(a.) Strongly agree (5), Moderately agree (4) Agree (3), Moderately Disagree (2), Strongly Disagree (1);

(b.) Multiple Choices;

(c.) Quantitative and Qualitative questions;

(d.) Rating Scale from 1 having the lowest scale up to 10, the highest scale.

In this study, the researchers chose to use a two-part simple questionnaire to collect data for the pre-development stage. It allowed the researchers to collect a high quantity of usable answers. It is quicker and more efficient, cheaper in obtaining information compared to a larger

sample. The questionnaire consisted of the 1st part where there are 13 questions and with 5 Likert scale questions, 11 Quantitative and Qualitative – comprising (6) Qualitative and (5) Quantitative questions. And 5 questions for Rating scale from 1 having the lowest scale up to 10, the highest scale.

The respondents chose the answers that suffice from the given information which were needed to obtain a quantifiable result to help the researchers to find out the situation and their behavior and experiences when they are in a traditional way of making an exam and also to find out if our system is working fine during our system testing.

Open-ended questions allowed the researchers to gather factual information from the respondents. It gave actual points of views on the statements or questions asked in the questionnaire, which made the results more valid and reliable.

With the given circumstances, the researchers opted to conduct a face to face survey, and they also administered an online survey via Google forms, a survey administration software included as part of the free, web-based Google Docs Editors suite offered by Google. The researchers printed out copies of their questionnaires and distributed them to small business establishments near them, and waited as they answered the questionnaire they were given.

2.1.3 Data Gathering Procedure

Prior to the conduct of the study, the researcher asked permission from the school particularly the beneficiary of our proposed system. The identified respondents selected at random were gathered and oriented on the purpose of the study. The researchers administered the instrument (personally) and through online intervention to ensure its 100% correctness. The

accomplished instruments were checked to make sure that all items are answered accordingly. The gathered data from the identified respondents were tallied, computed and analyzed for interpretation.

2.1.4 Data Analysis Procedure

The collected data from the questionnaires were statistically analyzed with the help of statistical tools. For concrete evidence with mathematical bases, this study employed the use of the following statistical treatment on the data gathered. In the descriptive statistics, the following was used:

Mode. This was used to determine the value that appeared the most.

Frequency-percentage. To determine the percentage of the data profile and result of the survey.

Formula: $P = F/N \times 100$

Whereas P = Percentage (%), F = Frequency, N = Total Number of Population.

2.2 Relational Database Approach

According to Lucas (2019), relational databases are a type of database. It uses a structure that allows us to identify and access data in relation to another piece of data in the database. Data in a relational database is organized into tables. The standard user and application program interface to a relational database is the structured query language (SQL). SQL statements are used both for interactive queries for information from a relational database and for gathering data for reports. A relational database is composed of a set table which

contains data classified into predefined categories. Each table relation contains one or more data categories. Each row contains a unique instance of data for the categories defined in the column.

In this study, the proponents are going to use SQL for the coding of the database and query it needs to connect their proposed system to the database. They are also going to use XAMPP to activate MYSQL and myPhpadmin to build, manage and navigate the database. They have seen it as an avenue for their Web - Based proposed system to obtain storing, organizing, maintaining, retrieving and securing the confidential and private information and data that the faculty of AMA Computer College - Cavite Campus, College Department is protecting.

2.3 Networking Approach

A computer network or known simply as network, consists of two or more computers or other devices such as a printer, scanner, external hard drive, modem and routers connected together and describes their arrangement to communicate to each other and exchange commands to each data. Network topology plays an important role in network management and directly perceived network topology is very necessary in network management to achieve levels of accuracy and security. Network topology's main purpose is to obtain and maintain the information between the nodes and their connection and draw an entire network topological map related to their arrangements and placements.

The client has one desktop computer and printer at the Dean's Office and 2 to 2 desktops and 2 printers at the Faculty office. Two desktop PCs are used by the College Department area and one desktop PC is for the Senior High School Department. Most of the faculty members have their own laptops just in case all desktop computers are in use.

The proponents will depend on the type of network topology that the school has to its computers. Since the system is a web based system, the proponents will also deploy their system to a free Web Domain and Web Hosting aside from localhost, so everyone in the faculty can access and visit the system through its given website everywhere with the use of the internet.

2.3.1 Network Diagram

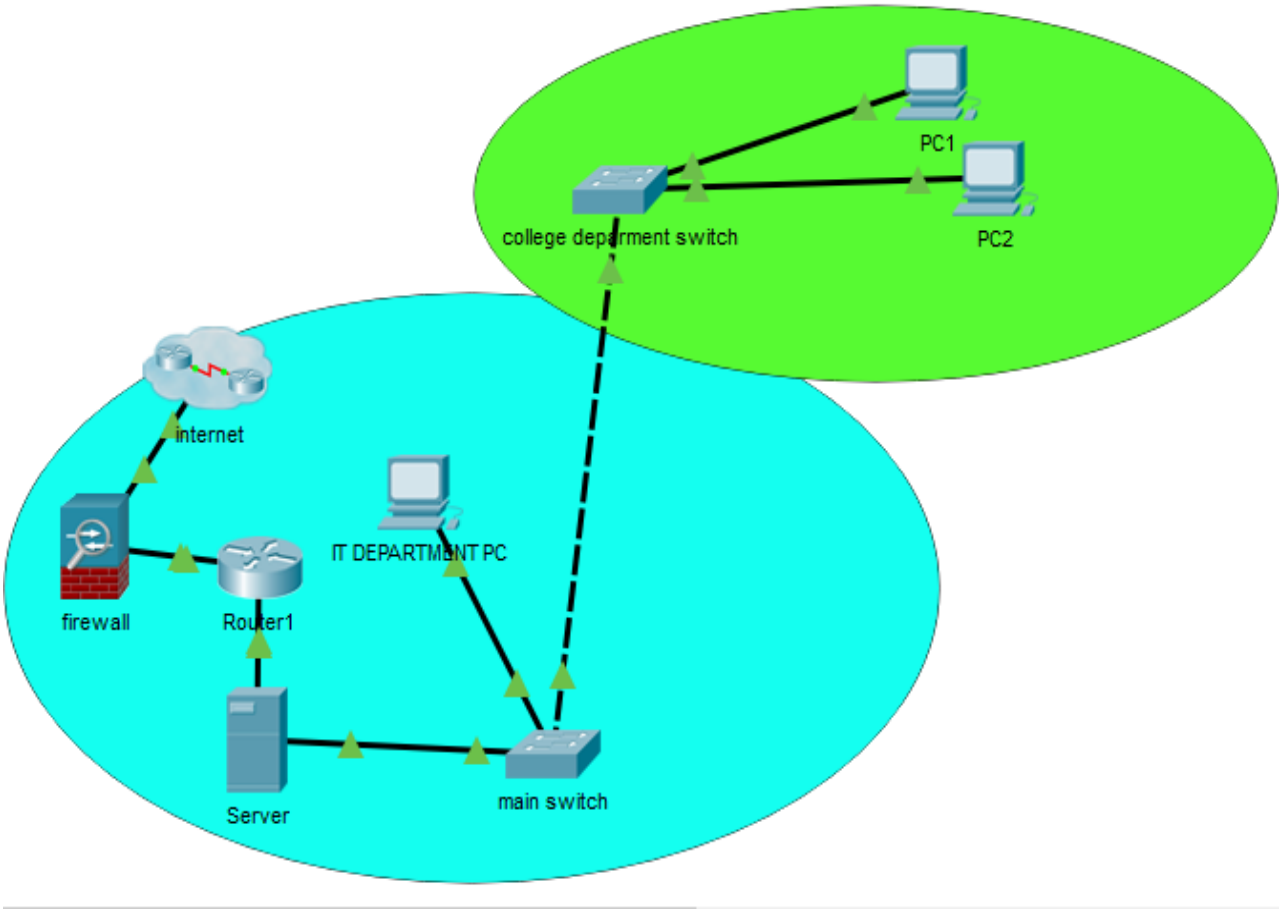

Figure 2: A network topology structure of AMA Computer College Cavite.

CHAPTER III

REVIEW OF RELATED STUDIES AND LITERATURE

3.1 Local Literature

Online Exam For Distance Educators Using Moodle

According to Borromeo (2013) of his research, the “Online exam for distance educators using moodle”, found that online examinations may be administered manually by teachers sending out questions through instant messaging, email, and forums, and students sending their replies to the questions. They may be also administered using existing online examination systems, which can automate the exam grading process depending on the exam question type. The University of the Philippines Open University (UPOU) uses Moodle as its main learning management system (LMS) platform. In Moodle, there is a Quiz module, which enables administration of online examinations within the online classrooms. Nevertheless, not all online exams within UPOU are administered through Moodle.

This study aims to determine the features of an online examination system desired by the teachers in the university. To achieve this, a survey and technology demonstration of the Moodle Quiz module in Moodle was developed. The survey was in the form of an online exam wherein the questions demonstrated the question types available in the Quiz module and inquired the teachers regarding the features they want to be implemented in an online examination system. The result is a proposal document for an online examination system for the university.

Moreover, less attention has been paid to the Moodle question types. Borromeo (2013) mentioned that one of the few researchers taking such an interest, studied which Moodle

question types some Philippine university teachers liked to use. The participants in the study were shown Moodle 8 standard question types. Even though the results shared a number of similarities, notice must be taken to numerical question type. The participants were using the numerical question types in Borromeo's (2013), but perceived negatively in this study. Such difference could be explained by the fact that in the previous study, some participants taught Mathematics for Multimedia because the study was not specifically aimed at English language teaching.

A Community Cloud-Based Course Management System Using Platform as a Service (PaaS) Model for Higher Educational Institutions

The reliability a new technology can offer to a University can be seen through the long-term effects it gives to the students and teachers. In a University setting, adapting to the evolution of technology is a good thing since there are more students than teachers. Under the International Journal of Information and Education Technology published by Comendador and Guillo (2014), the research intends to solve the struggles of teachers in giving feedback to students after an exam. Giving out feedback to students' activities or exams is important to the wellbeing of the students. Most Management applications or systems made for University often forget this feature. Although feedback is automated and is better to receive one personally, this feature is done to make it easier for teachers' side.

With the university using community cloud to share Platform as a Service (PaaS), it can offer courses or subjects online. The questionnaires in the system were formulated based on the National Standards of Quality for Online by North American Council for Online Learning

(NACOL). Using cloud and models helped the users to optimize the learning system from grading, distributing lessons, and also giving feedback to activities and exams.

Integrated Educational Management Tool for Adamson University

The continuous changes in information technology helps people to keep pace in the digital world. People are growing and so the data and services. One good example that technology benefits people is the existence of automation technology that lessens the workload of a manual process, and offers security and reliability.

It was discussed in the study of Doctor (2017) how the developed system for Adamson University vastly and greatly affects the management on grading, preparing exam, and collaborating of teachers with each other. The Integrated Educational Management Tool for Adamson University is a system developed that automates the processes of examination and student grading. It passed the non-functional requirements which are usability, reliability, performance, security, and scalability. The only downside of the system is it is not available in offline mode. Making available offline class records and exams with online auto synchronization of data processes were included for future recommendation.

Due to the effectiveness of the system, the faculty spend minimum time in preparing exam materials and recording the grades and can focus more time in giving quality education. Since preparing examination papers and grading the students is a lot of work, using the system really helps the teachers to take some time to rest before the new semester starts.

Assessment Of Traditional And System-based Management Examination In Computer In Ama School, Olongapo City, Philippines

Every Educator wants to become effective in their area of responsibility. Likewise, instructors or teachers need to find ways on how to motivate and help the students in gaining high scores and grades, this reflects their effectiveness as an Educator. Therefore, instructors or teachers should be equipped in the task of finding alternatives and approaches in learning and examination that will suit the students' motivation and atmosphere in order to achieve quality performance of their learning outcomes; this is the rationale of this study.

Through the study of Agatep JLE (2018), published on American Journal of Computer Science and Information Technology, the study aimed to determine the effectiveness of Traditional and System-based Management Examination in computers in AMA School, Olongapo City Philippines. The researcher employed the use of descriptive-analysis method of research with the use of questionnaire and documentary analysis. The study covered the one-hundred twenty (120) BSCS and BSIT student respondents from AMA Computer College-Olongapo City Philippines. Most of the student-respondents perceived to be Moderately Effective (ME) in the traditional examination approach and perceived to be Effective (E) in system-based management approach of examination. Overall findings support the superiority of System-based Management Examination of Computer Subjects. Recommendations were also provided.

Asynchronous Online Examination Security System Using Occupancy Detection

The paper introduces the capabilities of Occupancy Detection to enhance online examination security. Occupancy Detection determines the presence of a person in a particular

area and uses sensor networking which includes Passive Infrared Relay (PIR) sensor and Ultrasonic (US) sensor. PIR is designed to detect motion from a heat-emitting source (such as a person entering a room) within. On the other hand, Ultrasonic sensors produce low intensity, inaudible sound and detect changes in sound waves caused by motion.

Through a study led by Comendador, Molenilla,, Sabales, Suazo and Capangpangan (2015) of Polytechnic University of the Philippines (PUP), College of Computer and Information Sciences published on April 2015 in Journal of Automation and Control Engineering Vol. 3, No. 2, the computer vision part includes face detection of an intruder behind the examinee. The study aims to determine the accuracy of Asynchronous Online Examination Security System (AOESS) in terms of occupancy detection and computer vision. The PIR and Ultrasonic sensors act as occupancy sensors to monitor the presence of the examinee and identify suspicious movements and possible intruders. The sensors and external camera were integrated into a single hardware called Asynchronous Web-Based Test Security Unit (AWTSU) which may be used for the monitoring of an examinee during an online examination.

3.2 Local Study

Design And Development Of An Online Exam Maker And Checker

Instructors consider that test preparation, correction, and evaluation make up a significant portion of their time. Instructors being conscientious are further concerned about the quality of questions asked and methods for improvement in the evaluation of students' learning. Instructors often find themselves reusing questions or the whole exams, with the main concern of students' accidentally or purposefully finding out questions before the exam date. In this light,

test creation becomes daunting, especially when the exam is to be administered to hundreds of students. In order for instructors to address the problem with regards to the inefficiency of the exams and to bring improvements to it, a study has been made by the Instructor of Lyceum of the Philippines - Batangas online exam maker and checker.

Through the study of Ramos and Velasquez (2013), the “Design and Development of an Online Exam Maker and Checker”, the study is an online, computer aided tool that was designed primarily for the conduct of online examination. The system was created using PHP, a web based scripting language, and MySQL as the database software. The system focuses on the automation of students' examinations; preparation, scheduling, checking and grading. A database is provided for the storage of exam questions, answers to questions and students' records. The system allows instructors to create an exam by entering questions with its corresponding answers into the database. Instructors are provided with three options on the type of exam; these include, *true or false, multiple choice* and *fill in the blanks*. One limitation though, this online system is not to be used to compute for the class performance for the final grade since this requires other components such as seat works, graded recitations, laboratory activities, and other assessments. This only computes and shows the scores from previous exams and the average.

Based on the findings of the study, the following conclusions were drawn within the limitation and scope defined in the study. The developed software served as an alternative tool for students in taking examinations in their respective classes. The developed software was a useful tool for instructors in the preparation and checking of examinations as well as the maintenance of an online class record. The developed software was a tool equipped with

security features useful in minimizing cheating during examinations among students. The developed software provided a useful tool in administering online exams rather than the traditional paper-based exams.

iBank

In view of this goal to deliver quality education in the country, various school districts use standardized tests as a way to measure scholastic achievement. Usually, these districts need to revise tests with some frequency to avoid administering the same test year after year. Unfortunately, creating new tests can be a very time consuming endeavour; not only do test writers/teachers need to compose the test items, they also must determine the Item Analysis of each item in the test, a task that seems monumental to the already burdened teachers, considering the many roles, tasks and responsibilities they need to perform. Constructing a good test for a class, for example, would normally take teachers a lot of time, effort, and energy; a very demanding “input” which many teachers or lecturers cannot afford. As a result, high quality tests cannot be constructed and validated. These tests and items could have been stored and used repeatedly if they had an item bank and if they knew the concepts of item banking and computerized adaptive testing.

To clearly analyse and to address the problem, in 2012, Bermundo C., PhD PME of Ateneo De Naga University, Bermundo A., PhD PME of Bicol State College of Applied Sciences and Technology, and Ballester of Ateneo de Naga University conducted a study about exam generator, they called it “iBANK”. iBank is a project that utilizes software to create an item Bank that store quality questions, generate tests and print exams. These are the test items accepted in the Item Analysis. It segregates the different subjects, sub-subject and competencies which

correspond to the different behaviours such as cognitive, affective and psychomotor. It also stores problems and selections containing figures, graphs and tables. The software is run by the usual procedure using Windows by clicking the icon item bank twice. The user can start developing a volume of test items and manipulating the data by selecting information in the menu bar.

With Item Bank et al., teachers who used to neglect and abandon item analysis in favor of other teacher-related tasks, can now be helped. Using the data gathered from item analysis and test norms on the reliability and validity of the test questions, teachers can now formulate questions that will challenge the critical thinking of their students. Since teachers should not settle for mediocrity in their schoolwork, and should instead strive for excellence, their tasks can be facilitated if they recommend to the school the acquisition of the Item Bank et.al.

Implementation of Advanced Encryption Standard Cryptographic Algorithm in a Test Bank System

Technology is continuously evolving and gives a lot of advantages to human lives and different sectors. It has been more useful in education since it helps the both parties, the students and the professor in terms of efficiency. One example is leveraging high technology for specific processes such as using an application other than Microsoft Word in making an exam for students. Many applications and systems in making examinations are coming out because automation has been a trend for a long time. One of the most important variables the programmers have focused in making such systems is about its security. A working system or application is good but a secured working system is better.

Berol (2018) from Agusan del Norte Philippines conducted a study that focuses on security of a Test Bank System. The researcher introduces a working Test Bank System which has security measures. The said system just can be accessed within the school premises anytime, anywhere. In that way, the system is just accessible by students and professors of the school or university as long as they are inside the campus.

Due to the embedded Advanced Encryption Standard Cryptographic algorithm injected to the system, the database is secured and the information cannot be infiltrated by any unauthorized access. The other good thing about the secured system is it works perfectly even on low-end computers or laptops. The minimum requirements to run the system are as follows: with a hard disk or storage consisting at least 120 gb, memory of at least 2 gb and with a CPU or processor of at least 1.90ghz Intel Celeron.

Intranet Exam Generator (IEXGEN)

De Lima, Belen and Pabalan (2011), conducted a study that is aimed to develop a computer-based exam generator that would serve as a tool in providing fast and reliable examination and eliminate the paper and pencil method. It also aimed to generate questions randomly in order to avoid cheating during the examination and to provide a system that would automatically check the examination and develop an exam generator that contains an item analysis that will identify which item got the most number of wrong answers.

The Intranet Exam Generator (IEXGEN) provides a LAN based exam generator that allows instructor/s to input questions which automatically generate a quiz or an exam for each student in class. It supports several types of examinations: multiple choice, true or false, identification, enumeration, and essay. The instructor can use his/her previous self-made exam

for future references. The system is also capable of monitoring a particular question in which a student finds it difficult to answer.

The system was developed using the Iterative Life Cycle Model while convenient sample design was used to test if it would have a high demand in the commercial market. The respondents gave an overall agreeable feedback to the system during the evaluation; thus, it was recommended to implement the system in schools for this would give tremendous impact on technological development.

Test Bank Management System Applying Rasch Model and Data Encryption Standard (DES) Algorithm

Online examinations are of great importance to education. It has become a powerful tool for evaluating students' knowledge and learning. Adopting modern technology that saves time and ensures security. The researcher developed a Test Bank Management System that can store test items in any subject. The system is capable of conducting item analysis using the Rasch Model Scale. Items that undergo analysis based on Rasch Scale helped faculty by quantifying each item as "good", "rejected", or "revised".

Estrellado, Sison and Tanguilig III (2016) conducted a study for securing items in the test bank, Data Encryption Standard (DES) algorithm was successfully applied thus ensuring the safety and reliability of the questions in the test bank. Only items that are ready for deployment to the students' computer during the examinations will be decrypted. In conclusion, the system passed the evaluation process and eliminates redundancy of manual work.

The developed system is capable of storing test items in the test bank per subject. Random selection of the test items ready for deployment to the students' computer is one of the

functions of the system. It automatically checked the answer sheet of each student. The Rasch model was successfully applied by conducting an analysis of each item based on the result of the exams of the students, as it was part of the function of the system; thus, eliminating redundancy of manual work. After analysis faculty members could now easily quantify all the items in the exams as good, rejected, or revised items.

3.3 Foreign Literature

Envisioning The Use of Online Tests In Assessing Twenty-First Century Learning

The digital world brings with it more and more opportunities to be innovative around assessment. With a variety of digital tools and the pervasive availability of information anywhere anytime, there is a tremendous capacity to creatively employ a diversity of assessment approaches to support and evaluate student learning in higher education. The challenge in a digital world is to harness the possibilities afforded by technology to drive and assess deep learning that prepares graduates for a changing and uncertain future. One widespread method of online assessment used in higher education is online tests. The increase in the use of online tests necessitates an investigation into their role in evaluating twenty-first century learning.

Boitshwarelo, Reedy and Billany (2017) of Charles Darwin University, Ellengowan and Casuarina (2017) of Australia, published an article about *"Envisioning the Use of Online Tests in Assessing Twenty-First Century Learning*".

In recent times, there has been widespread interest from governments, industry, and educators in identifying a model of learning and assessment in higher education that meets the

challenges of learning in the digital present and prepares students for an uncertain future. The term twenty-first century learning is widely used to encapsulate the idea that fundamental changes in the nature of learning and education have occurred in the twenty-first century as a consequence of rapidly changing technologies and globalisation (Kereluik, Mishra, Fahnoe, & Terry, 2013). Hence, different forms of assessment that are commensurate with the twenty-first century are needed.

We use the term “online tests” to specify a particular type of ICT-based assessment, or e-assessment that can be used for diagnostic, formative, and summative purposes. While e-assessment can be used to broadly refer to any practice where technology is used to enhance or support assessment and feedback activities, online tests specifically refer to computer-assisted assessment where the deployment and marking is automated. Online tests (also known as online quizzes) are used extensively within learning management systems (LMS) in online and mixed mode delivery. For the purpose of this paper, online tests are distinguished from “online exams”, which are typically invigilated and conducted on computers in a controlled exam centre.

We review the literature around online tests to identify some of the research on their use in higher education contexts including the rationale for their use, their relationship to student learning, and trends in practice. Those are the rationale for using online tests, cognitive levels of questions, online tests in context, online tests and formative learning, the nature of feedback, Student attitudes to online tests, and online tests and twenty-first century learning

Automatic Question Generation Systems

Sheetal Rakangor and Dr. Y. R. Ghodasara(2015) published an article towards automatic creation of questions for examination purposes. In order to use automation in a system, one has to use algorithms. Although there are various types of algorithms, the articles solely focus on one algorithm, the Natural Language Processing or NLP. NLP algorithms are typically based on machine learning algorithms. Instead of hand-coding large sets of rules, NLP can rely on machine learning to automatically learn these rules by analyzing a set of examples. Some of the algorithms besides NLP are Named Entity Recognizer(NER) and Semantic Role Labeling(SRL).

Within the article, Manish Agarwal and his team says – “Question generation systems are divided into two modules, content selection and question formation. Content selection consists of finding the relevant part in text to frame questions from while question formation involves sense disambiguation of the discourse connectives, identification of question type and applying syntactic transformations on the content.”

New technologies and tools indeed can lessen the workload of professors in making exams. With enough research and study towards the creation and development of a question banking system, it would take less time in preparing questionnaires. With the help of few algorithms, the development of Automatic Question Generation Systems is feasible. As Sheetah Rakangor concluded – “As discussed many algorithms created and different methodology is used to generate the automatic question generation system. NLP is used to process the text and NER and SRL is used to identify the semantic relation. Most of the work is done in English language and generates MCQ type questions.”

Quizzy: Quiz Application Development Using Android-Based Platform

An application or system that is perfectly designed just for a limited program or course is efficient for both student and the institution or University. There's a saying that "Sometimes, less is more." and it also applies to creating a system. A simple system doesn't mean it has unsophisticated codes underneath it's simplicity.

Of all the given types of question in a particular exam, multiple-choice is the known one. In Pakistan, Sana I, Iqbal H. et al(2015) aimed to focus on the development of android-based multiple-choice question examination system, namely: Quizzy. which is developed with focus on the Computer Science field. This quiz application includes three main modules, namely (i) computer science, (ii) verbal, and (iii) analytical.

There are a vast number of systems and applications made to replace the manual way of giving out exams, lectures and gradings. Most systems and applications are made for laptop or desktops and run through accessing a browser and/or clicking the software icon twice. However, in the literature presented, the application is made for android users. It's portable and can give access to more students to use it since phones are a lot less expensive than desktops or laptops.

Review of computer-based assessment for learning in elementary and Secondary Education

The effects of technology on the motor skills and enthusiasm of the students in learning gave dramatic results. The students are more engaged than the usual way of learning which are reading from the boards. In this new generation, technology prepares people to adopt on new

ways of learning things. Interaction does matter for a child's or any human's growth and it does not just happen personally but also digitally.

In 2016. Shute et al, found the two most familiar assessments which are summative and formative. Summative assessment or assessment of learning refers to grades promotion and certification. It is a process that is usually administered or taken care of at the end of the semester, end of school year or after some major event. While formative assessment or assessment for learning is done to support teaching and learning. A simple example of this is a teacher giving a pop quiz to her students on some lessons, immediately analysing their scores and then having a recap of those questions given in a pop quiz to smoothen out the misconception shared by some students in the class.

The researchers believed that the evolution of technology changed for the better, especially in the learning mechanism of the students. Computers from the early 1960s were not very powerful compared to what we have today. Old computers have black and white text-based interfaces with very low ram. With sophisticated systems and applications for learning in this new generation, the learning and teaching assessment is better than the past generations.

Evidence-based Best Practices for First-year Blended Learning Implementation

Using technology in teaching replaced the way the University distributes lessons and gives grades to students. A face to face interaction with the students is the traditional way of teaching and assessing them. In contrast, using technology such as a question banking system or management system is the new way of how teaching and learning happens inside and outside the classroom.

A study led by Marasco et al. (2018) at the University of Calagary, Canada listed down the best practices for First-year Blended Learning Implementation. In their study, they promote flipped teaching to students. With this kind of approach, the professors provide a video or learning materials online which will be homework for students. The teaching session also happens inside the classroom but traditionally, reading from boards. The existence of technology in this approach was optimized for more effective learning of the students. Technology does not replace the teaching and learning approach but just integrates with the traditional way.

With the said approach, having both the technical and design focused implementations have demonstrated a successful development of blended online learning. Using the new ways and traditional ways in teaching the students remind them that old ways of learning are essential and as much as effective as what we can benefit from technology.

3.4 Foreign Study

A Systematic Review of Automatic Question Generation for Educational Purposes

Making exams requires attention, knowledge, creativity and reliable resources to be of use for educational purposes. It is not a mere list of questions to be answered but a set of questions to assess the knowledge of the students and see which information they were able to absorb. By issuing exams to the students, it makes them engage with the topics they have reviewed recently.

Kurdi et al. (2019) published an article in the United Kingdom about quality questions that can help the students have good remarks or grades in their exams. A system that produces

quality work or product is as much as important as the design of the user interface. The researchers cite some references that backed up their study. In addition to resource saving, having a large number of good-quality questions enables the enrichment of the teaching process with additional activities such as adaptive testing (Vie et al. 2017), which aims to adapt learning to student knowledge and needs, as well as drill and practice exercises (Lim et al. 2012). The researchers found that the majority of Question Generator systems focus on generating questions for the purpose of assessment. Characteristics of students involved in the study, such as their educational level and experience with the subject under assessment, are important for replication of studies.

Web-based Question Bank In Indian Higher Education: An Open Educational Resource

Teachers in college are still doing the normal and tedious process of preparing questionnaires for examination, long tests, and quizzes. As for the other end, students still get confused with several ambiguous questions in the exams. The questionnaires are usually type word-by-word by the professor of a specific subject he teaches. The exam should be based on the curriculum and relevant to the subject. It is type repetitively without knowing the same exam would be given in the next semester or so; hence, the soft copy gets deleted when it can be retrieved to modify or reuse. To address the problem related to foreign universities and colleges' issue regarding the examination questionnaire, a study has been made in India about the question bank system.

Through the study led by Ananthasayanam and Parthasarathy (2012) at India stated that only few Universities in the country electronically archive the past examination questions (PQ) prepared for future use. Considering the efficiency it would serve to the students and teachers

as well in accessing PQ and distributing question banks as web- based Open Educational Resource (OER). With integrated features, the system was further improved and was called as Web-Based Past Examination Question Bank(WPQB).

Web- based education such as virtual classroom, online distribution of learning materials and teaching/learning online assessment has been widely popular as technology continues to move forward. The Open Educational Resources (OER) was a concept of UNESCO which is based on the web. Within the study, referencing Rossum (1998), “Since 1998 when Tim O'Reilly conducted the Freeware Open Source Summit, the term open source has become very popular.” With supply of code of programs or systems, people can modify the features of the system without any restrictions. It is where the idea of the study came from.

OER offers learning content, tools and implementation resources. Learning content composed of the courses, modules and learning objects which are useful to students and teachers. Tools are the content development systems used to support development, use, organize and deliver the content. Implementation resources are the design principles and intellectual property licenses. Commission of India promoting OER to overcome issues such as lack of high-quality teachers and poor quality of educational resources at various Colleges and Universities come up with suggestions in regards of creating question banks as the OER which are as follows:

- To create distributed repositories of educational content.
- To increase the availability of educational applications through the internet.
- To create open-standard and service-oriented facilities for distribution of educational content.

Ananthasayanam and Parthasarathy (2012) concluded that, "Eventually, the WPQB would result in understanding questions, achieving more marks, knowing thrust areas, improving questions and question patterns. Further, a scientific evaluation of WPQB and its utility is also essential."

A Development of Item Analysis System and Item Banking System with Case Study of Internet Technology for Daily Uses

As time passes by, technology is continuously moulding the way how people live. Universities are greatly influenced by high technology. The E-learning system has been part of most Colleges and is still improving for the learners so they can learn effectively. Additionally, the instructors can update the learning materials online which consumes a lot of time and is harder to do in manual.

Wathhananon and Teabsornchai (2014) from Thailand set their sights on development of item analysis and item banking systems with case study of Internet Technology for Daily Uses. The researchers did not only focus on the system's core function which is issuing online exams but also have worked on the design of user interface.

Regarding the suggestions from instructors who used the systems, most agreed on the ease and convenience of use. Despite the advanced usage of the system, it didn't hinder the users to access it. For further improvement of the system few things have been recommended such as the shuffling of exam sub questions, enhancing of multiple exam issuers (as team), and more optional types of exam questions (such as true-false and matching). This is to enhance the more comprehensive student's performance evaluation and the future use.

Automatic Question Paper Generator System

A standardized and good set of questions predetermines the enthusiasm of students towards answering in exams. Gangar and his team (2017) stated, "The caliber of the question is the key in enhancing examination standards, which depend on intelligent and random choice of a set of questions." The National Board of India (NBA) persuades Autonomous institutes in their country to use the advantages of high technologies to create an effective system about automatic exam generators. Thus, the Department of Information Technology of Vidyavihar, Mumbai-77(Autonomous College Affiliated to University of Mumbai) led by Gangar started a study entitled "Automatic Question Paper Generator System".

The study aims to use automation in the creation of the program. Automation means to replace the manual operations with computer procedures and other machines. In the long run, automation reduces costs and human labor as well. Though error would not be completely eliminated, automation is said to be more reliable in handling big data for longer time. Through the method of automation, there are various algorithms used.

Manual Paper Generation	Automatic Question Paper Generation
Human process	Automated Process
Patterns or repetitions may occur	Totally random and unbiased process
Low Security as chances of paper leaking are high	Higher Security as chances of paper leaking are zero precent
Slow as human labour involved	Faster due to computer based automation
Less variety of different types questions	Huge variety of different types of questions

Table 3.1: Showing comparison of Manual process and automated process of question paper generation

Ittizar Aldabe et al. (2006) made an attempt to create automatic questions called ArikIturri, the procedure was based on Corpora and NLP methods, and the information source for the system was the linguistically inspected real corpora, depicted in XML mark-up language. NLP algorithms are typically based on machine learning algorithms. A corpus (plural *corpora*) or text corpus is a large and structured set of texts (nowadays usually electronically stored and processed).

New technologies widely helped the college students of India in studying through the development of Automatic Question Paper Generator System. The implemented system narrates how an automated process is better than the traditional process of producing examination papers. As a result, automation of examination gives relief to both students and professors.

Development of Mathematics Question Banking System for Secondary School in Malaysia

Preparing for an exam is a tedious process which includes developing the exam questions, getting reviewed for grammar, error, and quality of questions and lastly printing out the examination paper. Due to the process it involves, students from Malaysia focus their research towards the creation of the banking system. The study involves two Universities from the country which were led by Hui (2012).

A Mathematics Question Banking System (MQBS) is proposed and implemented at secondary school in Malaysia to allow teachers to collaboratively set, deposit and review online Mathematics exam questions. The psychometric properties of the Mathematics test question were first analysed using a Rasch Model Measurement computer program in order to ensure the best fitted items with appropriate level of difficulty before were included in the MQBS. A Rasch item bank enables the testing programs to be constructed in a flexible and appropriate manner, as different groups of students can take different items which are suitable to each of them.

The system is designed as a web application that supports three types of users including Administrator, Teacher and Student. The administrator's first module which is called Users Management Module allows an administrator to register accounts for users (Teachers and students). This module is created to prevent students from registering themselves pretending to be a teacher and gaining access to MBQS to obtain the questions. The second module of administrator is called "Question Calibration and Validation Module". This module allows the administrator to view and edit the exam questions according to difficulty levels. The teacher has three modules including Question Entry Module, Paper Generation Module and Question and Paper Management Module. Question Entry Module is like a big workstation of all teachers from different schools who have access to MQBS.

They can contribute questions to the question bank. Paper Generation Module is where a teacher would be selecting a question from a question bank that would automatically appear in the Student Application depending on date and time. Question and Paper Management Module enables teachers to edit or delete the questions from the temporary database. The user Students has only one module which is Online Examination Module. This is where they take the online examination according to the date and time given by the teachers.

Hui (2012) was thankful for the financial and technical support given by Multimedia University and Universiti Sains Malaysia for successfully launching the system, thus turning ideas into reality.

3.5 Justification of The Study

To date, examination papers in colleges are heavily typed by professors every single time. Archiving the exam for the future use may help the professor in retrieving the same exam. With new technologies and tools along different algorithms, integrated features for question banking systems would make it easier for professors not just to retrieve past examinations but also generate questions.

CHAPTER IV

ORGANIZATIONAL BACKGROUND

4.1 Organization History

The AMA Group of Companies was built upon the dream of the late Amable M. Aguiluz Sr. (AMA) Auditor General and National Treasurer during the term of President Diosdado Macapagal, to build an institution that would provide world-class education to the Filipino youth.

That dream bore fruit on October 20, 1980 when his son, Dr. Amable R. Aguiluz V (ARA), established the AMA Institute of Computer Studies and thus blaze the trail for popular computer education in the country. Originally located along Shaw Boulevard, the pioneering school offered EDP Fundamentals, Basic Programming and Technology Career courses.

In June 1981, the AMA Computer College (AMACC) was launched with a four-year degree course in BS Computer Science, the first to be offered in the country. From only 13, the student population of AMACC surged to 600 in 1983 and to 2,000 in 1985. To meet the growing demand for computer courses, AMACC established its first campus in Makati in 1983. A second campus followed in1986 in Project 8, Quezon City.

In 1987, AMA Computer Learning Center (ACLC) was established to offer short courses in computer programming and two-year technical vocational than 100 franchised learning centers.

In the same year, AMA Basic Education was formed to offer elementary, high school and eventually pre-school education. Now known as the ST. Augustine International School has

eight (8) local branches located in Metro Manila, Laguna, Cebu City, Mactan, Bacolod and Davao.

4.2 Vision and Mission

Vision

AMA will be the leader and dominant provider of relevant globally recognized information technology-based education and related services in the global market.

Mission

AMA University shall provide a holistic, relevant, quality and globally recognized IT-based education in all levels and disciplines with the objective of producing professionals and leaders responsive to the needs of Science and the international community cognizant of the welfare and benefits of its men and women thereby realizing their potential as productive members of the society for the honor and glory of God Almighty.

4.3 Goals and Objectives

Goals

Dedicated to develop the profound desire and capability of learning among the learners needed in the continuance of their studies in the field of discipline that the students have chosen.

Objectives

AMA University aims to help students finish their studies with enough knowledge on their areas of competence and be ready for the real world outside the campus.

4.4 Academic units

Here are the general undergraduate programs that AMA University is offering to any of its education system and campus branches nationwide.

- College of Computer Studies
- College of Engineering
- College of Business Administration and Accountancy
- College of Arts and Sciences
- College of Education

CHAPTER V

EXISTING SYSTEM

5.1 Brief Description

AMA Computer College - Cavite Campus, College Department has no system for producing an exam. They only do it manually by using word processors to encode and modify it before they can use it as a hard copy of test questionnaire for their students

Some faculties do prepare a lesson plan but also some of them are encoding lessons to a Powerpoint presentation or Word Document. And when preparing a test questionnaire, a professor would likely encoding it on a document with designated file name on it to be able for the professors to search and access it easily.

Every Prelim, Midterm, and Final, they will start to access it and do a little bit of changes to the test levels and types of exams of their questionnaires. The professors also modify the header of the test questionnaire if when the dates it will be used, what proctor will be in charge, and on what school year, and semester does the examination will occur. Once they are done modifying it, they will proceed on printing or photocopying it to produce a bunch of copies related to the number of students in certain classes they hold. They will give a copy to each student and they can only use it during examination.

5.2 Inventory of IT Resources

Below are some of the machines and other things the institution use to operate their works in their fields. They are categorized as hardware and software:

5.2.1 Hardware

- PC Desktops or Laptops
- Printers and Inks
- Telephone

All faculty members in the college department have PC desktops in their office. Some of them have their own PC Laptops, they use such of these to get their work done and to communicate and collaborate with other faculty members. The proponents also use the telephone to connect, communicate and collaborate with other faculty members who are away from the office. Printers and inks are also important for them wherein this machine will be their last destination if they want their soft documents to have a hard copy and get printed.

5.2.2 Software

- Microsoft Windows 10, 7
- Microsoft Office Word, Excel, Powerpoint
- Browsers

Most of their PC's have a Microsoft Windows 7 or 10 version of the operating system. They also use Office Word, Excel and Powerpoint to encode the documents that they want to produce offline. If professors want to get the work done online, they prefer to use a browser and visit some online and web application services to encode, collaborate and communicate with other faculty members online to finish their work on producing test questionnaires and lessons.

5.3 Input Documents

Name: Test Questionnaire/Test Paper (Soft Copy)

Number of Copies: 1 - 4

Origin: Faculty Member - College Department

Recipient: Faculty Member - College Department

Purpose: For the faculty members of the college department to stock a set of questions for a document that they need to make a questionnaire paper. The documents will be produced as a draft first and will remain a soft copy as the professor will update the documents every time that it changes and additional set of questions to the documents.

5.4 Output Documents

Name: Test Questionnaire/Test Paper (Hard Copy)

Number of Copies: 1 - 4 (if photocopied, it will depend on the number of students of certain classes that the professor holds)

Origin: Faculty Member - College Department

Recipient: Faculty Member, Students

Purpose: For the faculty members of the college department once the professor reaches the final stages of updating the soft copy of the documents. The professor will produce a printed copy or photocopy to distribute the test questionnaires to their students during examination.

5.5 SAD Tools

5.5.1 Major Cycle of Operation

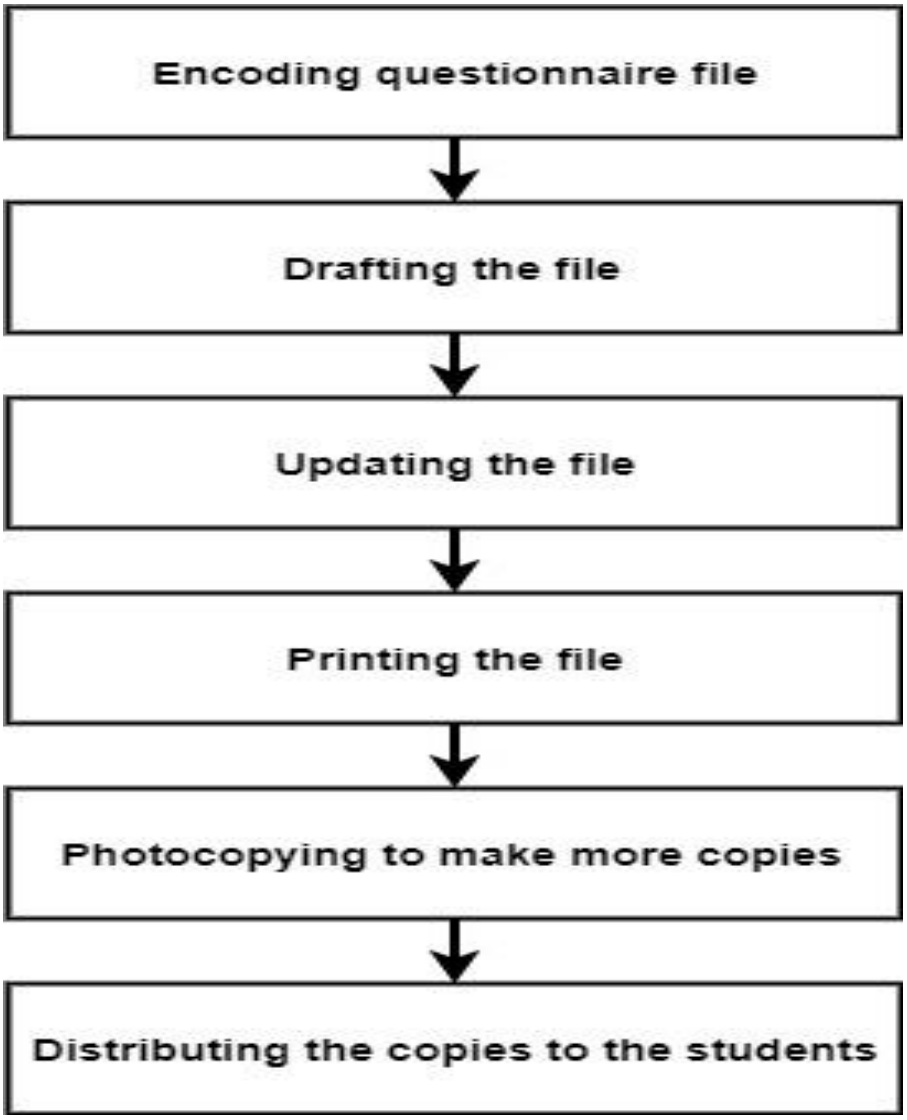

Figure 5.1: A manual cycle of producing an exam by a faculty.

5.5.2 Level 0 Diagram

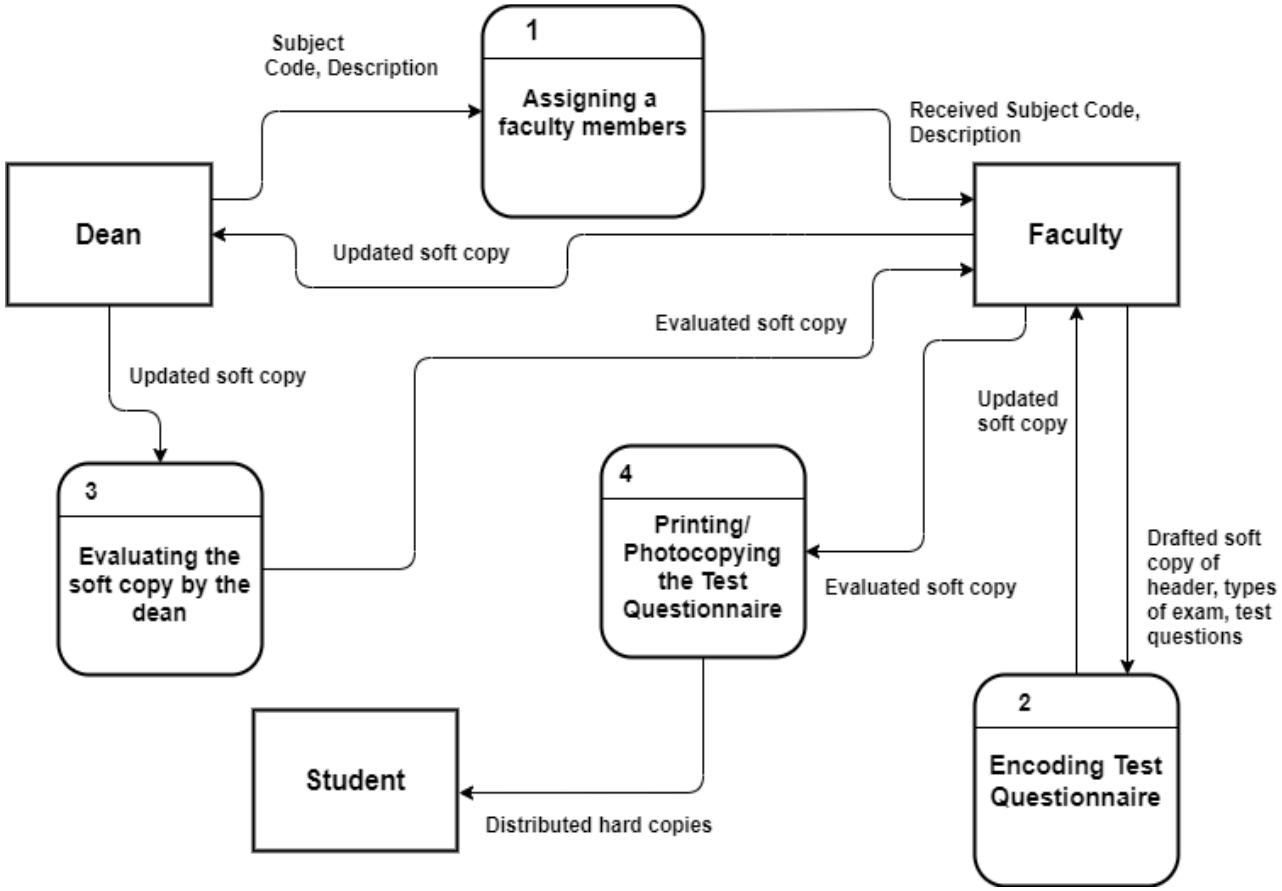

Figure 5.2: A manual process of info and work from Dean,

to Faculty, up to the Students.

5.5.3 Context Diagram

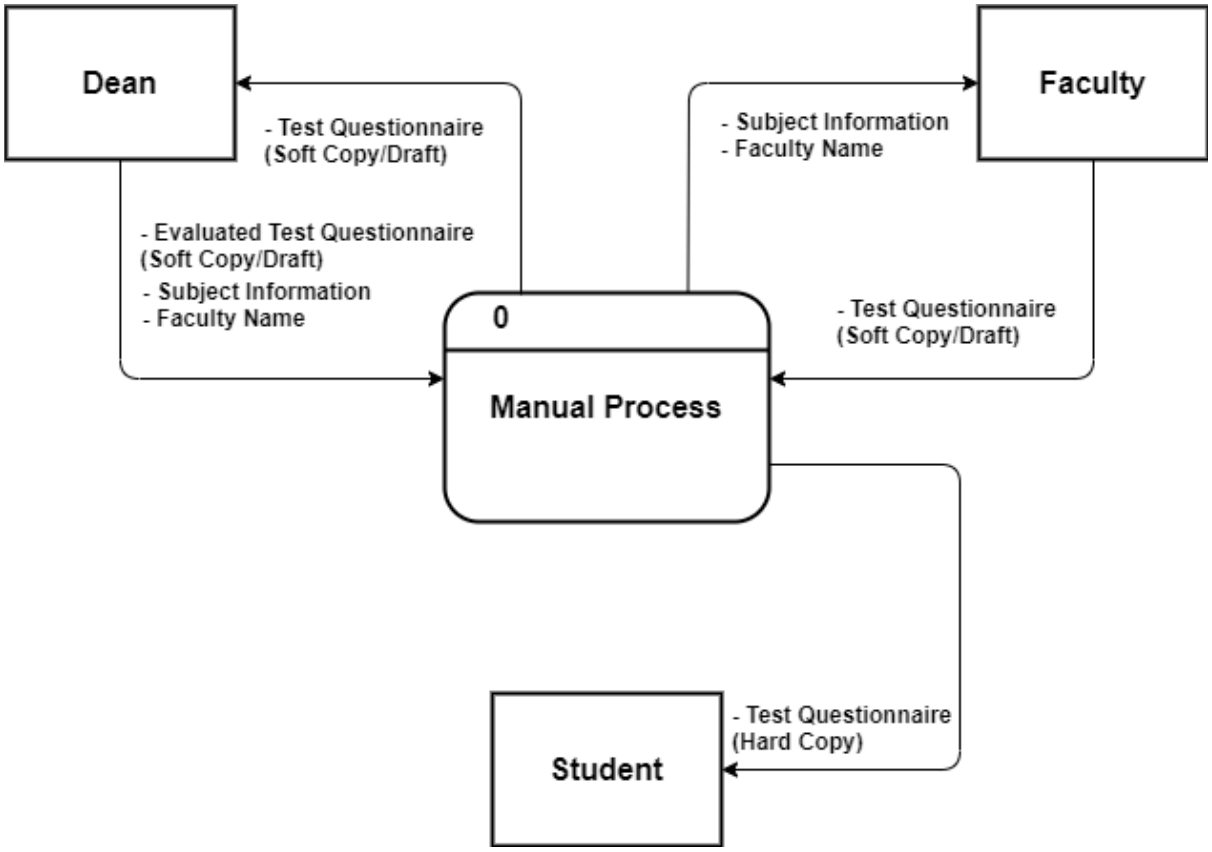

Figure 5.3: An overall manual process of info and work from Dean, to Faculty, and up to the Students.

5.6 Problem Analysis

Since the client has no system for producing an exam, they only encode those data using word processors or sometimes they use online services like Google Docs to encode it online. The documents or drafts that they have encoded will be stored to their hard drive or flash drive and their other options is to store and save it to Google Drive, an online file storage service. In this case, such irregularities and scenarios happen when the hard drive/flash drive has been corrupted, the file will never be retrieved, or the word processor application is running so slow, it will make more time for the user to get it done. And some test questionnaires are constructed and have its ordinary set of usual arrangements produced by some professor every examination which makes the test questionnaire familiar every set of semester that may lead to leak of those questionnaires by the students who already took the exam.

CHAPTER VI

PROPOSED SYSTEM

6.1 System Overview

The proposed system of the proponents will replace the manual process of producing an exam with additional features essential for the admin and faculty of AMA Computer College - Cavite Campus, College Department. It will possibly decrease the number of manpower, space, time needed for them to produce an exam. The system will not only give the school the benefit of being able to give the students a random set of questionnaires for all students of the College department, but also it will give the school a fair enough assessment to the academics that the learners get in their lessons.

The administrator for the proposed system will have a main control to the system to rightfully manage and monitor the number of the faculty and the other admin who are the users of the system. They create subjects in the system and assign each faculty and other admin to handle the subjects so they can put all of the questions on the subjects based on the lesson it covers. They also have the functions of the faculty when producing exams .

The faculty will be the source of the test questionnaire as they are handling classes. They are storing questions based on what lessons and subjects it is. Once they need it for the student's quiz and examination, the system will generate the questions in a random order, based on the preferences of the faculty on the arrangements of the test questionnaires' content.

6.2 System Objectives

6.2.1 General Objectives

The general objective of this system is to help the professors in the college department in getting the ease of producing test questionnaires for the students and make it possibly time efficient and dependable.

6.2.2 Specific Objectives

Through the final outcome of the system, the proponents listed the following specific objectives:

- The user will have an avenue to manage the subjects handled, manage each of its lessons while listing the questions.
- To organize and put questions in a random order per type of exam based on the given subject.
- Filter out examinations for avoidance of repetition.

6.3 Users of The System

Administrator

They are the major users of the system. The admin is the one responsible for creating and assigning the subjects to the other user. They also have the functions to create, delete a user account and monitor the number of users within the system.

Faculty

They are also an important user of the system. The faculty, aside from the other admin, can view the assigned subjects to them. They can add, view, edit, rename or delete lessons to the subjects and add questions to each lesson.

6.4 Hardware and Software Requirements

In using the system, users should at least use the minimum software and hardware requirements.

Hardware Requirements:

- Monitor: 1024 x 768 or Higher resolution
- Processor: Intel(R) Core(TM) i3 - 500u 2GHz or Higher
- Ram memory: 2gb Ram or higher
- Printer: Epson L360

Software Requirements:

- Operating system Windows 7, or higher, Linux Ubuntu, macOS
- Browser 32 bit and 64 bit (Firefox, Microsoft Edge, Opera, Chrome, Safari), supporting HTML5, HTTP, HTTPS and security protocol.

6.5 Cost and Benefit Analysis

6.5.1 Operating Cost Annually (Existing System)

Hardware:	
Desktop (5)	24,857 x 5 = 124,285
Printer (2)	7,990 x 2 = 15,980
Software:	
Windows 7 Home version	6,000
Other:	
Bond Paper(5box) 500 sheets	360 x 5 = 1,800
Subtotal:	**148,065**

Table 1.1: Calculation of Cost and expenses in the Faculty and Dean Department.

6.5.2 Development Cost (Proposed System)

Hardware:	
Laptop(3)	26,799 x 3 = 80,397
Printer	8,781
Software:	
Windows 7, 10 Home version	6,000
Manpower:	
Others(coffee, transportation, paper etc)	4,370
Subtotal:	**99, 528**

Table 1.2: Calculation of cost by the expenses of the proponents.

6.5.3 Operating Cost (Proposed System)

Hardware:	
Desktop(3)	24,857 x 3 = 74,571
Printer (2)	7,990 x 2 = 15,980
Software:	
Windows 7, 10 Home version	6,000
Other:	
Bond Paper(5box) 500 sheets	360 x 5 = 1,800
Subtotal:	**98,351**

Table 1.3: Calculation of cost and expenses in the proposed system.

6.6 SAD Tools

6.6.1 Major Cycle of Operations

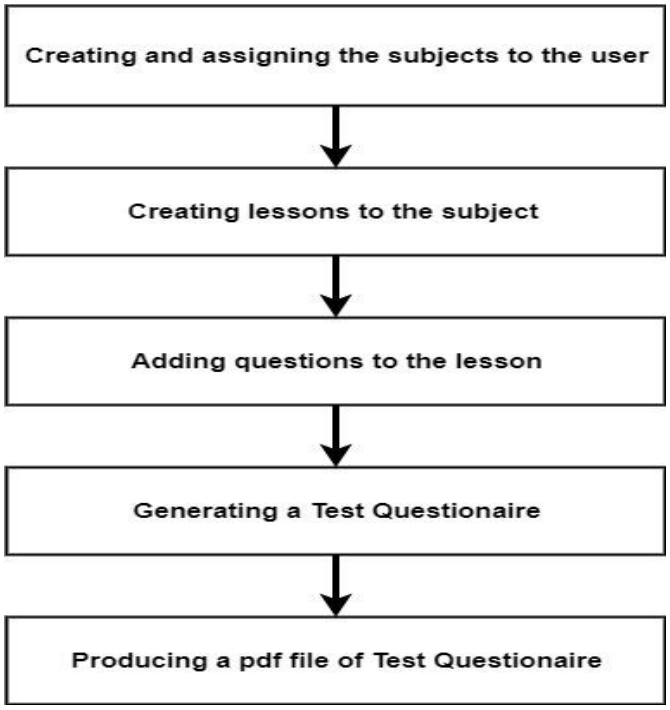

Figure 6.1: A cycle of producing exam papers using the proposed system.

6.6.2 DFD Level 1 Diagram

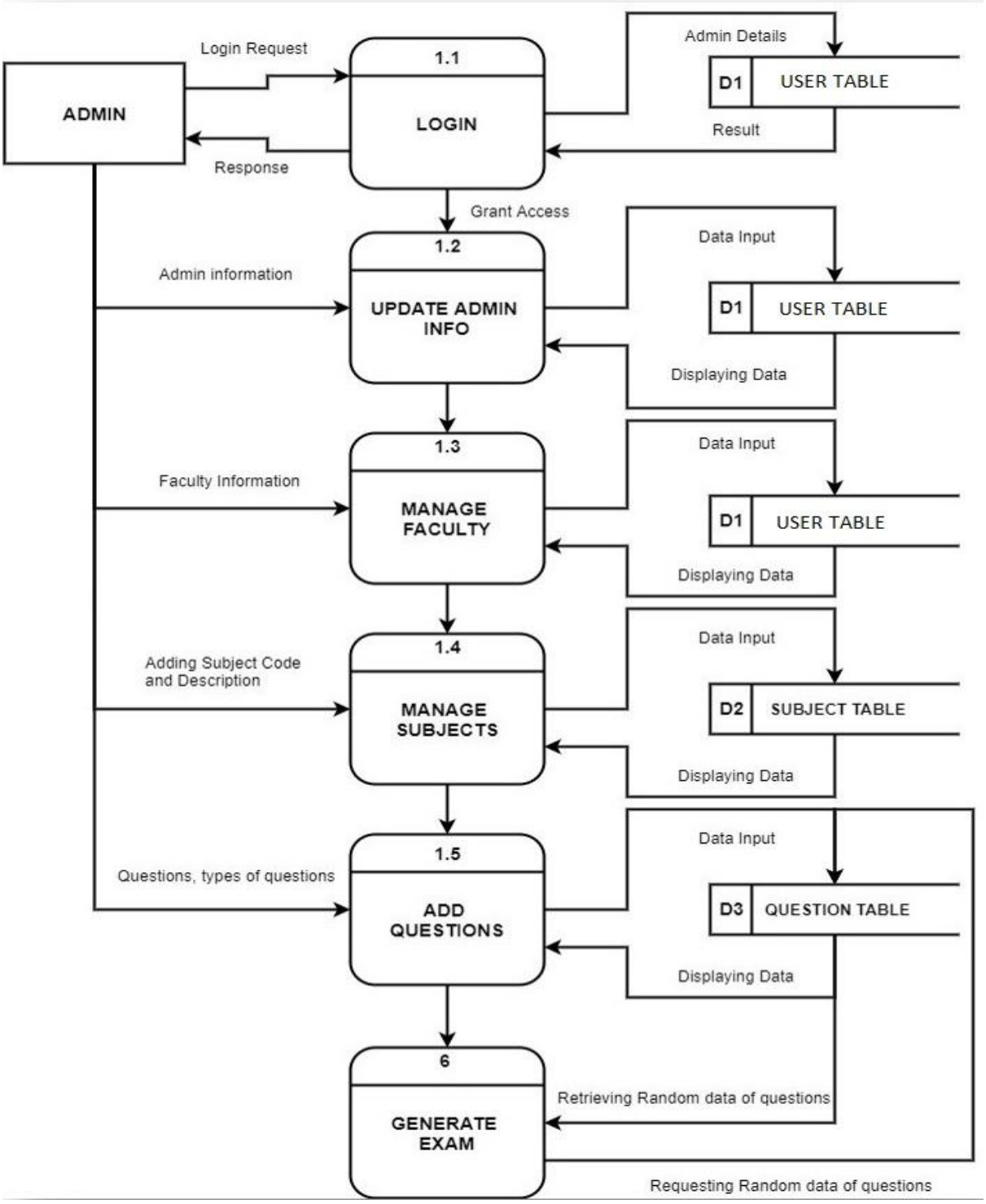

Figure 6.2: Data process of Admin from user interface up to the database.

6.6.2 DFD Level 1 Diagram

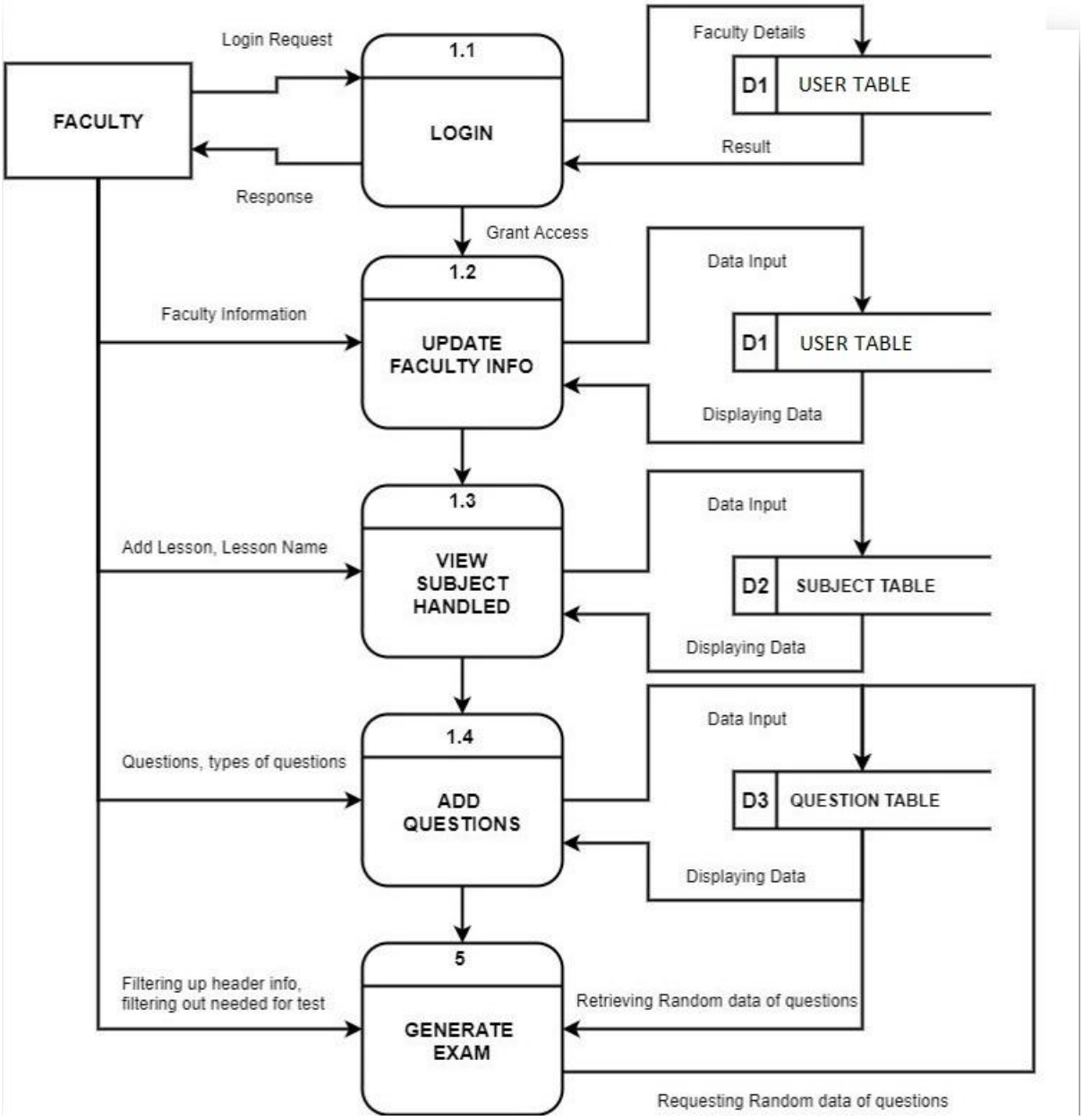

Figure 6.3: Data process of Faculty from user interface up to the database.

6.6.3 DFD Level 2 Diagram

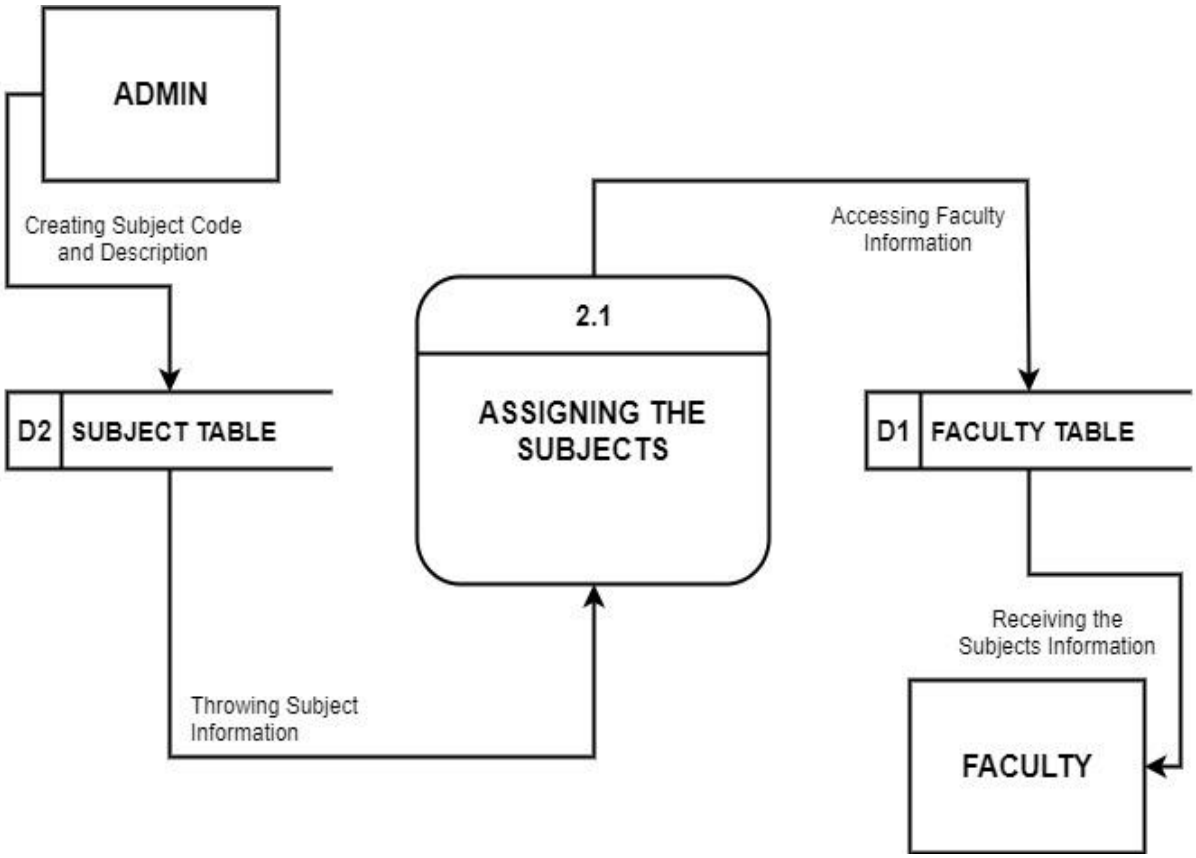

Figure 6.4: A data process between Admin and Faculty when an Admin is about to assign subjects to a faculty.

6.6.3 Context Diagram

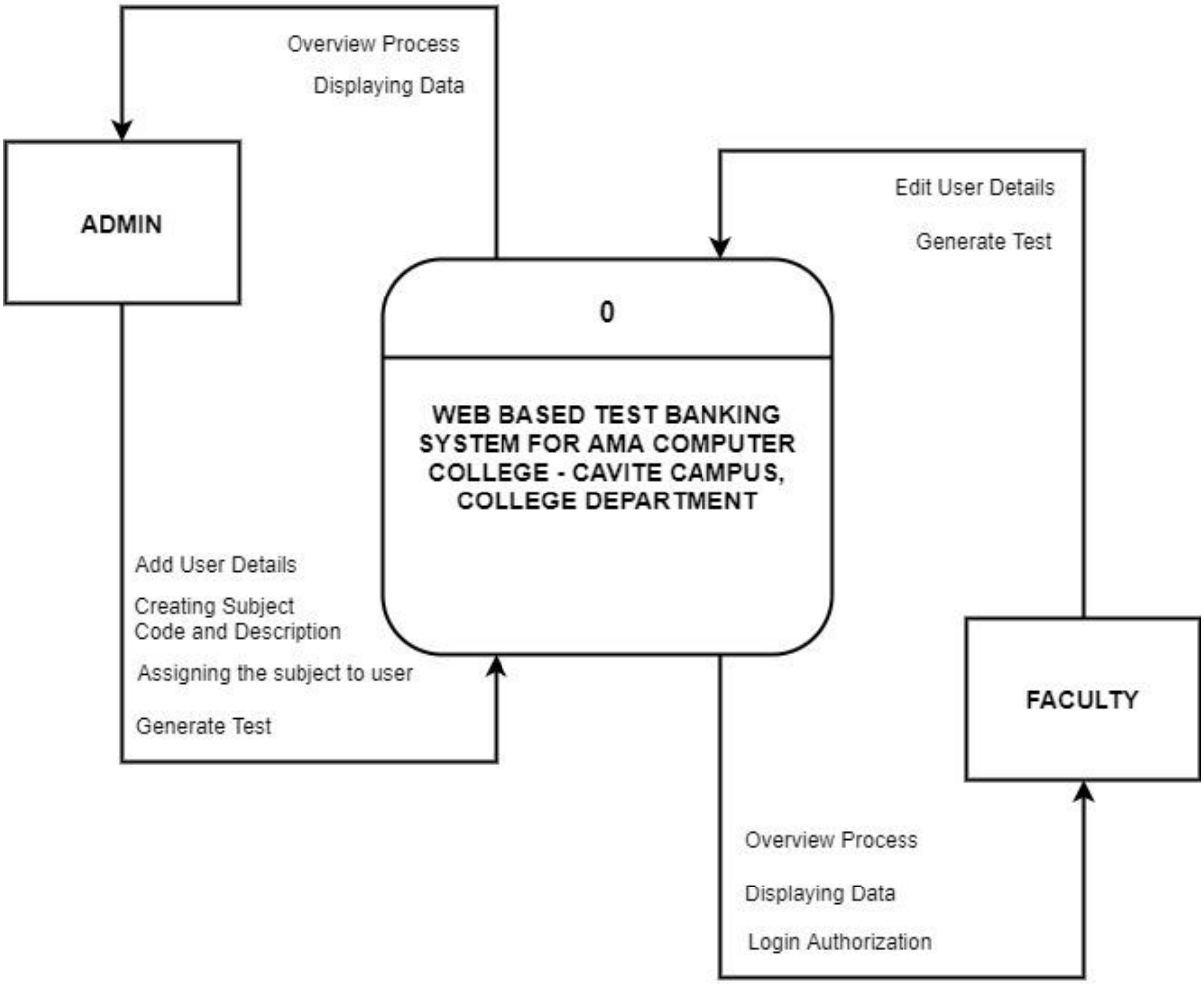

Figure 6.5: The context of data process cycle of AMA Test Banking System between Admin and Faculty.

6.7 Floor Plan

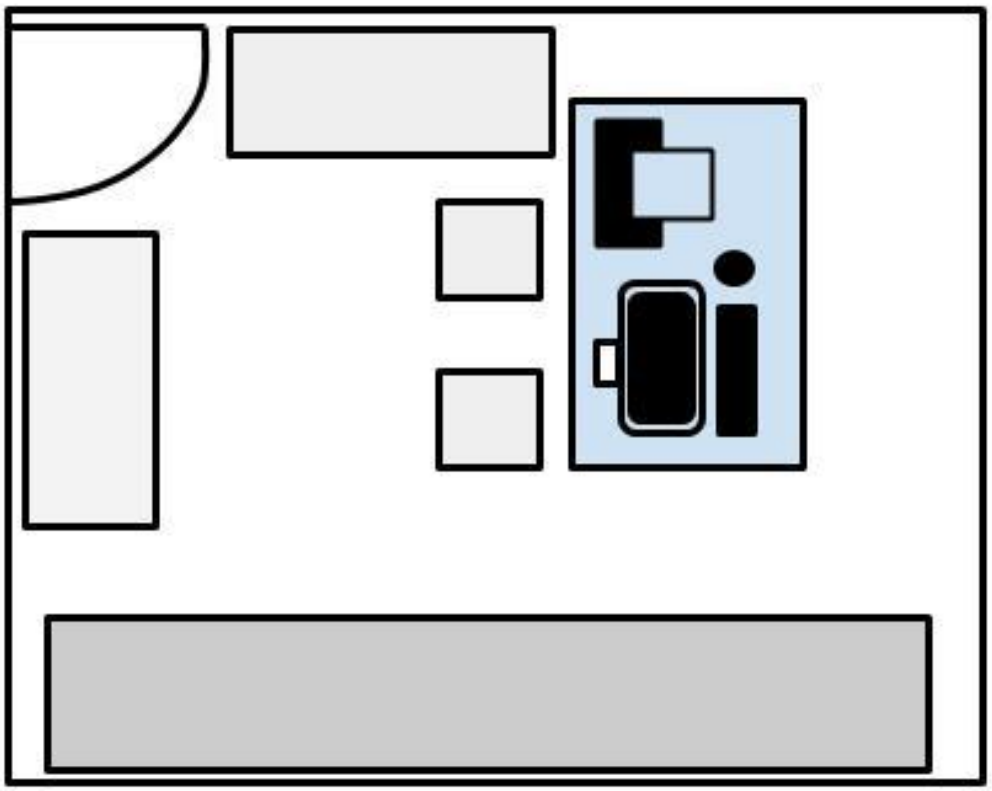

Figure 6.6: A one dimensional blueprint of Dean's office

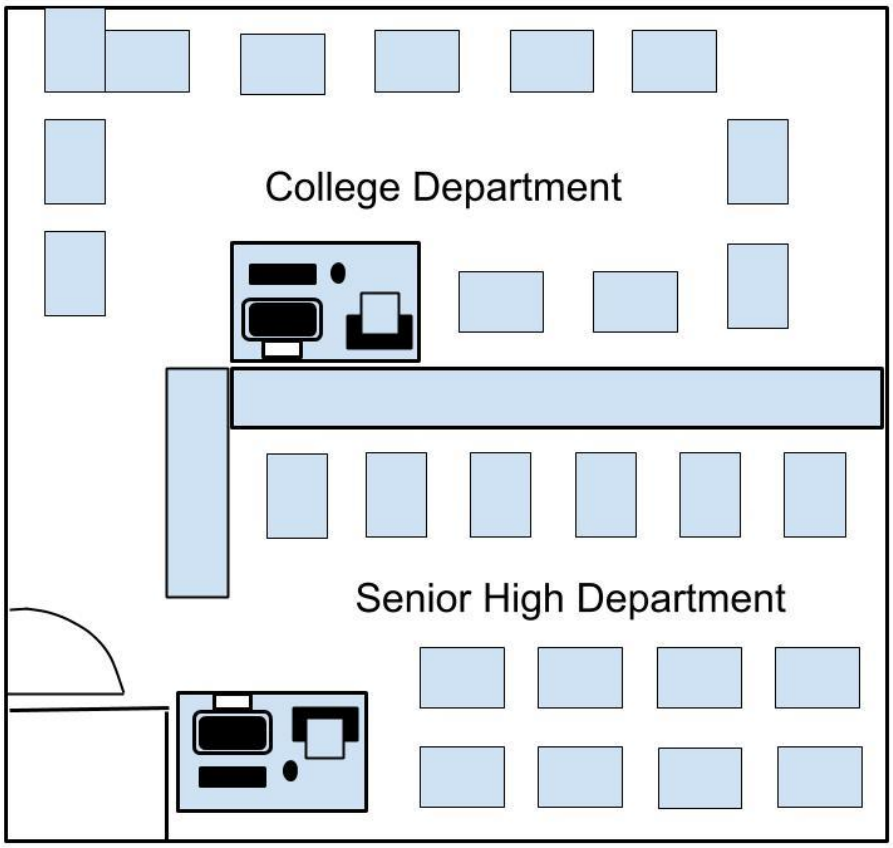

Figure 6.7: A one dimensional blueprint of Faculty Department office

6.8 System User Interface

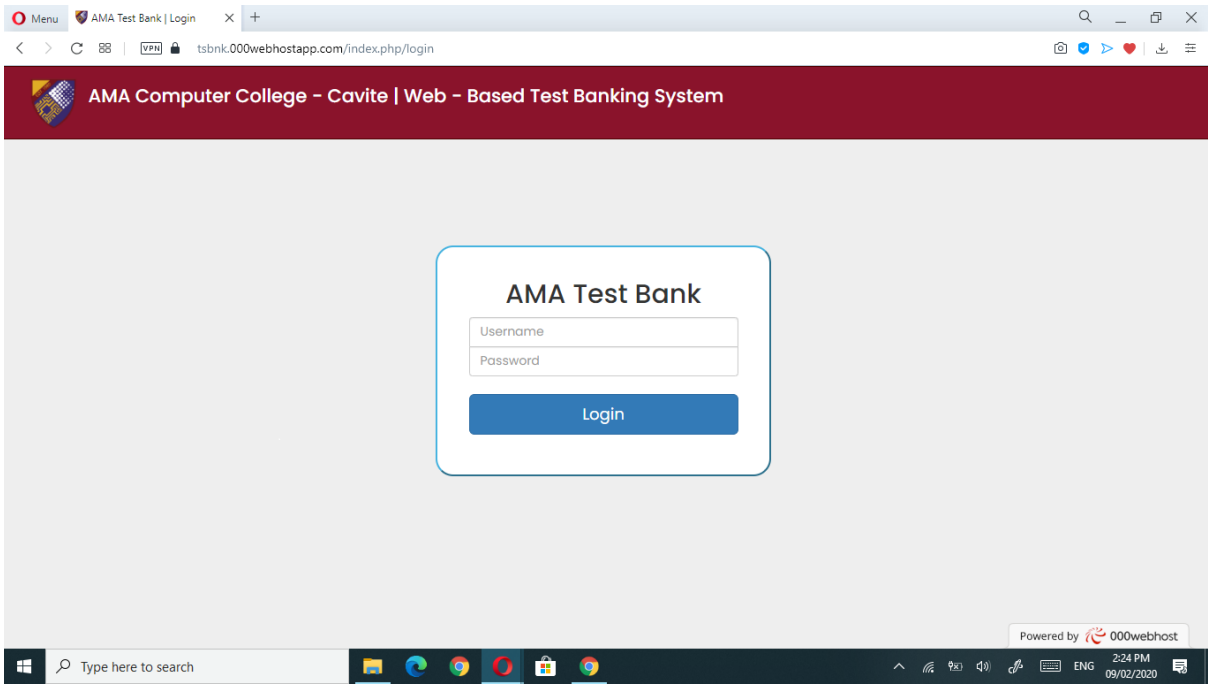

Figure 6.8: Login Page

The system has a login page provided for the users to sign in to their account to prevent unauthorized user logging in to the system.

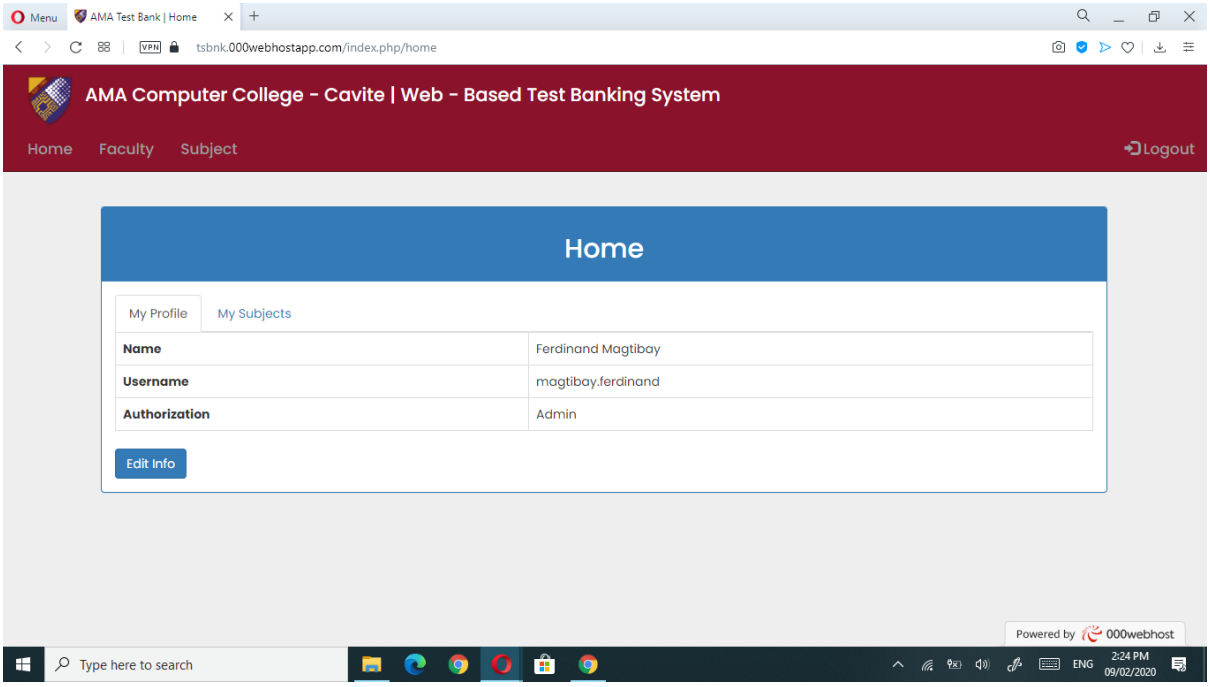

Figure 6.9: User Profile Page

This is where the users can see their personal info and also the “list of subjects that has been assigned to them”, (list of subjects is only an admin feature).

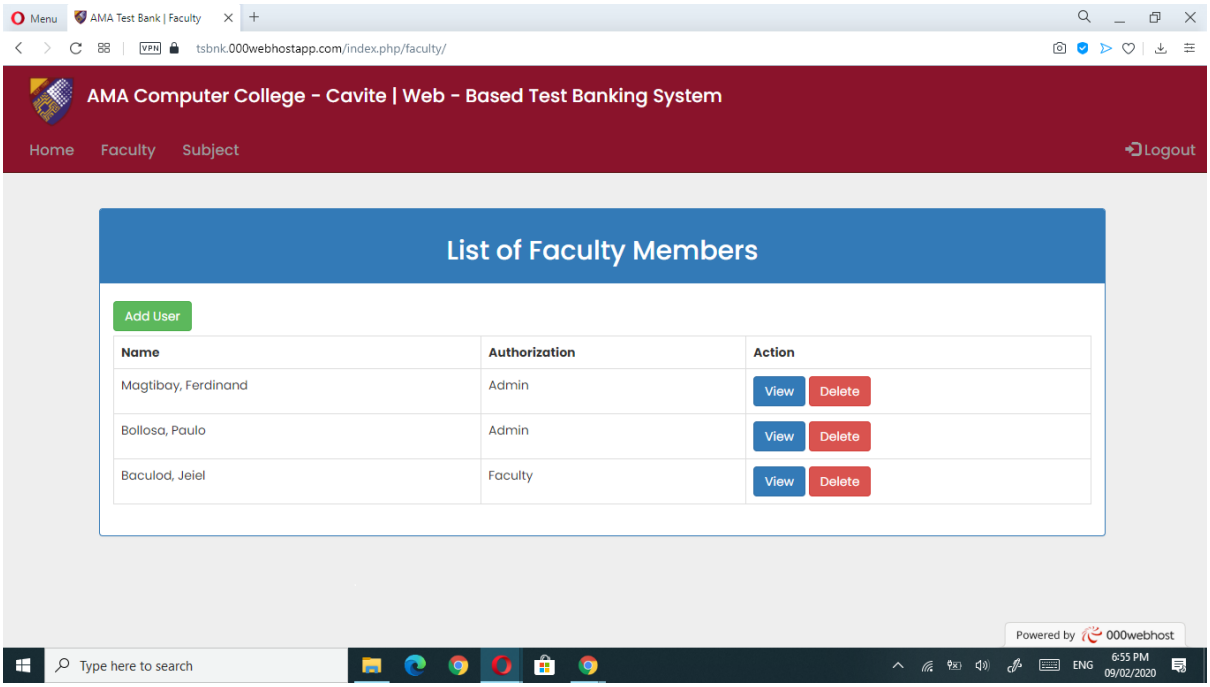

Figure 6.10: Faculty Page

This page is only an admin feature where he/she can create, edit and delete and set a faculty/admin user. He/she can also assign subjects there to the faculty.

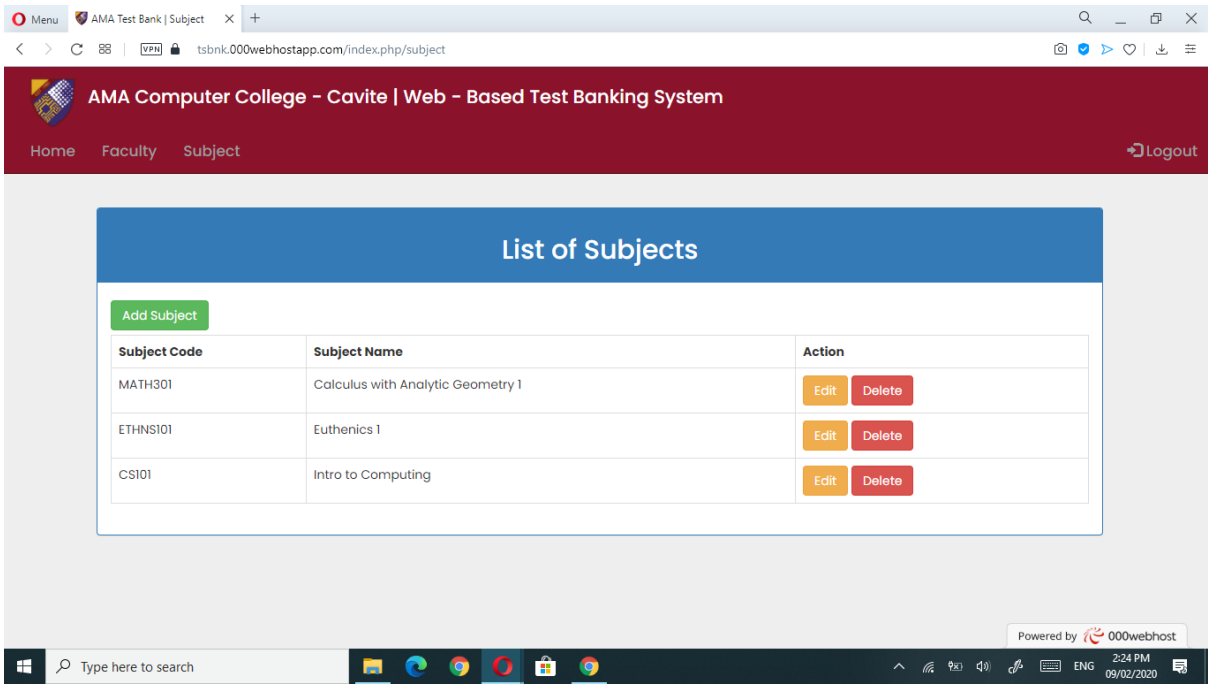

Figure 6.11: Subject Page

In this page, you can see the list of the subjects that has been created by an admin, he/she can add, assign or delete the subjects. Faculty can only add, view or delete lessons on their assigned subjects.

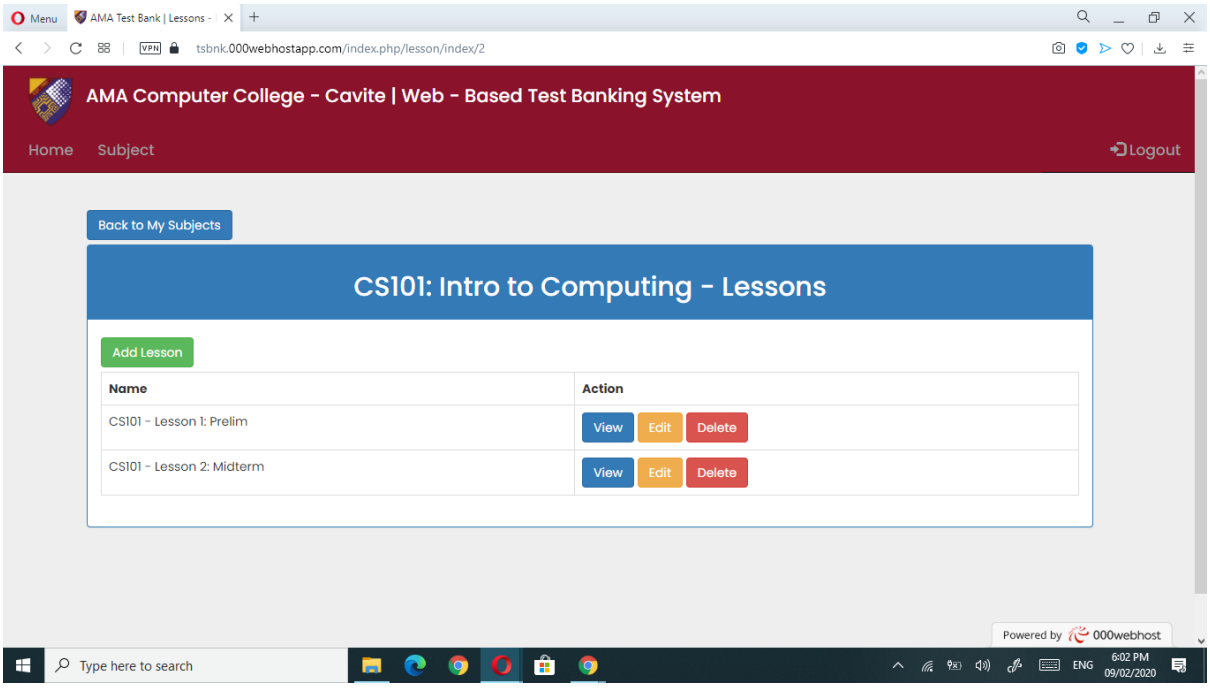

Figure 6.12: Lesson Page

In this page, you can see the list of the lessons that have been created by the faculty or admin, they can add, view or delete lessons.

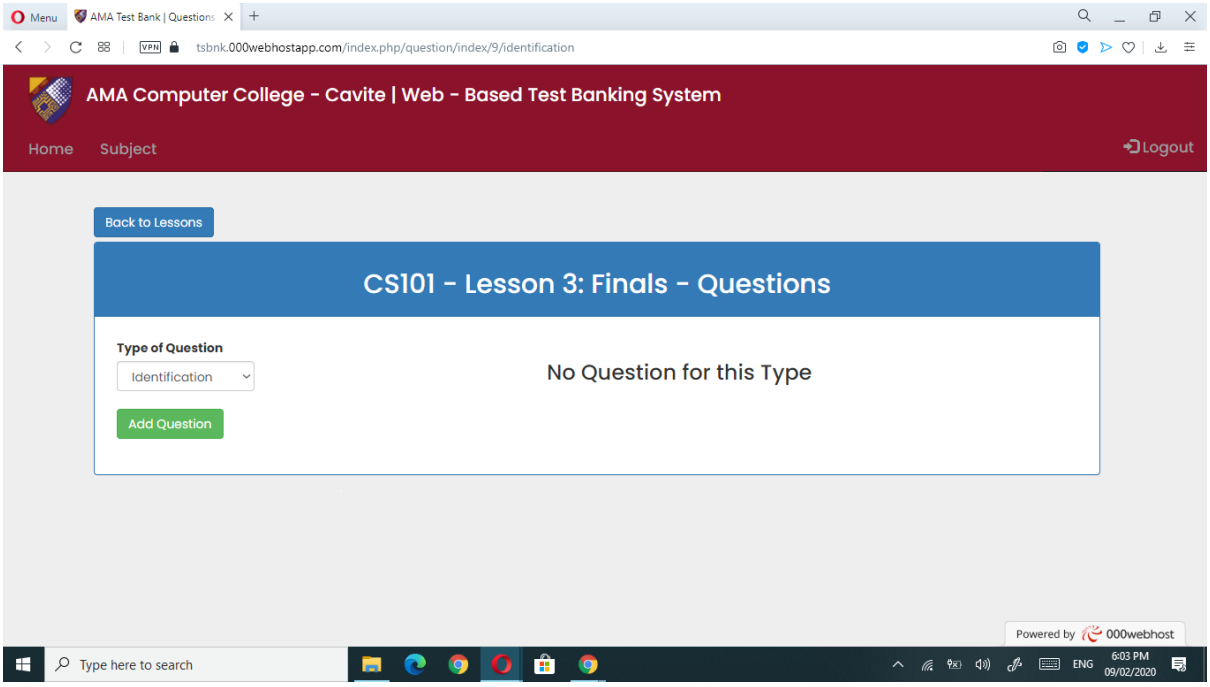

Figure 6.13: Add Question page

Here is where the banking of questions happens. Users will put a lot of questions, based on the lesson that is covered, and the types of exam it is included.

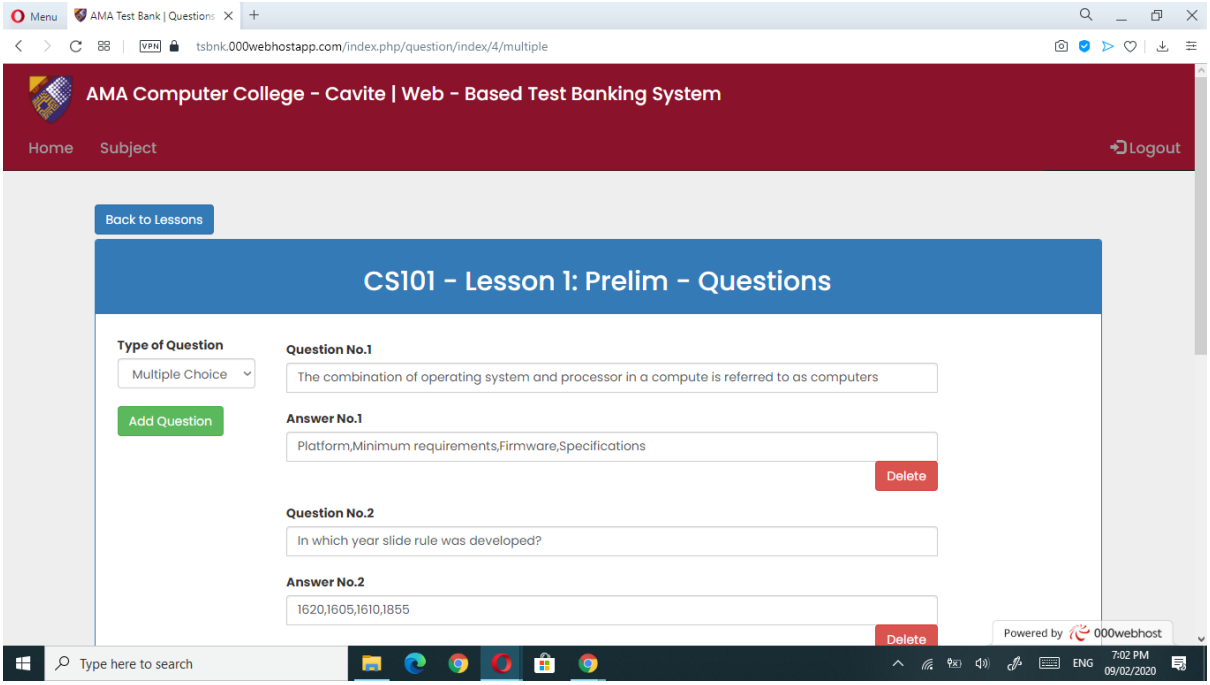

Figure 6.14: Multiple Choice

In this type of exam, the user will put questions, also with a corresponding answer. But the system will determine the right answer based on the sequence of input choices by first to input the right answer, followed by the other set of choices separated by a comma.

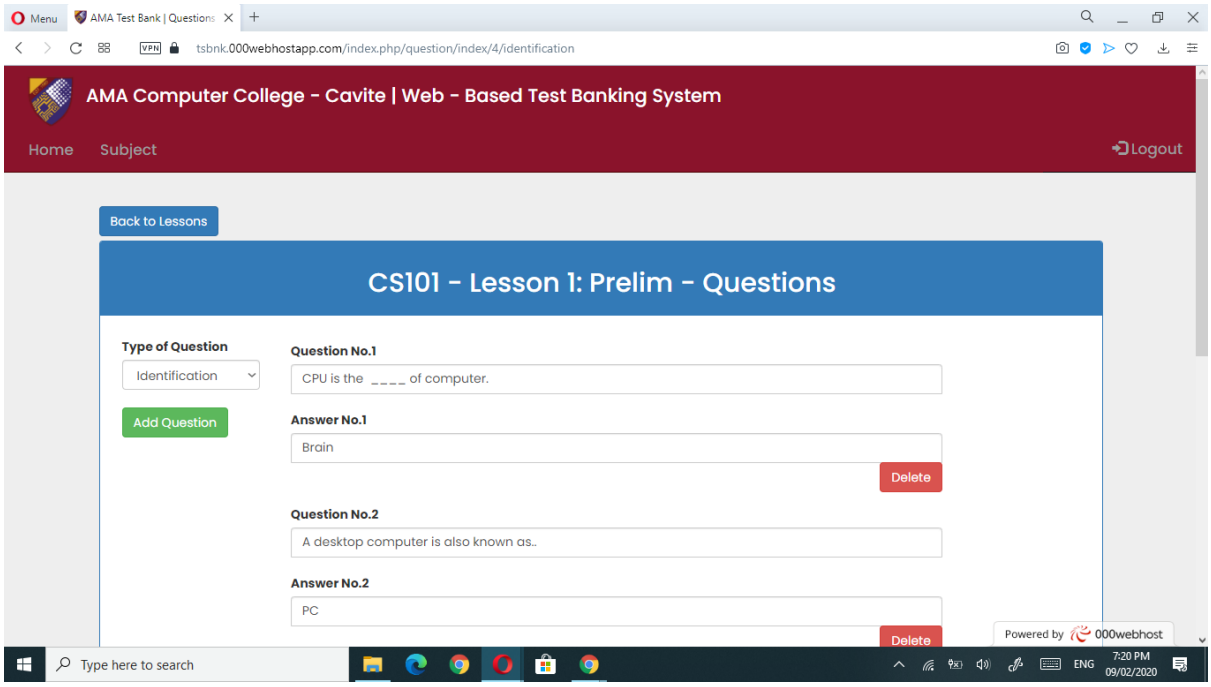

Figure 6.15: Identification

The user will put questions, also with a corresponding right answer. The user will only put one or more right answers.

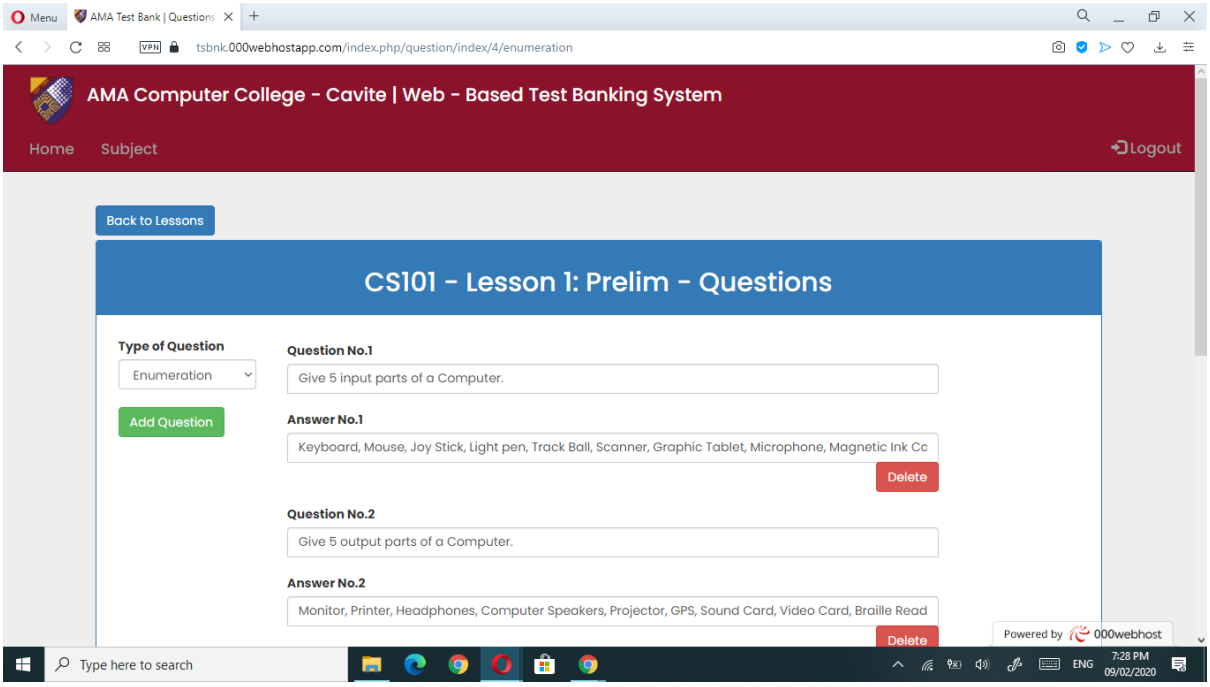

Figure 6.16: Enumeration

The user will put questions, also with a corresponding set of right answers. But the user will also decide if the set of answers will be in a right order or in any order, separated by a comma.

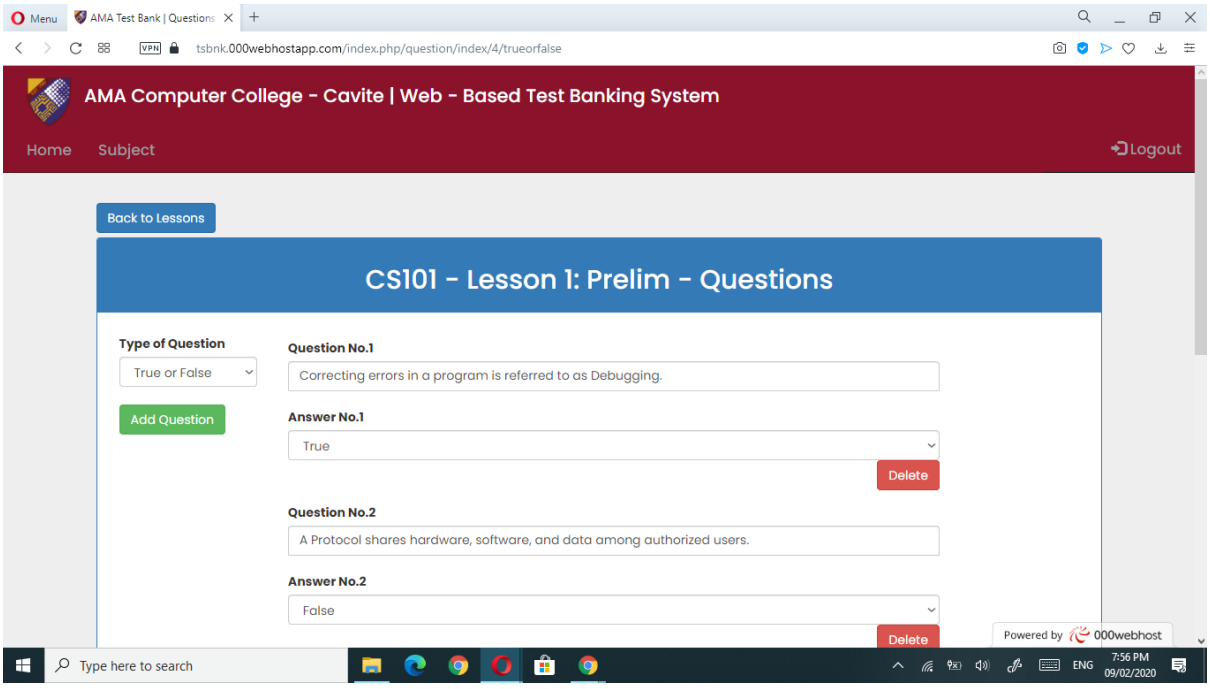

Figure 6.17: True or False

The user will put questions, also with corresponding answers. But the system will provide a textbox for a selection if the right answers are true or false and will be determined by the user's choice.

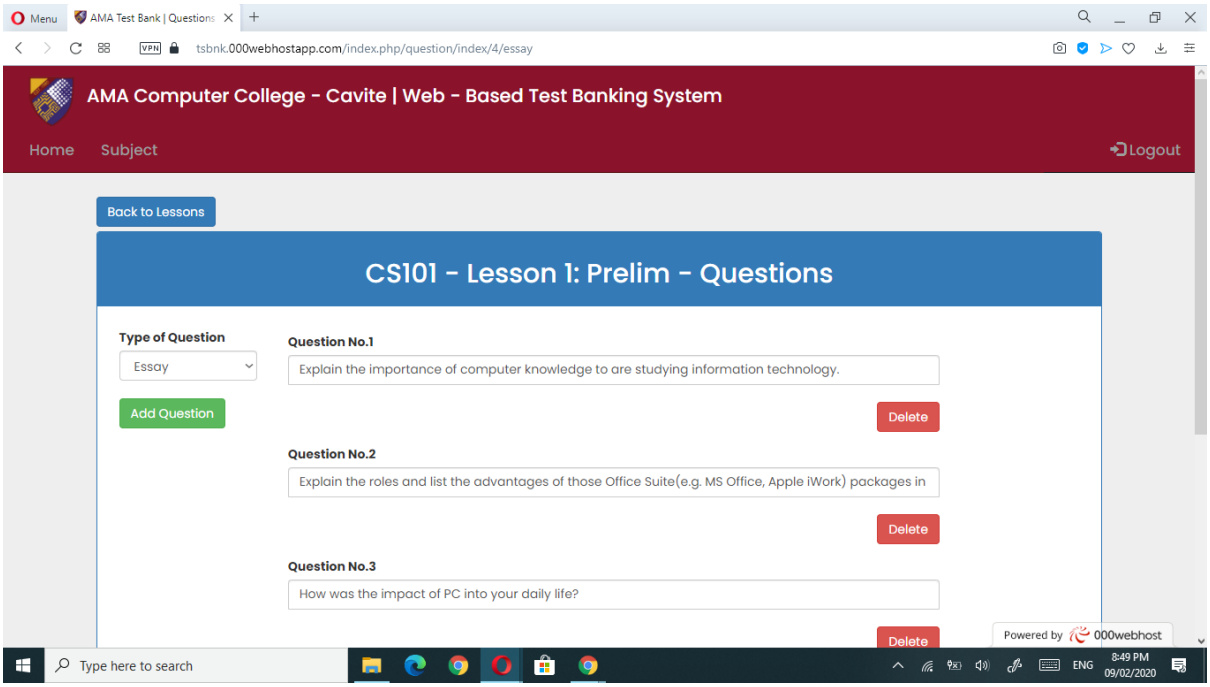

Figure 6.18: Essay

The user will put questions, but without corresponding answers, since the essay requires subjective and objective writings of the examinee's thoughts and opinions. The examinee's answer will be determined by the actual evaluation of the faculty.

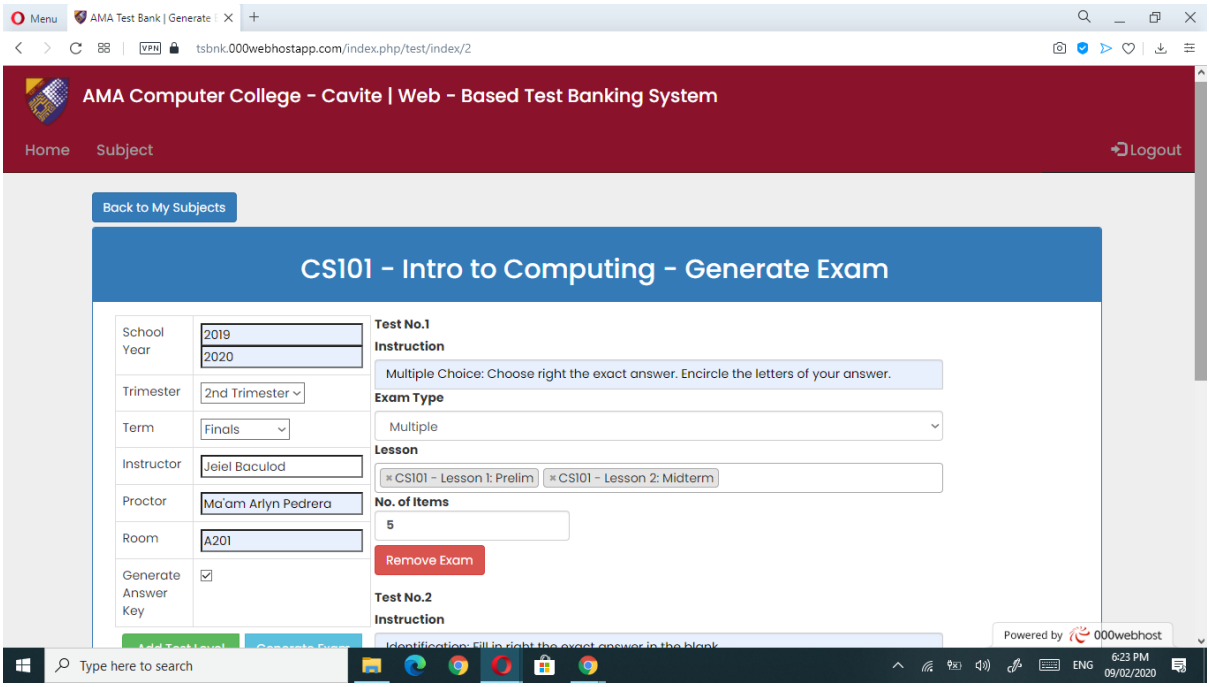

Figure 6.19: Test Generator Page

In this page, the user will set filters for the exam header, specially for the category and types of questions for the exam.

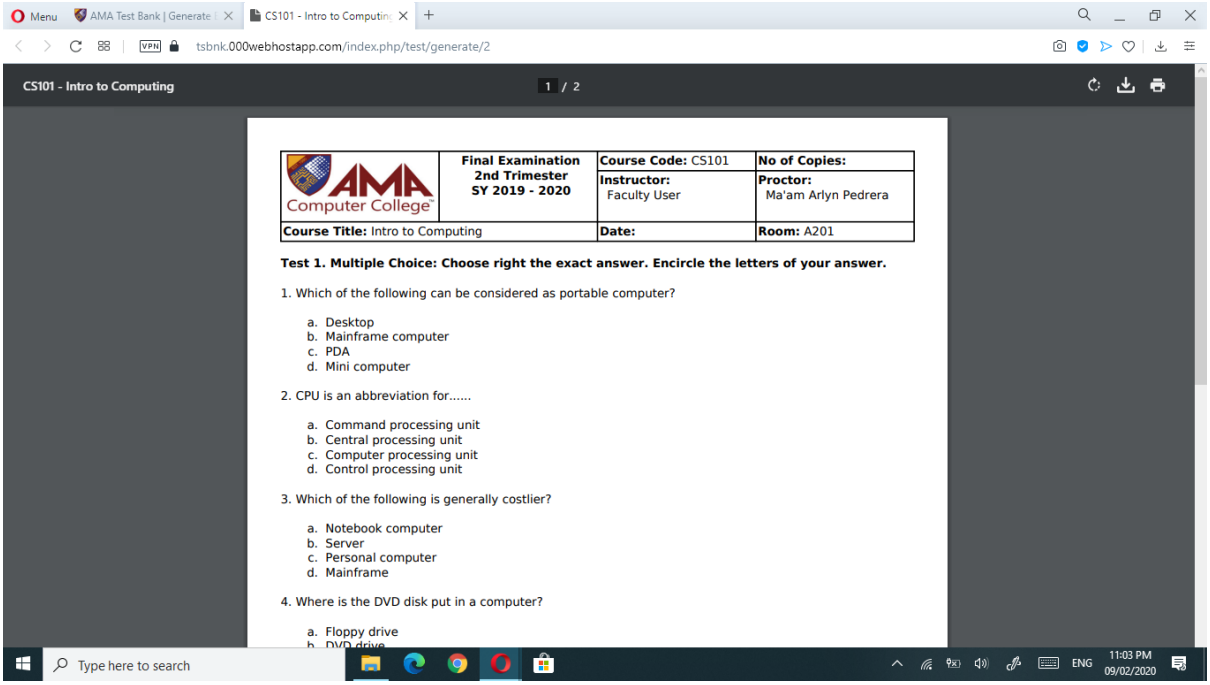

Figure 6.20: Generated Test Page

After the system generates the test questionnaire, it will redirect to another tab to display the generated output of the system displayed in a pdf file format.

CHAPTER VII

TESTING AND RESULT ANALYSIS

7.1 Introduction

This chapter brought in the presentation of the pre development, system testing, and result analysis derived from the survey, the compilation of the questionnaire and the results of the study to justify our proposed system, the Web - Based Test Banking System. The proponents used both papers survey questionnaires and online surveys to collect data that are needed to analyse the outcome of our study.

7.2 Result Analysis

7.2.1 Pre Development Analysis

Each faculty member of AMA Computer College, Cavite - College Department, was given survey questionnaires to answer. The survey's purpose for this section is to determine the situation and the behaviour of the faculty members of the college department in the manual process of producing the exam that helped us to use it to develop the proposed system. Each question required them to check each choice to rate every question.

Question No.1 - Choices	Result
Encode to Word processor	100%
Written then Encode	0%
Only Written	0%

Table 7.1: "How do you prepare your test questionnaire?"

Table 7.1 shows the evaluation of the respondents to the question “How do you prepare your test questionnaire?” A total of 100% of respondents who have agreed they are using Word Processor to encode their questionnaire. This serves, that the manual process of producing an exam, they are still using word processors, although a product of innovation, somehow can’t accommodate the fast pace of work.

Question No. 2 - Choices	Result
50	20%
60	40%
70	0%
80	20%
90	20%
100	0%

Table 7.2: “How many items do you often prepare for their exams?”

In table 7.2 answered the question, “How many items do you often prepare for their exams”, shows that faculty members always set the item up to 60 items, based on the table above, it has 40% respondents, the other respondents responded for 50 items garnering 20% , 80 items garnering also 20%, and 90 items. This result gave us the formulation of considering the addition of this feature and setting a high number of items in generating a test on our proposed system.

Question No. 3 - Choices	Result - 1	Result - 2	Result - 3
Multiple Choice	100%	0%	0%
Identification	0%	40%	0%
Essay	0%	0%	20%
Matching Type	0%	0%	0%
True or False	0%	60%	20%
Application Type	0%	0%	0%
Enumeration	0%	0%	60%

Table 7.3: "Choose at least 3 type of exam you often use for your test questionnaire."

In table 7.3, with the question, "Choose at least 3 type of exam you often use for your test questionnaire." In result 1, Multiple Choice garnered 100%, in result 2, Identification garnered 40%, while True or False garnered 60%, while in result 3, Essay has 20%, True or False got 20% and Enumeration got 60%. In overall percentage, Multiple Choice has 100%, True or False has 80%, Enumeration has 60% and Identification has 20%. This result gathered helped us to add these 5 types of exam on our proposed system.

Question No.4 - Choices	Result
Not very often	80%
Often	20%
Not At all	0%

Table 7.4: "Do you always encounter input error, wrong questions on your test questionnaire?"

In table 7.4, with a question, “Do you always encounter input error, wrong questions on your test questionnaire?” Eighty percent (80%) of them responded that it is not very often for them to encounter it on a manual process but 20% responded that it is often to encounter it. Justifying that in the manual process, they could still experience redundancy and error in their questionnaire. Although it is manageable to overcome it.

Question No.05 - Choices	Result
Not very often	0%
Often	0%
Always	100%
Not At all	0%

Table 7.5: “Do you also prepare a secured answer result key?”

In this table 7.5, answered the question, “Do you also prepare a secured answer result key?” All of the participants responded, resulting in 100% agreeing that they always prepare an answer key to their test questionnaire which is a big benefit for us to add it to our proposed system.

Question No. 6 - Choices	Result
Only Test I	0%
Up to Test II	0%
Up to Test III	40%
Up to Test IV	60%

Table 7.6: “How many test levels can you create?”

Table 7.6 shows that faculty members preferred to make test level up to Test IV garnering 60% of respondents while some preferred to make it up to Test III garnering 40%. This result is also beneficial for us to add a test level feature and determine how it could be a feature on our proposed system.

Question No.7 - Choices	Result
Not very often	0%
Often	60%
Always	40%
Not At all	0%

Table 7.7: "Do you keep test questionnaires in secured folders, cabinets?"

In table 7.7, answered the question, "Do you keep test questionnaires in secured folders, cabinets?" The 40% responded that they keep their test questionnaires in the secured folders and cabinets often. The 60% responded that they always keep it on their secured folders and cabinets. Justifying that in a manual process, they are still keeping it physically or electronically in a secured folder. When the time comes, they will access it and find those questionnaires that time to do it and are time consumable.

Question No.8 - Choices	Result
Strongly Agree	80%
Moderately Agree	20%
Agree/Disagree	0%
Moderately Disagree	0%
Strongly Disagree	0%

Table 7.8: "You somehow give students set A and B exams?"

Table 7.8 shows that most faculties responded that 80% of them strongly agreed, giving their students a set A and set B exams. While 20% are moderately agreed on giving set A and set B exams. This took us into consideration of giving our proposed system a highlight feature, a systemized selection of questions by putting an algorithm to our program that will randomly pick questions based on its type of questions, lesson and subjects covered. To achieve the randomized set of questions so users can create a set A and B of exams.

7.2.1 System Testing Analysis

Each faculty member of AMA Computer College, Cavite - College Department, was given survey questionnaires to answer. The survey's purpose for this section is to give them an experience with our proposed system, by putting our system into testing phase. They will try to navigate our system and after that, they will answer our survey. The survey contains questions that are relevant to the system testing procedure. They will answer those questions based on what they have experienced in the system testing phase Each question required them to check each choice to rate every question.

Scale From "Not Good" to "Best"									
1	2	3	4	5	6	7	8	9	10

Table 7.9: Rating Scale

Table 7.9 discusses the corresponding rate scale to every percentage obtained from the computations of the respondents' answers. The scale of one (1) represents being "Not Good" up to scale 10 represents being the "Best". Each scale from one (1) to 10 has a percentage equivalent based on the respondents choices.

The results of the evaluation are as follows:

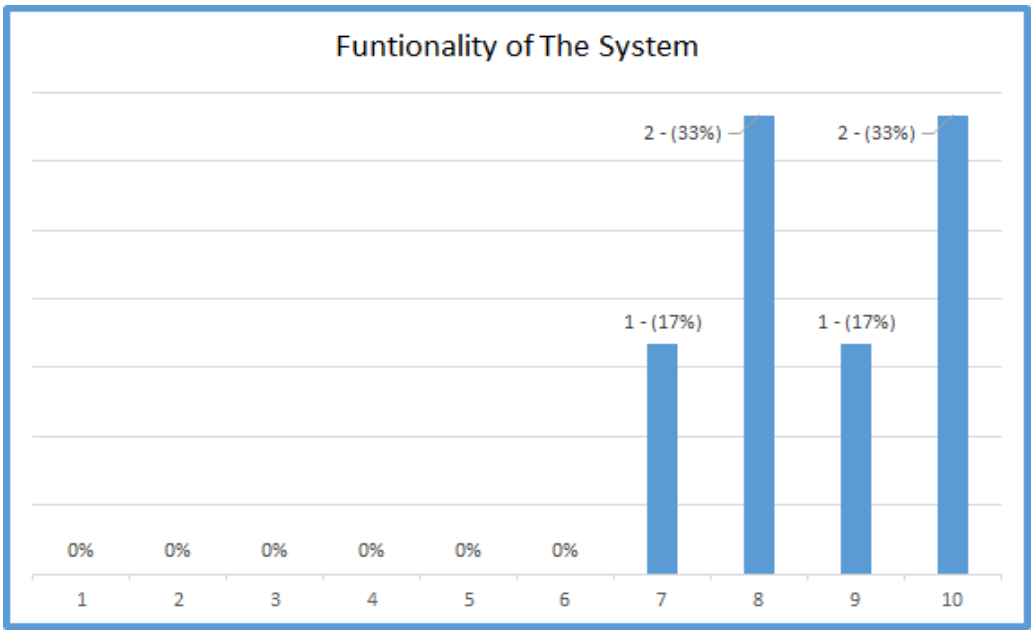

Figure 7.1: Functionality of the System

In figure 7.1, shows the evaluation of the respondents in terms of the project's functionality. Functionality refers to whether the project offers precise details of the functions and has the ability to interact with other components. The respondents were asked one question, "Is every function of the system from login up to navigating the system good for you?" The 17% respondents answered seven (7), some 33% respondents answered eight (8), the other 17% respondents chose eight (8), and the other 33% respondents chose 10.

In this test, eight (8) and 10 had both the highest percentage and seven (7) and nine (9) had both the lowest which revealed that the respondents believed that the project is functional.

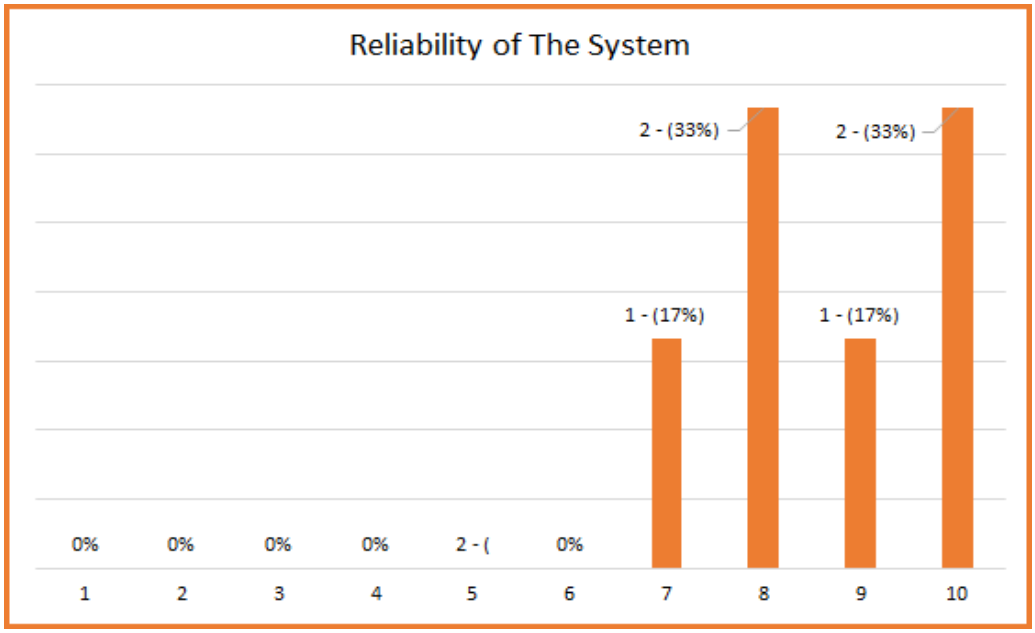

Figure 7.2: Reliability of the System

Figure 7.2 shows the evaluation of the respondents in terms of the project's reliability. Reliability refers to whether all modules are working and are free from errors. The respondents were asked one question, "Is the system good for your preferences as a teacher/faculty

member?" The 17% respondents answered seven (7), some 33% respondents answered eight (8), the other 17% respondents chose eight (8), and the other 33% respondents chose 10.

In this test, eight (8) and 10 had both the highest percentage and seven (7) and nine (9) had both the lowest which revealed that the respondents believed that the project is usable.

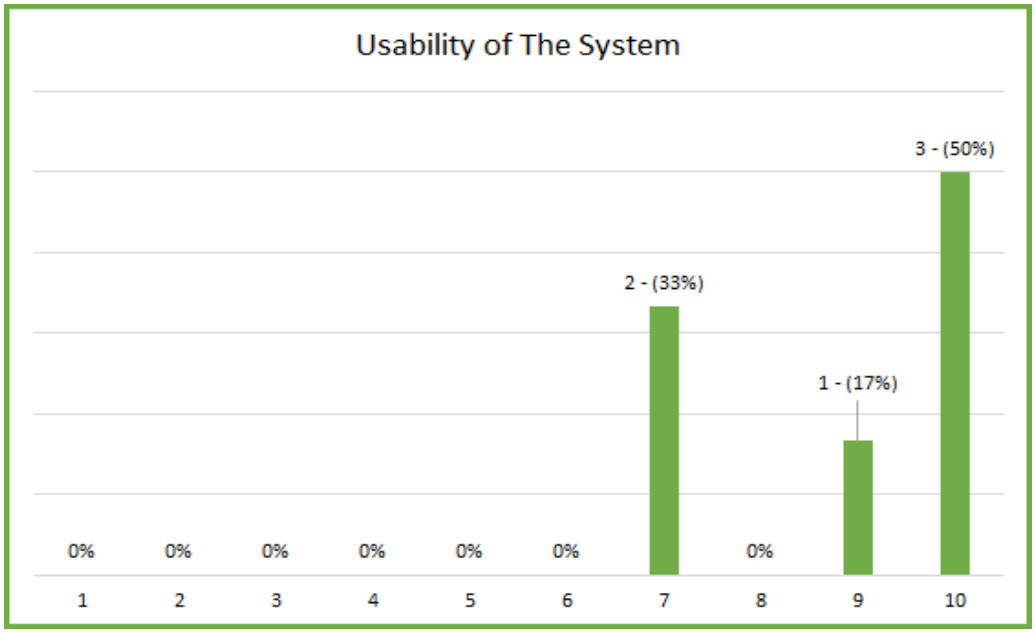

Figure 7.3: Usability of the System

Figure 7.3 shows the evaluation of the respondents in terms of the project's usability. Usability refers to the project's ability to determine the ease of use of a given task. The respondents were asked one question, "Is the flow and smooth experience of navigating every area of the system good for you?". 2 respondents chose 7 with 33%, 1 respondent chose 9 with 17%, and 3 respondents chose 10 with 50%.

In this test, 10 has the highest percentage and 9 has the lowest and 7 being at the middle which revealed that the respondents believed that the project is usable.

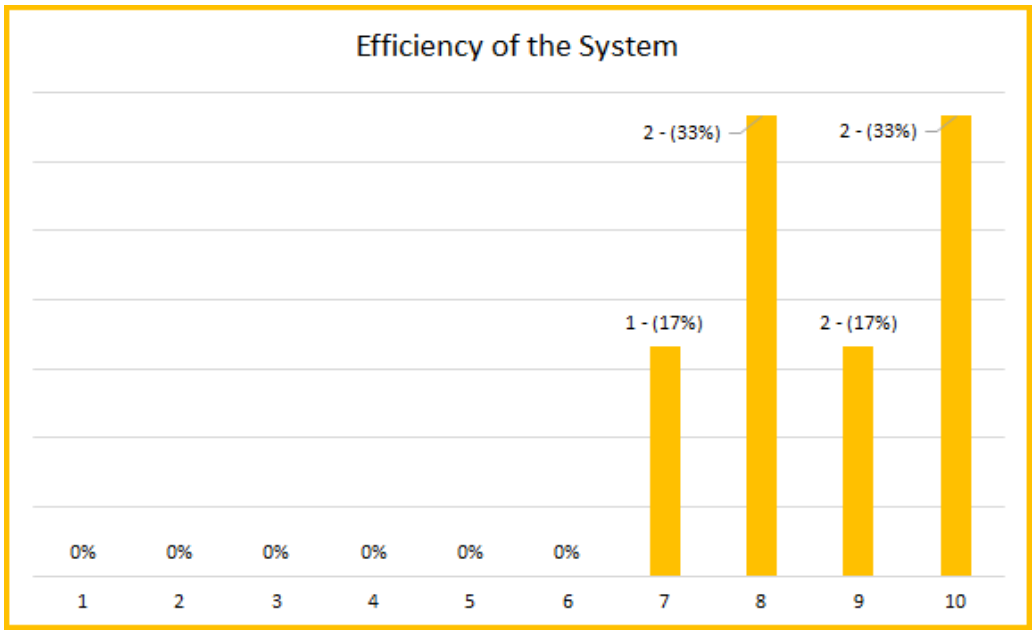

Figure 7.4: Efficiency of the System

Figure 7.4 shows the evaluation of the respondents in terms of the project's efficiency. Efficiency refers to the project's ability to perform effectively in a well-organized manner. The respondents were asked one question, "Is this system efficient for you to replace the manual process of producing an exam?". The 17% respondents answered seven (7), some 33% respondents answered eight (8), the other 17% respondents chose eight (8), and the other 33% respondents chose 10.

In this test, eight (8) and 10 had both the highest percentage and seven (7) and nine (9) had both the lowest which revealed that the respondents agreed that the project is efficient.

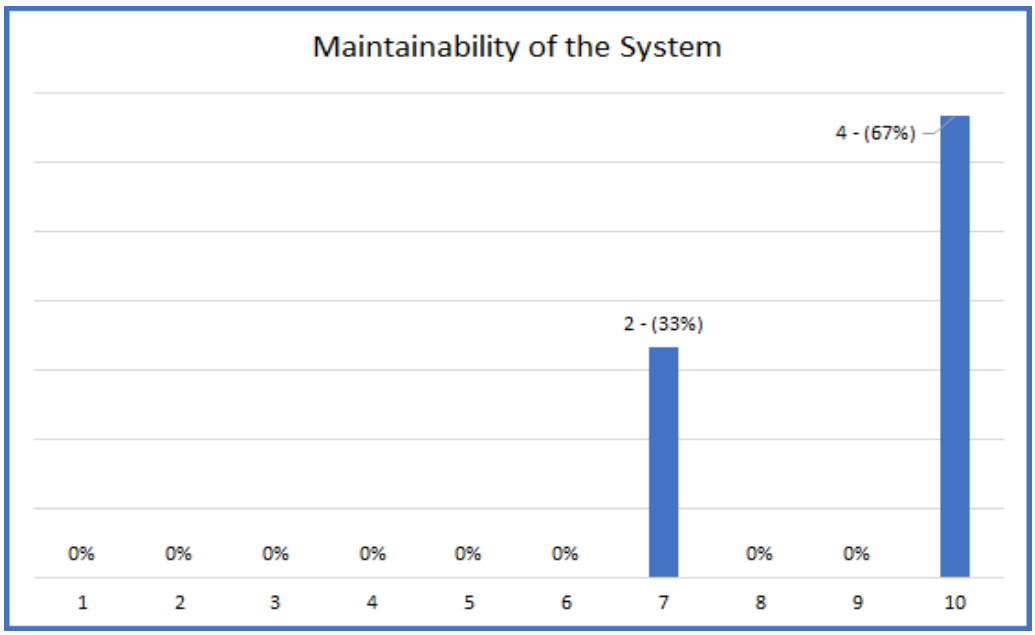

Figure 7.5: Maintainability of the System

Figure 7.5 shows the evaluation of the respondents in terms of the project's maintainability. Maintainability refers to the attainment of the software is to identify and fix a fault within a software component. The respondents were asked one question, "Do you find this system can maintain its operation while you are using it?" Thirty-three percent (33%) of respondents chose seven (7) while the 67% chose 10.

In this test, 10 has the highest percentage and seven (7) has the lowest which revealed that the respondents agreed that the project is maintainable.

CRITERIA	6 RESPONDENTS
Functionality	8.67
Reliability	8.67
Usability	8.83
Efficiency	8.67
Maintainability	9
Average Score	8.73

Table 7.10 System Testing - Summary of Results

Table 7.10 interprets the summary of results of the system's rating in different categories and was calculated based on the scale of all of the respondents' choices. With an overall average of 8.73, the system's breakdown of rating includes: Functionality gathered a rating of 8.67, reliability gathered a rating of 8.67, usability gathered a rating of 8.83, efficiency accumulated a rating of 8.67, and maintainability acquired a rating of nine (9). Having a System Testing overall average of 8.73.

CHAPTER VIII

SUMMARY, CONCLUSION, RECOMMENDATION

8.3 Summary

This study is only in the field and focused on finding a solution in the areas of faculty - college department, producing an exam in a typical way, having some workloads and issues that compromises the exam's efficiency and making a system to ease the process of producing the exam by systemizing it.

Primarily the results of the survey on the situation of the faculty - the college department having a manual process of making an exam up to system testing of our proposed system had a positive impact and effect. The data that the researchers gathered with the use of printed questionnaires and an Google forms - an online survey, were the instrument used as the foundation to the findings regarding the statement of the problem.

8.4 Conclusion

This research has the objective to determine the ways on how to come up in developing this proposed system, the Web-Based Test Banking System, as well as to show how this would be beneficial to the users of this system. Based on the results of the analysis, and results, the traditional way of making an exam is still time consuming for some although they are using word processors, they still keep them in folders and cabinets.

Also, with the help of this research, researchers gathered some info that helped to add some functions and features on our proposed system. On the outcome of the proposed system,

this research proved that based on the system's summary of results, the respondents agree that the application is functional, reliable, usable, efficient, and maintainable.

It is believed that this system will ease the workloads of the faculty members by targeting to minimize the process of producing the exam from storing questions, up to filtering up questions when generating a test.

8.5 Recommendation

1. Some users may find hassle inputting all of the questions to the subjects or transferring all of the questions from papers or word documents to the system that require time to do so. This may be a hassle at the first stage of using it. But the aim is at the time the user needs to generate test papers. It would lessen the time of preparing it. Also, inputting all of the questions in the system would be organized and segregated, beneficial for them to access it.

2. Researchers recommend to try to learn first to navigate the system to familiarize them with the functions and features of the system, before doing such things.

3. Moreover, it was recommended to use the keyboard shortcut, F3 or fn + F3 or "Find in Page" on a browser feature when looking for a subject to assign it to the faculty. The researchers tried to put a search function on that but due to time, few resources, and failures to fix and achieve the function, the proponents could not achieve it.

REFERENCES

Chapter 2: Relational Database Approach

McCombes, S. (2020). Methodology - Descriptive Research. Retrieved from https://www.scribbr.com/methodology/descriptive-research/

Olivera, L. (2017). Everything You Need To Know About Relational Databases. Retrieved from https://dev.to/lmolivera/everything-you-need-to-know-about-relational-databases 3ejl

Chapter 3: Local Literature

Agatep, JLE. (2018). Assessment of Traditional and System-based Management Examination in Computer in AMA School, Olongapo City, Philippines. Am J Compt Sci Inform Technol Vol.6 No.2:22, ISSN 2349-3917. Retrieved from http://www.imedpub.com/articles/assessment-of-traditional-and-systembased-management-examination-in-computer-in-ama-school-olongapo-city-philippines.pdf

Borromeo, R. (2013). Online Exam For Distance Educators Using Moodle. Retrieved from https://www.researchgate.net/publication/271498127_Online_exam_for_distance_educators_using_moodle

Comendador, B. & Alberto, G. (2014). A Community Cloud-Based Course Management System Using Platform as a Service (PaaS) Model for Higher Educational Institutions. International Journal of Information and Education Technology. Retrieved from http://www.ijiet.org/papers/454-F015.pdf

Comendador B.E.V., Molenilla D.E.S., Sabales G.C., Suazo G.A.G., & Capangpangan J.R. (2015). Asynchronous Online Examination Security System Using Occupancy Detection, Journal of Automation and Control Engineering Vol. 3, No. 2. Retrieved from http://www.joace.org/uploadfile/2014/0801/20140801025255998.pdf

Doctor, A. C. (2017). Integrated Educational Management Tool for Adamson University. International Journal of Computing Sciences Research. Retrieved from https://www.stepacademic.net/ijcsr/article/view/20

Chapter 3: Local Study

Bermundo C; Ph.D. PME, Bermundo A; Ph.D. PME & Ballester, A. (2012). iBank. Retrieved from https://files.eric.ed.gov/fulltext/ED542459.pdf

Berol, L. (2018). Implementation of Advanced Encryption Standard Cryptographic Algorithm in a Test Bank System. SMCC Computing Journal. Retrieved from https://sherj.smccnasipit.edu.ph/articles/computing1/Berol.pdf

De Lima, L. C., Belen, R. M., & Pabalan, L. S.. (2011). Intranet Exam Generator (IEXGEN). Ani: Letran Calamba Research Report, 1(1). Retrieved from https://ejournals.ph/article.php?id=149

Ramos, M.J. & Velasquez, J.(2013). Design And Development Of An Online Exam Maker And Checker. Retrieved from https://www.academia.edu/5024517/DESIGN_AND_DEVELOPMENT_OF_AN_ONLINE_EXAM_MAKER_AND_CHECKER

Sison, A. & Tanguilig Iii, B. (2016). Test bank Management System Applying Rasch Model and Data Encryption Standard(DES) Algorithm. International Journal of Modern Education and Computer Science. Retrieved from https://www.researchgate.net/publication/308929960

Chapter 3: Foreign Literature

Boitshwarelo, B., Reedy, A. K. & Billany, T (2017). Envisioning The Use of Online Tests In Assessing Twenty-First Century Learning. Retrieved from https://telrp.springeropen.com/articles/10.1186/s41039-017-0055-7

Marasco, E. et al. (2018). Evidence-based Best Practices for First-year Blended Learning Implementation.American Society for Engineering Education. Retrieved from https://www.asee.org/file_server/papers/attachment/file/0009/4333/ASEEPaperFinal.pdf

Rakangor, S. & Dr. Ghodasara, Y. (2015). Automatic Question Generation Systems. Retrieved from http://www.ijsrp.org/research-paper-0115/ijsrp-p3757.pdf

Sana, I. & Iqbal, H. et al.(2015). Quizzy: Quiz Application Development Using Android-Based Platform. Retrieved from https://www.researchgate.net/profile/Dr_Muhammad_Asghar/publication/303896969_Quizzy_Quiz_Application_development_using_Android_Plartform/links/575b71e408aec91374a62665/Quizzy-Quiz-Application-development-using-Android-Plartform.pdf

Shute, V. & Rahimi, S. (2016). Review of computer-based assessment for learning in elementary and Secondary Education. Journal of Computer Assisted Learning. Retrieved from https://myweb.fsu.edu/vshute/pdf/jcal.pdf

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Gangar, F. & Gori, H. et al (2017). Automatic Question Paper Generator System. Retrieved from https://www.ijcaonline.org/archives/volume166/number10/gangar-2017-ijca-914138.pdf

Hui, Y. & Nyean, C. et al (2012). Development of Mathematics Question Banking System for Secondary School in Malaysia. Retrieved from http://www.ipedr.com/vol37/003-ICMEI2012-E00011.pdf

Kurdi, G. & Leo, J. et al (2019). A Systematic Review of Automatic Question Generation for Educational Purposes. International Journal of Artificial Intelligence in Education. Retrieved from https://¬link.springer.com/¬article/10.1007/¬s40593-019-00

Parthasarathy, M. & Ananthasayanam, R. (2012). Web-based Question Bank In Indian Higher Education: An Open Educational Resource. Retrieved from https://eric.ed.gov/?q=question+bank&id=EJ1102155s-in-Maple-TA-using-LaTeX.pdf

Wathhananon, J. & Teabsornchai, P. (2014). A Development of Item Analysis System and Item Banking System with Case Study of Internet Technology for Daily Uses. The Eleventh International Conference on eLearning for Knowledge-Based Society. Retrieved from http://www.ijcim.th.org/SpecialEditions/v22nSP2/02_02_020A_Julaluk.pdf