DEVELOPMENT OF A WEB-BASED EXAM TEST PAPER GENERATOR FOR TUP VISAYAS

A Research Project

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Computer Engineering Technology Department

College of Engineering Technology

Technological University of the Philippines Visayas

Capt. Sabi St, Brgy. Zone 12

Talisay City, Negros Occidental Visayas

by

RODOLFO T. BAYLEN III

YOSHIYUKI CANOY

PATRICK S. LASOLA

PAUL JOHN C. PADOHINOG

CHRISTIAN NOEL J. SALVADOR

JIMBHOY B. TALAGTAG

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Chapter 1 – INTRODUCTION

Background of the Study

These days exams papers are crucial in today's modern society for gauging students' progress in their education. The information of technology is now replaced by the useful applications. Every product that may effectively cut down on time and energy use is acknowledged and appreciated for creating the software. An educational institute may find it essential to build an appropriate automated system for producing test questions and maintaining related data.

Institutions of higher learning must continuously enhance their teaching and learning approaches in the fast-paced, fiercely competitive educational climate of today. The creation and use of efficient assessment systems that can measure student comprehension and information retention with accuracy is one of the critical elements in enhancing learning outcomes.

The issue facing teachers and instructors at Technological University of the Philippines Visayas (TUPV) right now is creating exam test papers that are in line with the learning objectives of their courses and reflect the right level of difficulty for their students. Moreover, manual exam marking and scoring can take a lot of time and be prone to mistakes, providing students with inconsistent grades and feedback.

The creation of a web-based exam test paper generator for TUPV can offer a solution to these problems by streamlining the exam creation process, ensuring consistency and accuracy in grading, and freeing up teachers to concentrate on giving their students useful feedback.

Instructors will be able to efficiently construct exam test papers that match their course learning objectives and challenge their students' subject-matter understanding by automating the exam preparation process.

Objectives of the Study

The main objective of this study is to develop a web-based exam test paper generator for Technological University of the Philippines Visayas (TUPV) that will automate and streamline the process of creating and administering exams for instructors and students. The specific objectives are:

1. Develop a web-based exam test paper generator with the following features:
    a. Create exam test papers that can be tailored to particular test question types and degree of difficulty on a user-friendly digital platform.
    b. Generate a ready to print Exam test paper file.
2. To Fabricate the system using the following programming languages and frameworks: HTML, CSS, JavaScript, PhP, MySQL, Bootstrap, and MariaDB.
3. Test the system in terms of:
    a. Time-saving for the teachers in creating test papers.
    b. Accuracy in generating test papers.
    c. Adaptability to the changing needs of the education system.
4. Evaluate the system through User Satisfaction and Effectiveness in generating test papers quicker and efficient.
5. Offer TUPV instructors and students a productive and useful tool for developing test papers that will improve students' learning outcomes and experiences while lessening instructors' workload.

Scope and Limitation of the Study

The scope of this research will be including the design and development of a web-based exam test paper generator. The system will be built using web development tools and a database management system. The system shall have a user-friendly interface to allow users to quickly comprehend the many features and functionalities provided by the system, and this will contribute to the system's overall efficiency in generating exam test papers.

The development of the system will make use of web development technologies like HTML, CSS, JavaScript a few frameworks like Bootstrap or Tailwind as well as database management systems such as MySQL or MongoDB to store information on the purpose of few features like storing data of the key answers and questions to automate the generation of exam test papers. User testing and surveys will be conducted to assess the system's usability and effectiveness. The system's scalability and maintainability will be evaluated through performance testing.

Significance of the Study

The key beneficiaries of this project will be TUPV professors who will use the system's features to improve the overall efficiency of teaching and learning at TUPV while reducing instructors' workload. the study will provide an innovative solution to the problem of generating test papers for TUP Visayas. The system can enhance the learning process and improve the productivity of teachers and students while reducing costs and increasing scalability. The results of this study can contribute to the improvement of the educational system and provide a foundation for further development of the system.

The study's results might inspire future researchers to carry out related investigations that explore additional factors not addressed by the study, or they might inspire them to modify or add new features to the system. This study might also be useful to other researchers as a reference for future studies. The researchers want to gain a better understanding of automated functionalities and effective methods for creating exam test papers.

Chapter 2 - CONCEPTUAL FRAMEWORK

This chapter contains research, articles, and publications that verify the conceptualization or theoretical framework of the study. This supports the principles and procedures that the research will use. Also, it offers the data required for choosing the materials and parts that will be employed in the creation of the prototype. The description of the conceptual model that was applied to the study as well as the definition of terms are also given in this study.

Review of Related Literature and Studies

The studies about a web-based test paper generator for the Technological University of the Philippines Visayas has received very little studies. However, there are several studies that have investigate about the use of test paper generators and computer-based testing in general and could offer useful information for the creation of the suggested system.

In this chapter provides a review of related literature and studies that will help researchers obtain basic information and references for the current study. The researchers cited significant facts that

would support the significance and relevance of the Development of a web-based exam test paper generator for Tup Visayas.

A Review of Models for Computer-Based Testing

Computer-based testing (CBT) has gradually gained popularity as a feasible substitute for paper-and-pencil testing during the past 40 years. The switch to CBT is neither simple nor affordable, though. To create a successful operational program, numerous design engineering, test development, operations/logistics, and psychometric adjustments are necessary, according to Drasgow, Luecht, and Bennett (2006). Early CBT research nearly entirely concentrated on theoretical challenges like increasing measuring effectiveness by reaching sufficient levels of test score reliability with the fewest number of items possible. However, it quickly became clear that additional practical concerns, such as assuring content representation, making sure all test takers have enough time to finish the exam, implementing new item kinds, and managing the extent of item exposure to test takers, also needed to be addressed. In the recent years, research on CBT has concentrated on creating models that meet crucial objectives including limiting item exposure and maintaining content validity while simultaneously achieving required levels of measurement efficiency. Additionally, practitioners are becoming more aware that basic CBT research using small samples or simulation studies requires cost-benefit analysis as well as engineering design and implementation criteria to ensure that feasibility, scalability, and efficiency are assessed in more detailed ways than by merely reporting a decrease in error variances for theoretical examinee scores (Luecht, 2005a, 2005b).

E- Exams System for Nigerian Universities with Emphasis on Security and Result Integrity

Ayo, et. al. (2007) E-examination is a system that incorporates conducting exams online or through an internet, according to al. To stop the irregularities proposed by the Joint Admissions Matriculation Board (JAMB), a body charged with conducting entrance examinations into all Nigerian universities, they proposed a model for e-Examination in Nigeria where all applicants are subjected to an online entrance examination. One of the private universities in Nigeria, Covenant University, was where this approach was created and tested. According to their research, the system can solve some of the issues connected with conventional testing procedures, such as impersonation and other forms of testing fraud.

Traditional versus Electronic Tests

Tests are used in educational institutions to gauge students' academic progress, examine, compare, and assess the efficacy of instructional strategies, guide and counsel students, choose candidates for prizes and jobs, and grade students for certification purposes. To determine if a learner has accomplished a learning objective is one potential use of a test in the context of an educational institution. The results of such a test can assist teachers in troubleshooting issues with their chosen method(s) of instruction and in better understanding the learners' abilities in each topic. Based on the results of the analysis, the test can be used to modify the instructional setting or methodology to enhance the effectiveness of the instructor (Chen, et. al., 2005). Currently, there are two ways to administer tests: I the time-consuming traditional method of administering tests using paper and pencil, which involves creating test items, grading students' test sheets, and analyzing learners' responses for each test item; and (ii) computer-based tests, an electronic exam that enables test activities to be carried out using various electronic platforms/environments. The electronic examination (e-Examination) system essentially entails

the administration of exams utilizing a variety of electronic devices (computers, smartphones, etc.) connected to the testing system via the Internet or the Intranet. Since most of the process is automated, administering, grading, and reviewing the test require little work. The exam typically takes the form of a multiple-choice test.

Computer Supported Learning. A Large-Scale, Web-Based Learning and Assessment System to Support Flexible Education.

Gardner, et. al. (2002) in their work developed a computer-supported learning system, named CECIL, which included an interesting function of 'self-Assessment' to enhance students' learning effectiveness. The function of 'self-assessment' is equipped with item pools and teachers can administer and construct examinations easily through the Internet. They also pointed out that the advantages of item pools are that 'teachers are able to incorporate large item banks (item pools) from textbook publishers and batch load these questions with a minimum of manual effort'. Moreover, Gardner et al. (2002) also stated that teachers who administer and construct an examination through the Internet have the advantage of helping students to check their understanding of the learning materials at all hours.

Web-based Assessment and Test Analyses (WATA) system

To provide the most comprehensive Computer-Based Test (CBT) or Web-Based Test (WBT), Wang et al. (2004) developed an assessment system using the Triple-A Model (assembling, administering, and appraising) as the baseline qualification. This system was designed to be more appropriate for teacher education. The core components of the CBT system are included in the Triple-A Model. The process of assembling involves creating test pools, test objects, and test schedules. The act of administering involves selecting test items and item

options at random, giving test takers credentials to use the test online, and gathering and recording test score information. Analyzing and processing test data is the main emphasis of appraisal to produce a statistical report.

A Novel Web-Based Online Examination System for Computer Science Education

For computer classes, Zhenming, et. al. (2003) suggested a web-based operational skills assessment and evaluation system. In a different study by Rashad, et. A web-based online exam system was suggested by al (2010). The system administers tests to students and automatically grades their exams. The technology simplifies administering tests, gathering answers, automatically marking submissions, and producing test reports. It supports a wide variety of inquiries. It was accessed online and is always appropriate for both local and remote inspection. The system might support students taking the exams as well as lecturers, instructors, teachers, and anyone else who wants to write new exams or alter ones that already exist. The system was created utilizing a variety of free source tools. This system uses a MySQL database, PHP, HTML, and AJAX. A universal auto-grading module was created to support various test and question formats. The Mansoura University Quality Assurance Center served as the system's testing ground. The experiment validated the use of these web-based tools for evaluating students in high student volume colleges.

Comparison of test performance on paper-based testing (PBT) and computer-based testing (CBT) by English-majored undergraduate students in China

Large-scale English proficiency examinations are frequently administered using computers in a process known as computer-based testing (CBT). There isn't any research on whether CBT can be used for the Test for English Majors-Band 4 even though CBT usage is rising in China (TEM 4). The current study examined whether the testing mode affected the

TEM 4 score and variables (such as computer familiarity and attitude toward CBT) that could be associated with TEM 4 performance on CBT. 92 Chinese undergraduate students took the test after being randomly allocated to one of the groups, either paper-based testing (PBT) or computer-based testing (CBT). A mixed method was used, comprising (1) thematic analysis of semi-structured interviews; (2) thematic analysis of test performance in two modes; and (3) quantitative and qualitative analysis of computer familiarity and attitudes among CBT group participants. The findings showed that: (1) test results in CBT and PBT were comparable; (2) two items in the computer familiarity questionnaire—comfort level when reading articles on the computer and forgetting time when using computers—positively correlated with CBT scores; and (3) participants' attitudes toward CBT had no bearing on test results.

Scanner Based Assessment in Exams Organized with Personalized Thesis Randomly Generated via Microsoft Word

According to the research team consist of Teneqexhi, Romeo, Qirko, Margarita; Sharko, Genci, Vrapi, Fatmir, and Kuneshka, Loreta. One of the most onerous tasks for university professors throughout the world is grading exams. On the other hand, even when the exams are set up with multiple-choice, the time for student's outcome takes up relatively too much time; in this case, the possibility of students for cheating from one another becomes a risk for "objective assessment outcome." Multiple-choice exams make exams assessment a little bit easier, but the teacher can only prepare more than 3-4 variants. We have created a platform that is suitable for testing in large classrooms while attempting to do away with the time-range. The process is as follows: The teacher creates a JPG file, or just an e-picture, for each exam question, preferably with uniform proportions for all photographs. Using the sniping tool in Windows is simple. Let's assume that there will be 60 exercises or questions on the exam paper (can be up to 100). Each student's thesis will contain all 60 of these exercises or questions in a specially customized

version that was randomly organized by a machine. By using the same combination logic to every generated version of exam-paper, every thesis or exam-paper has a corresponding unique solution key for the result, and only the computer is aware of it. As a result, the instructor creates 60 JPG images that are stored in a USB memory stick folder. The teacher gives the faculty secretary (printing center) this USB together with information about the number of students they have and the folder where the images are kept. In the presence of the teacher, an operator uses Microsoft Word with a unique macro code developed in Visual Basic to create the right page making to automatically make and print 60 variations of the exam papers. A customized answer sheet with each student's photo is also printed by the secretary. As little time as possible must be allotted for student authentication during tests, it is crucial for e-students. The results are created right away following the exam procedures using the "SEKRETAR" software, which automatically scans all answer sheets.

Digital Examination in Higher Education-Experiences From Three Different Perspectives.

In the past ten years, assessment using new technology has solidified its position inside the university system. This essay presents the learnings that were gained over the course of the past two years as the Royal University of Technology in Stockholm, Sweden, adopted digital examinations. Teachers, students, and administrators all have diverse perspectives on the same experiences. From the teachers' point of view, the results have been quite positive: Less time is spent on grading written exams, the grades are seen as fairer, and the time saved may be used to improve the quality of other course components. Most students appreciate that they receive results much more quickly, that they can easily alter their exam answers, and that the grades are more equitable. From the standpoint of the students, the experiences have also been quite favorable. The experiences are much more complicated when seen from the final perspective,

which is that of the administrators. The adoption of digital examination was supported by some aspects of the administrative system, while it was resisted by others using a variety of tactics. The study ends with several recommendations for improving written exams, based on the lessons learned from the Swedish situation.`

A Students Attendance System Using QR Code

Users are increasingly favoring smartphones over desktops and notebooks as their primary computing devices. The use of smartphones to speed up the process of taking attendance by university instructors would save lecture time and hence improve the educational process. It is known that cellphones are most popular with users at the age of around 26. In this study, a method based on a QR code is proposed, which is shown to students before or during each lecture. To verify their attendance, the pupils must scan the barcode. The paper discusses the system's high-level implementation specifics. It also goes through how the system authenticates students to stop bogus registrations.

Conceptual Model of the Study

The foundations, tenets, and findings of the relevant investigations as well as the ideas from the literature offered are used to develop a conceptual model. The conceptual model for the investigation is displayed:

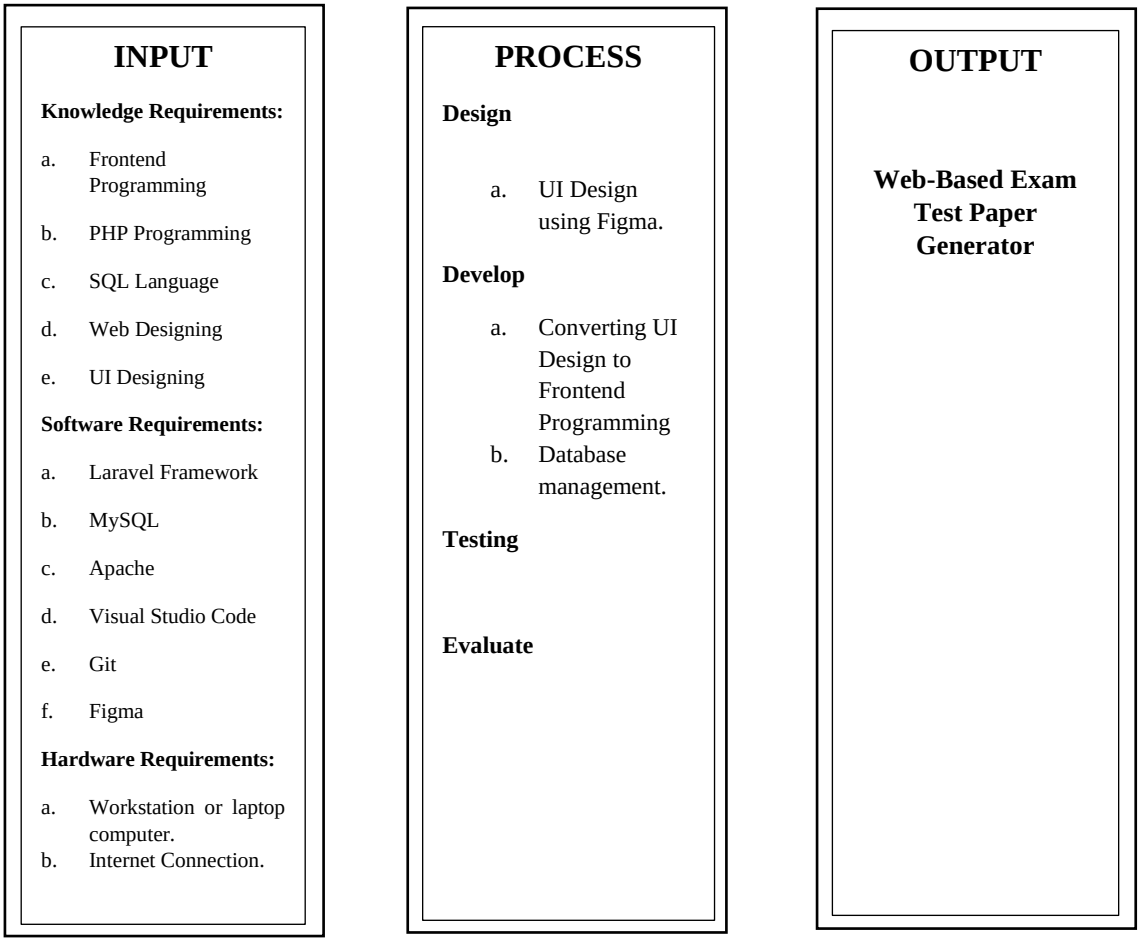

Figure 1. Workflow of the system.

Input

The requirement for a web-based exam test paper generator for TUP Visayas served as the project's input. For the purpose of enhancing their students' learning, TUP Visayas needs a

tool that will enable them to produce top-notch test materials. In order to save time and effort on manual creation of test papers.

Process

This section discusses the data gathering for the project's concept and the essential elements that the prototype must take into account to deliver the desired results. Gather information and conduct research on the various test paper generators and analyze TUP Visayas's needs and demand for the test paper generator.

Output

The finished product of this project is a web-based exam test paper generator. Depending on the demands of the subject and course, this tool can generate test papers with varying degrees of difficulty.

Operational Definition of Terms

To aid in a complete understanding of the research, this section of the chapter will provide a list of terms used in the study and their definitions.

Exam Test Paper Generator The term refers to a piece of software that automatically creates test papers based on parameters like subject, course, level of difficulty, and question format.

Software development is the process of creating, testing, and deploying computer applications or programs to satisfy particular user requirements.

Accuracy is the degree of precision and correctness in the output or result of the software tool is referred to as accuracy.

Functionality The capacity of a software tool to carry out its intended functions and satisfy user needs.

Chapter 3 – METHODOLOGY

Introduction

This chapter provides the methodology used in creating the Development of a web-based exam test paper generator for TUP Visayas, it includes the Project design, Project Development, Operation and Testing Procedure and Evaluation Procedure

Project Design

The suggested system would be able to have a log-in process that will require a Username, Password, and the Department the user is in, a user interface in which the user can customize and generate exam test paper, an option where the user can add questions to the question bank, and a question bank that is stored in the database. The various design illustrations in this paper were created with Figma and a few plugins.

The Workflow of the system is presented at figure 2. The user will have access to the Client-Side User Interface, where they can post question data that will be retrieved via APIs and used to obtain information about the corresponding exam paper from the Question bank that is stored in the database.

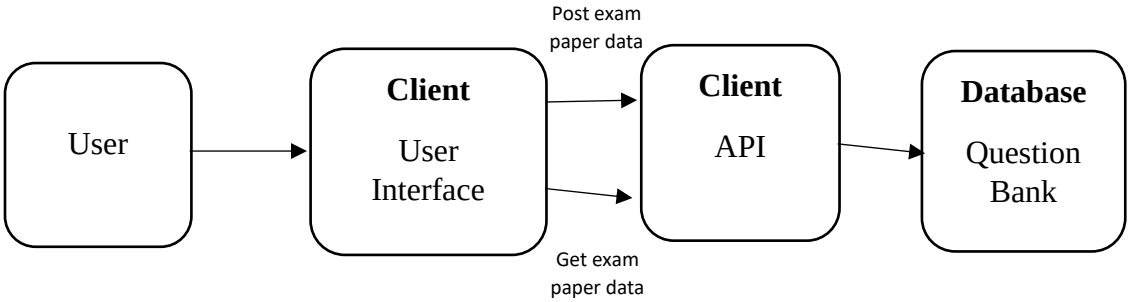

Figure 2. Workflow of the system.

Project Development

1. Development

1. Frontend Designing (User Interface of the system).

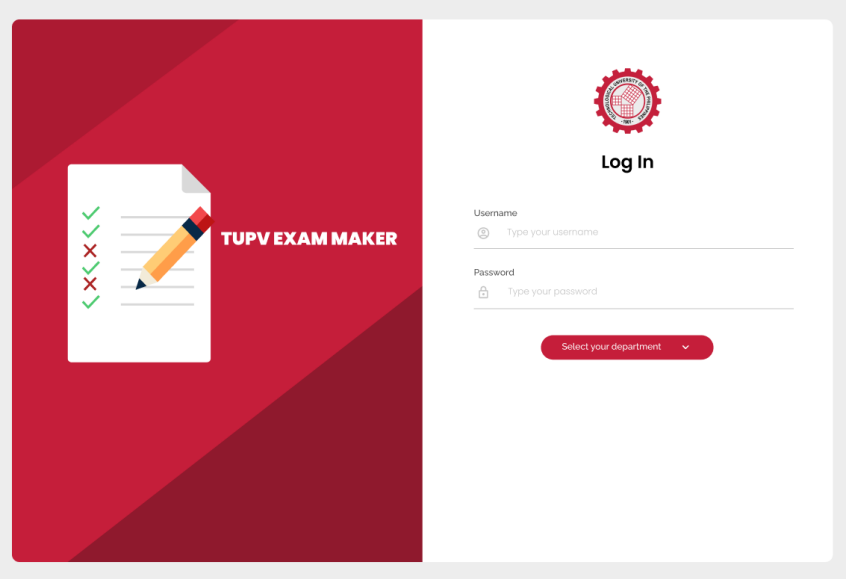

Figure 3. GUI of the Login Page.

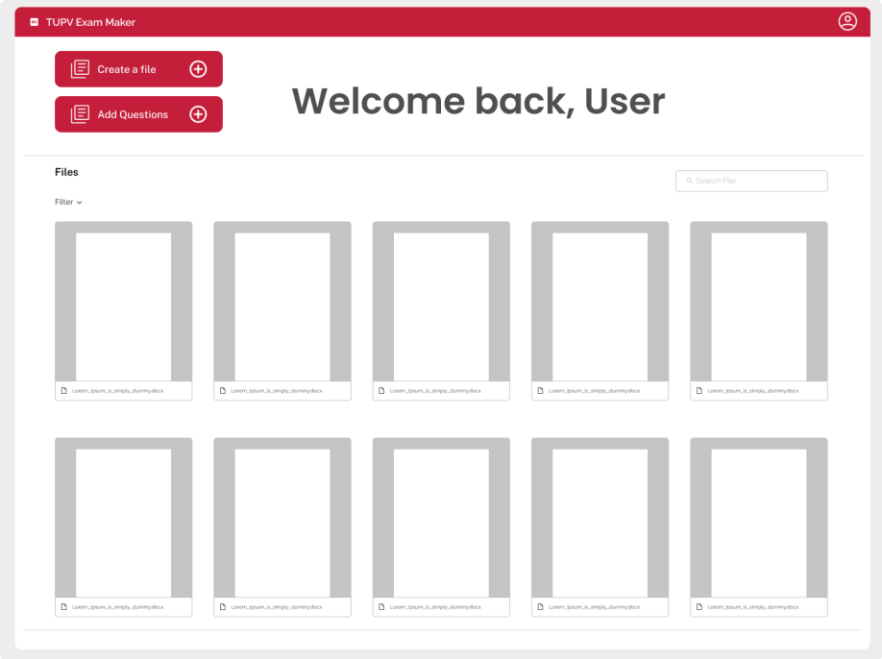

Figure 3.1 GUI of the Dashboard Page.

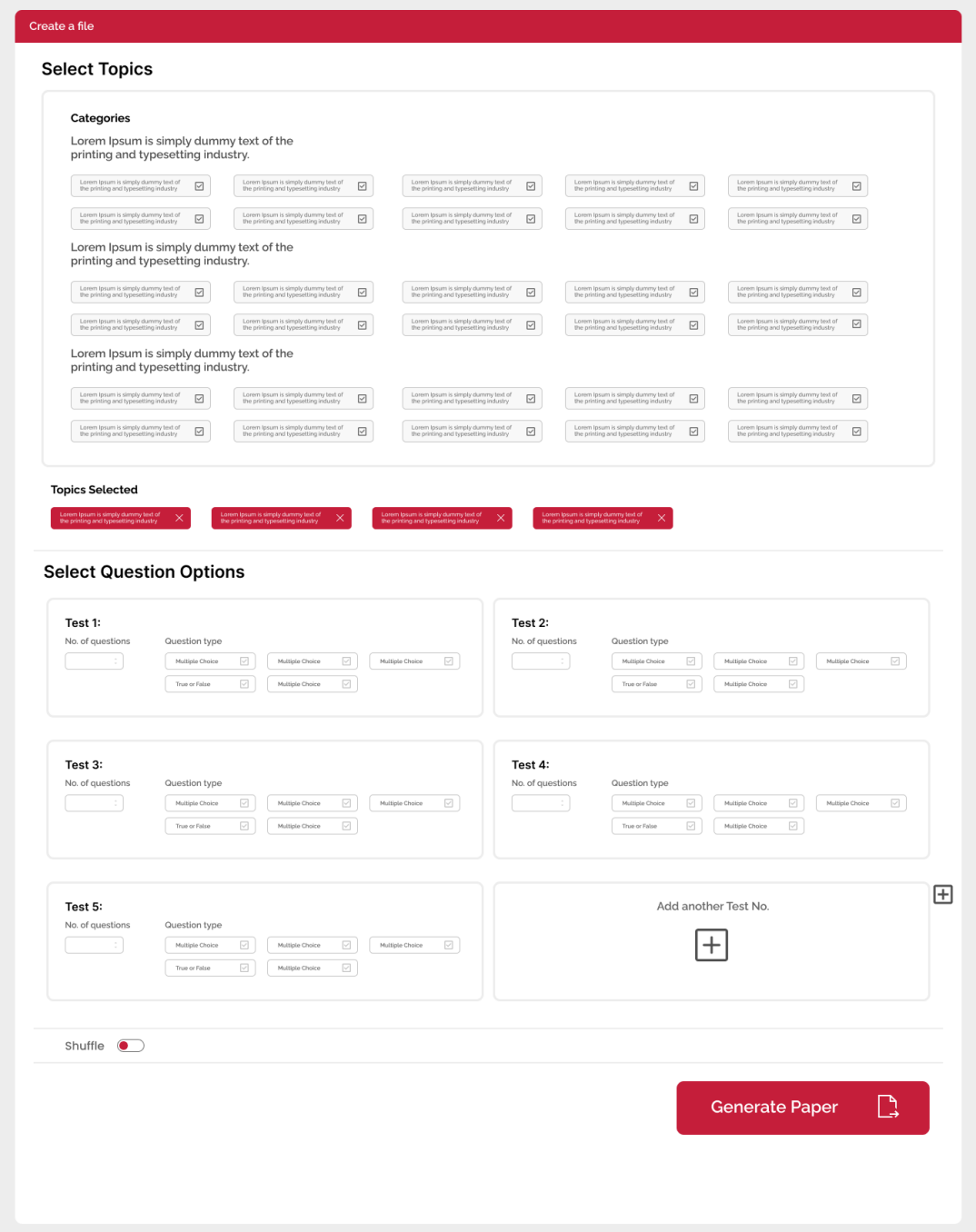

Figure 3.2 GUI of the “Create a file” Page.

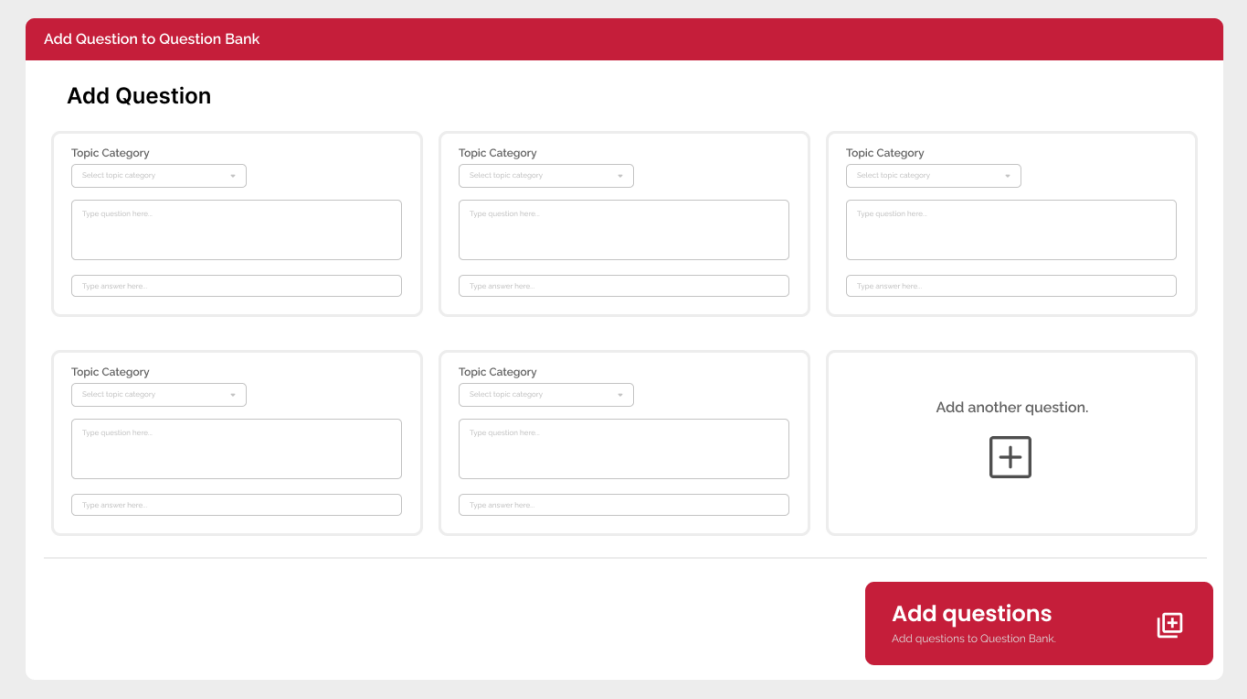

Figure 3.2 GUI of the “Add Questions” Page.

Refer to Figure 4, 4.1, and 4.2 for the system's flowchart in order to better comprehend the development process.

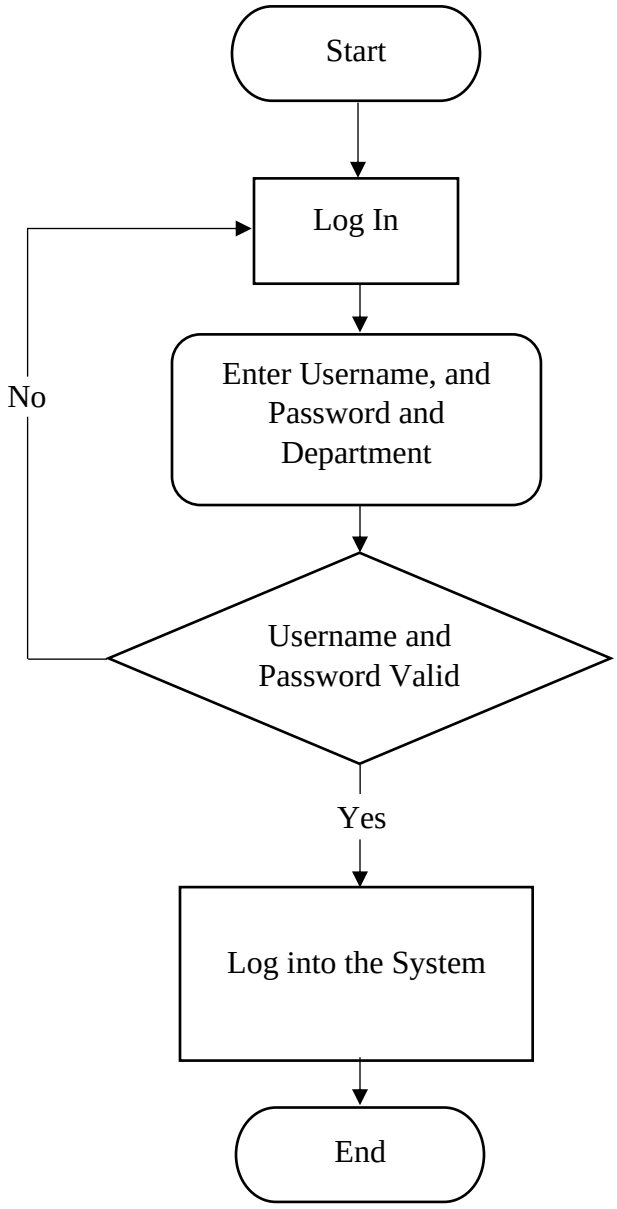

Figure 4. Flowchart of the Login Page.

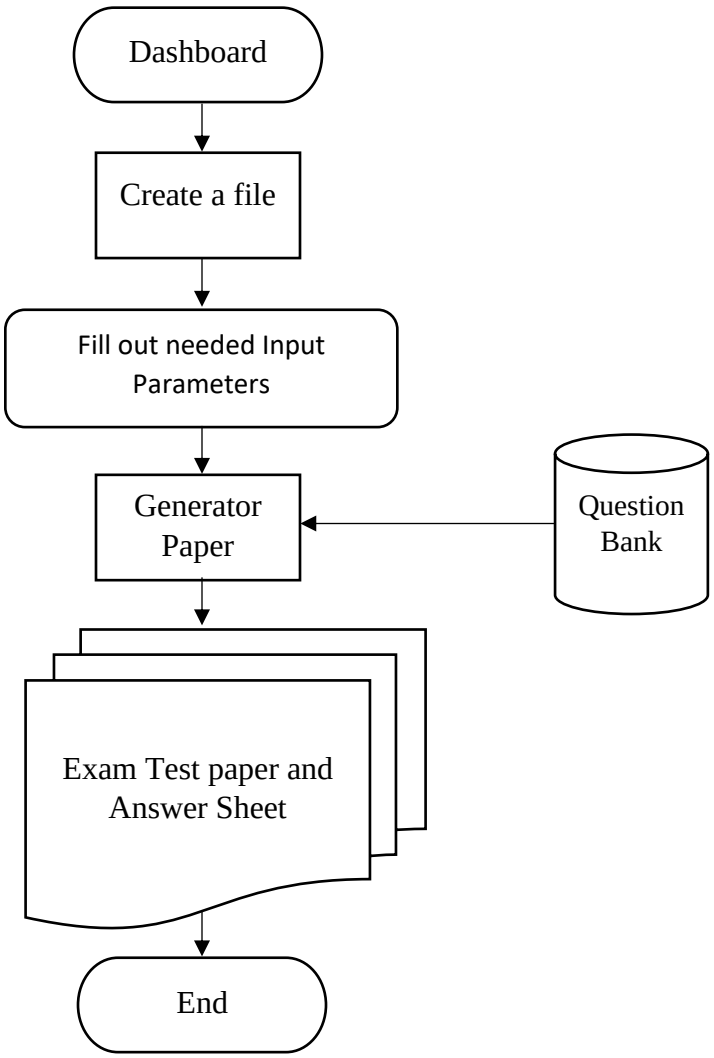

Figure 4.1 Flowchart of the “Create a file” Page.

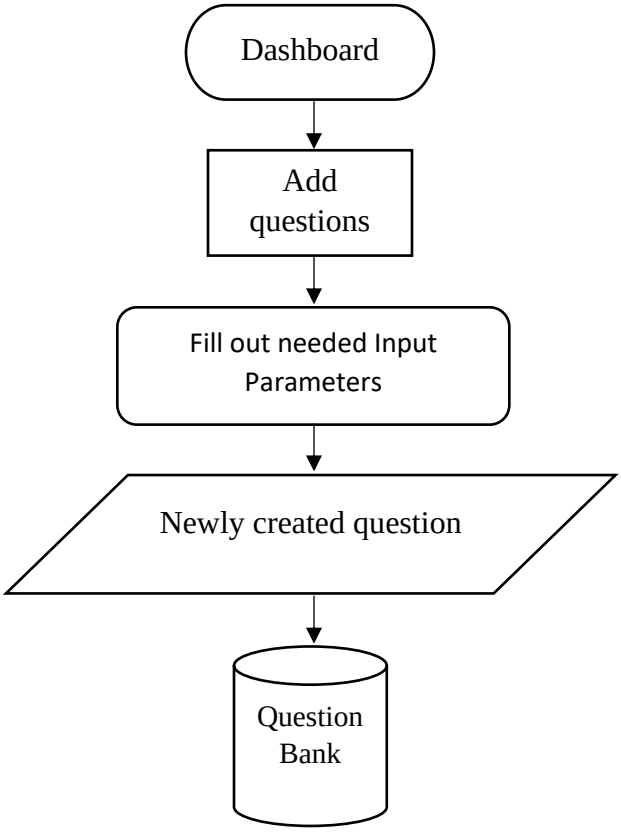

Figure 4.2 Flowchart of the "Add Questions" Page.

2. **Programming.**
    1. Frontend Programming.
    2. Backend Programming.
3. **Testing Procedures.**
    1. Software Testing.

Operation and Testing Procedure

Operation procedures are used to ensure that data is collected, analyzed, and interpreted consistently and accurately, regardless of who is carrying out the task.

Testing procedure, the process of evaluating the validity and reliability of a instrument use to collect data. This can help researchers to make the study much more accurate and reliable for the collected data.

Operation Procedure

This section consists of the comprehensive instructions that the user must follow in order to accomplish the creation of exam test papers and the other uses of the system. It is necessary for the process to run consistently in order to ensure that the end result will be optimal as it was intended.

General Operation Procedure

1. Open a web browser.
2. Type the URL (http://tupv.testpapergenerator.edu.ph).
3. The user must type the provided username and password and their respective department in order to log in.
4. In the dashboard, the user is met with the files they've created before. In order to create a new file, the user must click "Create a file" button on the upper left side of the page.
5. The user shall input the following exam parameters such as topics, number of questions, and the amount of test.
6. After filling up, the user must click the Generate Paper button.
7. The File is then downloaded into the user's device.

Testing Procedure

The testing procedure will involve both system testing and user acceptance testing. The purpose of system testing is to ensure that the web-based exam test paper generator functions as intended, while the purpose of user acceptance testing is to evaluate user satisfaction with the system and identify any areas for improvement.

Evaluation Procedure

The project's performance will be reviewed using a survey form comprised of questions. It will be given to a panel of 20 evaluators composed of 5 IT Experts and 15 Professors.

General Evaluation Procedure

1. Show the evaluators the system.
2. Talk briefly about how the study was evaluated.
3. Give the evaluators a questionnaire.
4. Explain how the system works.
5. Take the evaluator's inquiries into consideration.
6. Assemble, tabulate, and evaluate the findings.
7. Analyze the outcomes.

Based on the evaluation of the prototype, a Likert scale will be used. The validated tool includes a Likert Scale with a minimum rating of one (1) and a maximum rating of five (5).The prototype will be judged using metrics based on the criteria.

The scoring formula for the prototype evaluation is shown in Table 4. Analysis and interpretation of the prototype evaluation's output will take place. The quantitative interpretation of the score or data is shown in Table 5.

Numerical Scale	Descriptive rating
4.51 – 5.00	Excellent/ Highly Acceptable
3.51 – 4.50	Very Good/ Very Acceptable
2.51 – 3.50	Good / Acceptable
1.51 – 2.50	Fair/ Fairly Acceptable
1.00 – 1.50	Poor/ Poorly Acceptable

Numerical Scale	Descriptive rating
4.51 – 5.00	Excellent/ Highly Acceptable
3.51 – 4.50	Very Good/ Very Acceptable
2.51 – 3.50	Good / Acceptable
1.51 – 2.50	Fair/ Fairly Acceptable
1.00 – 1.50	Poor/ Poorly Acceptable