CHRISTIAN SERVICE UNIVERSITY COLLEGE
KUMASI

DEPARTMENT OF COMPUTER SCIENCE

ONLINE EXAMINATION SYSTEM FOR SENIOR HIGH SCHOOL

PETER BOAMAH

ABUBAKARI ESSILFIE

JUNE, 2013

DECLARATION

We wish to declare that apart from references made in some books, this work being presented as dissertation in partial fulfillment of the requirement for the award of BACHELOR OF SCIENCE (BSC) in COMPUTER SCIENCE as the result of our own effort under the competent supervision by Mrs. Judith Nkum Ayembillah.

…… …….

DATE PETER BOAMAH

(STUDENT)

…… …….

DATE ABUBAKARI ESSILFIE

(STUDENT)

I declare that, the students were supervised in undertaking this project.

…….. ……

DATE MRS. JUDITH NKUM AYEMBILLAH

(SUPERVISOR)

…… ……

DATE MISS LINDA AMOAKO

(HEAD OF DEPARTMENT)

ACKNOWLEDGEMENT

We are immensely grateful to God Almighty for bringing us to this far.

Our great appreciation goes to our parent Mr. And Mrs. Koduah Bruku and Mr. Augustine Kwame Acheampong and Mrs Magaret Braimah for bringing us up in a God fearing manner and educating me up to this level.

We acknowledge the input of MRS JUDITH NKUM AYEMBILLAH, our supervisor, who doubles up as a lecturer at the department of COMPUTER SCIENCE. You have been the main proofreader and supervisor.

We acknowledge my Head of Department, MISS LINDA AMOAKO and the entire lecturers at Computer Science Department.

We also acknowledge, Mr. K. Baah (ICT teacher K.S.T.S). Mr. Martin and Otabil Acquah Quansah for their word of encouragement.

We reserve the last but extremely important appreciation to Mr. Kwadwo Ampaw Bediako (CEO NAKMAD GROUP OF COMPANIES/AGYA APPIAH BITTERS), who really support and gingered our spirit and to all who for adverse ways helped us undertaking this project successfully.

We say God bless you all.

ABSTRACT

The design of the ONLINE EXAMINATION SYSTEM FOR SENIOR HIGH SCHOOL was started on the first week of October 2012 and lasted for six months. The following methods were used, Questionnaires, Interviews and Observations. The study was conducted in line with the objectives, to integrate technology more effectively into learning and revising practice across disciplines.

In all 400 questionnaires were distributed to final year students of which 398 representing 56.8% responded. The findings gathered showed that a lot of student surf the internet always to learn.

The study also reveals the effects and problems associated with conducting examination manually among the teachers and student in various institutions in Kumasi Metropolis.

From the above findings, it was concluded that;

1. Student find it very difficult to get past question on their own
2. The students do not see their result and exams papers after mocks and other examination have been conduct on time due to the population of the student.
3. Marking examination question becomes very tedious among teachers.

The study ended with some recommendation. Among these recommendations was that,

With this online examination system, students should practice questions on the own, conduct examination online and see their result instantly which will save the teacher a lot of time and energy in conducting examination manually

TABLE OF CONTENT

CHAPTER THREE

METHODOLOGY / RESEARCH DESIGN

CHAPTER FOUR

IMPLEMENTATION AND TESTING

CHAPTER FIVE

CONCLUSION AND RECOMMENDATION

CHAPTER ONE

1.0 INTRODUCTION

Education is a key element in the growth of a Nation. Every government tries to implement policies to improve the educational system. Education is the major backbone of a Nation like Ghana and as such should be a concern for the government and the entire population as a whole, so education should be aimed at improving and preparing student to thrive in this challenging and technological advancing world. We have to make sure that students have access to Educational materials like past questions of examination bodies around and educational materials of well-endowed educational institutes in the country.

Hence the **ONLINE EXAMINATION SYSTEM FOR S.H.S**; involves conducting test online using the internet or intranet of any individual or institution to conduct test to help student assess themselves before going in for the main WASSCE exams conducted by WAEC. The set of questions that will be used is multiple choice objective questions and quizzes that can be easily evaluated online.

The **ONLINE EXAMINATION SYSTEM FOR S.H.S** is basically a web based system to examine and evaluate the abilities and capabilities alongside the examination preparedness of the prospective candidates of the WASSCE examination. This is an automated system which stimulates how the WASSCE examination is conducted and improves it with instant results and reviewing of the questions to know which one you got wrong or correct as well as grading the candidate instantly. The system will focus on the core subjects of the WASSCE Examination.

The system will also have security features so that candidates' privacy would not be invaded. It will require every candidate accessing the system for the first time to register with a username of his choice and a password and use that username and password in subsequent logins. The username and password can be change.

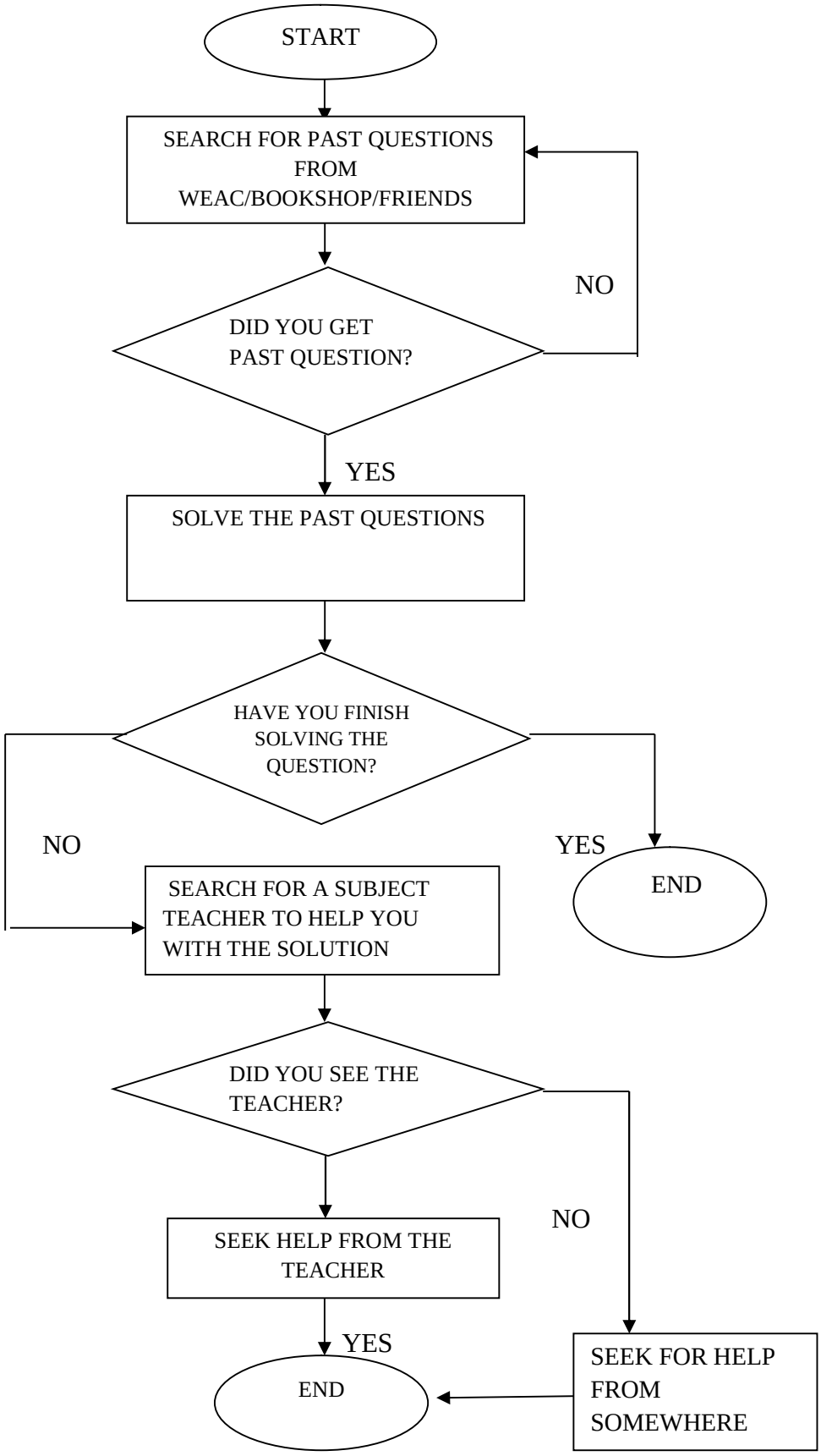
1.1 OVERVIEW OF EXISTING SYSTEM

The existing system is very tedious and time consuming. Preparing for examination is very difficult. After candidates have studied all the notes available to them, assessing themselves becomes a big problem. Some of them set questions on their own which might not be framed well thereby confusing themselves on the whole. Others may go in for questions from books which might not have answers in them for the candidate to review his answers after solving the questions and those with answers turn out to have printing mistakes, interchanging answers here and there thereby confusing the candidate.

The existing WAEC system makes access to past questions very difficult to most of the candidates in the country. Past questions must be purchased at WAEC centers which are very few in the country. Prospective Candidates who have access to internet by the help of today's growing telecommunication industry does not get access to past questions online.

Some teachers are very reluctant to give assignment and class exercises that will help the candidates prepare for the exam unless it is time for what is usually referred to as "MOCK" examination which is unfortunate. The student might not see the answer sheet of the "MOCK". How then will the student be able to review answers to see where he got right or wrong?

THE FIGURE 1 SHOWS A FLOW CHAT OF THE EXISTING SYSTEM



1.2 PROBLEM STATEMENT

There are major problems and concerns with student's education in the nation. Every candidate taking WASSCE examination has to take the core subject (English, Core mathematics, integrated science and Social studies) which is compulsory alongside the electives subject of the course you are studying. The problem of preparing for examinations has been one of the problems for students in Ghana and the world as a whole. It is an established fact that networking technology which has enabled communication by conforming to standards has indeed created an upward surge in the growth of Education.

As web-based technologies infiltrate every aspect of everyday life, it is imperative that students are kept up-to-date, learning the most effective ways to use technology to enhance their instruction and their learning. The above project will prepare students as they go through the online questions for their examinations and again urge students to develop the zeal to surf the web for study materials and again develop a centralized data bank, where students can access questions and learn on a particular subject privately at their own pace and at their own comfort.

We decided to undertake this project in order to help students prepare sufficiently for an examination much earlier than normal. It will take away the stress involved in going around looking for past questions to solve and most importantly getting the correct answers as well.

1.3 THE PROPOSED SYSTEM

The proposed system is called **ONLINE EXAMINATION SYSTEM FOR S.H.S.** This system will be a web-based application system. The application will be an automated

examination for the STUDENT in the S.H.S to handle the core subject aspect of the syllabus and also as a form of learning new questions which the student have not seen before so in case they meet them in the WASSCE examination, they will be able to answer the questions with ease.

The system will have SUBJECT and the QUESTION of choice to select.

For security purpose, password will be needed to get access to the examinations question on the website. The system will provide privacy to the candidates. The system will be secured from hackers and fraudsters to prevent the questions to be known to students. The examination will be in a multiple choice questions form. The system will automatically mark their scripts for the Student immediately as the student finishes with the examination just by pressing a button or as soon as the allocated time for the exams is up. So the student can know their score and will also allow the Student to review their marked script. The system will allow student to print report after the assessments.

1.4 AIMS

Developing technology competence among students is critical in order to cultivate online learning in which technology is used to support the learning and revision of examination and to meet the individual learning needs of all students. As a capacity-building project, it will aim at;

- Developing an online database which will store examination questions.
- Developing a system that will prepare students as they go through the online questions for their examinations
- Urge students to develop the zeal to surf the web for study materials.

- Developing a centralized data bank, where students can access questions and learn on a particular subject privately at their own pace and at their own comfort.
- Prepare the students to acquaint themselves with technological advancement in information technology.

1.5 OBJECTIVES

- To integrate technology more effectively into learning and revising practice across disciplines.

1.6 METHODOLOGY

The development of the **ONLINE EXAMINATION SYSTEM FOR S.H.S** platform entails operational findings to come up with the necessary requirements such as system and relational objectives. The fact and findings acquired will help in the total development of the system.

Technical approaches listed below will initiate the planning and the development of the platform;

- Questionnaire
- Interviews
- Research and site visits
- Observation of the work environment
- Sampling of existing documentation, forms and databases

A questionnaire is a form containing a set of questions, especially one addressed to a statistically significant number of subjects as a way of gathering information for a survey.

An interview is a conversation between two people (the interviewer and the interviewee) where questions are asked by the interviewer to obtain information from the interviewee.

Some of the WASSCE candidates from all levels will be interviewed to collect data or information on their thoughts and wishes about the project. Some other universities with the same learning platform will be contacted for possible information and experience with regards to system development. Articles, journals, books of reference and internet are explicitly viable medium for research. NIIT, an information and technology training school which has her Head Quarters in Accra will be visited to ascertain the smooth take off in developing the platform for the System.

1.7 RESEARCH QUESTIONS

- Will the software enhance the passes in the Core subjects by the candidates?
- Will the candidates be able to pass the West African senior secondary certificate examination (WASSCE) after using the software?
- Will the software improve the candidates' academic performance?
- Will the system able to integrate technology more effectively into learning?
- Will the system encourage the students to acquaint themselves with technological advancement in information technology?

1.8 SIGNIFICANCE OF THE STUDY

The study is to help student in the Senior High School who are preparing for their examinations to be able to go online and solve possible Examinable questions. The platform will also help students who are new to the WASSCE Examination to have a feel of structure of examination questions by West African Examination Council (WAEC). Knowing what to expect in their examination room, before doing the final examination, which will to help

students excel. The platform will help in monitoring the performance of each candidate who sign up to the system. Users can improve upon their performance as they solve the questions over and over again. Also, because WAEC have a tendency of repeating questions which they think students really need to know, there is a likely hood that, as the student uses this platform, the student will come across such question which in the long run gives the student a head start. We decided to undertake this project in order to help students prepare sufficiently for an examination much earlier than normal. It will take away the stress involved in looking for past questions to solve and most importantly getting the correct answers as well.

1.9 TOOLS

Software requirements:

The Software requirements for the **ONLINE EXAMINATION SYSTEM FOR S.H.S** will be;

Front End:

- HTML,(hypertext mark-up language),
- PHP,(hypertext preprocessor)

Why PHP?

- PHP runs on different platforms (Windows, Linux, Unix, etc.)
- PHP is compatible with almost all servers used today (Apache, IIS, etc.)
- PHP is easy to learn and runs efficiently on the server side
- FLASH

Back End:

- MYSQL
- WAMPSERVER
- Operating System: Windows, Linux

CHAPTER TWO

LITERATURE REVIEW

2.0 INTRODUCTION

Over the last decade there has been a steady increase in online courses for professional training in business and online academic courses in all business disciplines. This is in spite of the continuing debate about whether or not online learning is as effective as classroom learning. There is substantial research that suggests that student performance in online courses is not significantly different from performance in traditional classroom courses. Arguably, some of this research is descriptive in nature with little empirically driven comparisons. However, there is an emerging line of research that controls for course and instructor differences and uses learning outcomes based performance measures (Merrill and Galbraith, 2010). The findings are similar to prior descriptive research. That is, student performance is similar in online and traditional classroom courses. There are still many additional research opportunities associated with comparing the learning outcomes of different instructional delivery methods, but, bottom-line, online courses are here to stay. Nevertheless, academic researchers and online course designers are still faced with substantial challenges. Overcoming these challenges offers opportunity for the improvement of online education and the development of a unified theory of online learning. Experience has shown that time and effort spent in design and development of an online course can be extensive when compared to a classroom course.

2.1 THE CONCEPTUAL FRAMEWORK

In this article it narrowly defines an online learning module as a learning module that is presented on a course website. The term 'online learning' is used in this context. The learning module may be delivered by software such as Blackboard or it may be presented on a website

by programming without predesigned delivery software. The module is a question lesson that is part academic course for senior High School.

Objectives: To integrate technology more effectively into learning and revising practice across disciplines and developing a system that will prepare students as they go through the online questions for their examinations preparedness

Design: The system will be design base on the literature review, questionnaires and interviews with WEAC Examiners and some Teachers in the senior high school levels. All the records from the research will be analysis and used to design the system. The system design methodology will be base on Rapid application development

Is a software development method involved iterative development and software prototyping.

Result: The proposed framework for evaluating students' online learning will be organized using the water fall model.

2.2 RELATED STUDIES AND LITERATURE REVIEW

A literature review revealed research and studies based on implementation of a variety technology in college courses. "The internet has opened many possibilities for the classroom instruction but it can also be a barrier to teaching as well" (Bugeja, 2006). The new innovative technologies provide opportunities to improve learning and create a more exciting and motivating environment (Connors, 2007).

According to a case study by Ralph, Buskirk, and Schmidt (2007) regarding the use of online projects, students in favor of online projects indicated that the accessibility to the professor for fast and easy feedback was a great asset. Furthermore, the study revealed that when implementing technology students were concerned with the expense of the technology, the necessity for internet access, and the reliability of the technology.

Research on student perceptions and satisfaction with online courses provide insights to student reactions and satisfaction with implementation of an online exam. Hale (2007) found that student satisfaction surveys reveal that the most important reason for taking a distance education course is its convenience. In addition, Steinman (2007) indicated that "students' perceptions of online courses can be negative if they experience large transactional distance with the instructor and with other students and can influence whether a student will stay in or drop out of a class."

Steinman (2007) also found that "many students choose to enroll in online courses and the demand for online courses is high. Taking an online course can provide educational experiences that would otherwise be unavailable, especially for students who live in rural areas and do not have convenient access to schools." Rowh (2007) also found that "online courses offer convenient learning and students who take online classes are working hard. They're just doing it at their own pace, on a schedule and in a setting that works for them."

Walker (2007) indicates that the "widespread availability of computers and the Internet provide considerable enrichment in terms of variety of material and formats for presentation over what was possible with the old correspondence courses". The Chronicle for Higher Education (2007) reported that a university stated that they "use electronic education to add on to their curriculum, not as the main basis." This lends to the implementation of an online exam into a traditional classroom where students still get the face-to-face interaction with the instructor and classmates but the control of time and location to take their exams.

Patterson (2006) conducted a post-examination survey of students completing an online exam. The study “found a large majority of students were able to easily access the online exam, found the testing tool easy to use, and were able to complete the comprehensive exam with little difficulty. The future use of online assessment for the comprehensive exam was supported by 87% of respondents.” Furthermore, Patterson found that the “Web-based comprehensive exam procedures employed made it possible for students to take the exam at the time and place of their choosing”. The exam was able to reduce stress for students by giving them the ability to choose time and location of taking the exam according to Patterson. Patterson (2006) also acknowledged that the “challenges to test items security and the creation of procedures to minimize the possibility of collaboration and cheating on this type of "high-stakes" examination remains to be fully met.

A study of online exams by Luecht (2001) “identified six challenges of Web based testing: test-taker identity and testing materials security risks

- Measurement of problem-solving and complex skills
- Implementation of advanced item selection and test construction algorithms
- Management and processing of test response data,
- Deployment of "high-bandwidth" multimedia tests.
- Optimization of the "usability" of Web-based testing interfaces.” Luecht (2001) also identified several “strengths of Web-based testing including rapid test development and deployment, around-the-clock test access, prompt results reporting, and decreased need for test administration personnel.”

A study by Hay (2002) reports that an online exam is one in which questions are answered on, stored on and often marked by computers. Hay discovered the following keys to taking an online exam:

- Do not be tempted to access software other than that prescribed during the exam
- Sometimes attempting to use other packages interferes with the exam software, thereby jeopardizing your answers
- Even if you have finished your exam and are waiting to leave it is unwise to use the computer in any ways other than those required for the exam.

HAY (2002) METHODOLOGY, RESULTS, AND IMPLICATIONS

Two classes were utilized as a case study for implementing an online exam. The course already uses a computer simulation and although it is not required the courses have an online forum available for students use if they choose. The students are given two exams during the course: a midterm and a final. A total of 49 students participated in the two exams. The Midterm Exam covered eleven chapters of the textbook. The Midterm Exam consisted of 60 multiple choice questions generated from a textbook test bank. Two versions of the exam were created one for each class. The questions on the exam were in order with the textbook. Students were given 3 hours to complete the exam and were allowed to use their textbooks and notes on the exam. The exam was administered during the regular class session and the students took the traditional paper and pencil exam. The instructor collected the exams at the end of the three hour time limit, hand scored them, and returned the following week in class. The Midterm Exam resulted in 22 – As, 18 – Bs, 6 – Cs, 1 – D and 2 – Fs (See Figure 1).

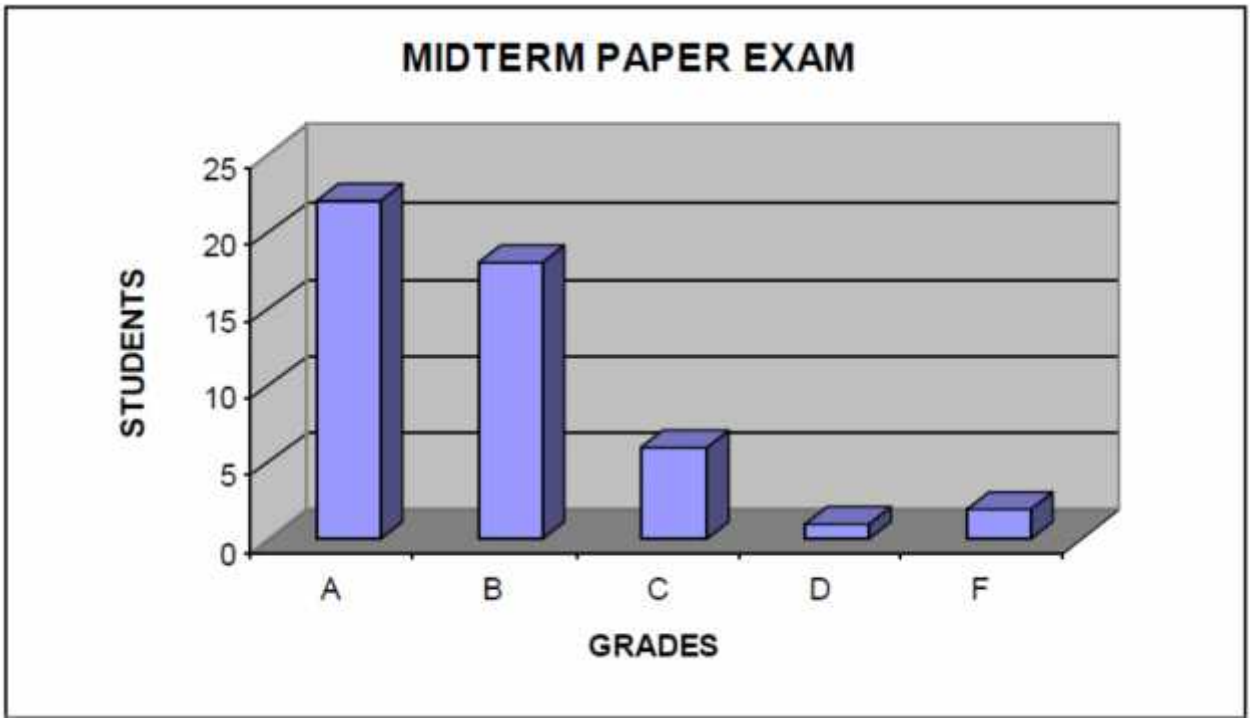


Figure 1 – Midterm Paper Exam

The Final Exam covered nine chapters of the textbook. The Final Exam also consisted of 60 multiple choice questions generated from a textbook test bank. The exam was generated randomly by the computer portal Blackboard. Each student logged into blackboard to access their exam. The exam allowed the students to have 3 hours to complete it once they started it. Each student was given a unique test with random questions from the nine chapters. The questions were not given in any particular order. Students were given a one week window in which they were allowed to complete the exam but once they started the exam they need had to complete it. The exam was open note and open book but the students were instructed that they were not allowed to use any other outside assistance with the exam. The exams were electronically scored immediately upon submission by the students and the students instantaneously received their scores.

The Final Exam resulted in 26 –As, 13 – Bs, 9 – Cs, 1 – D, and 0 – Fs (See Figure 2).

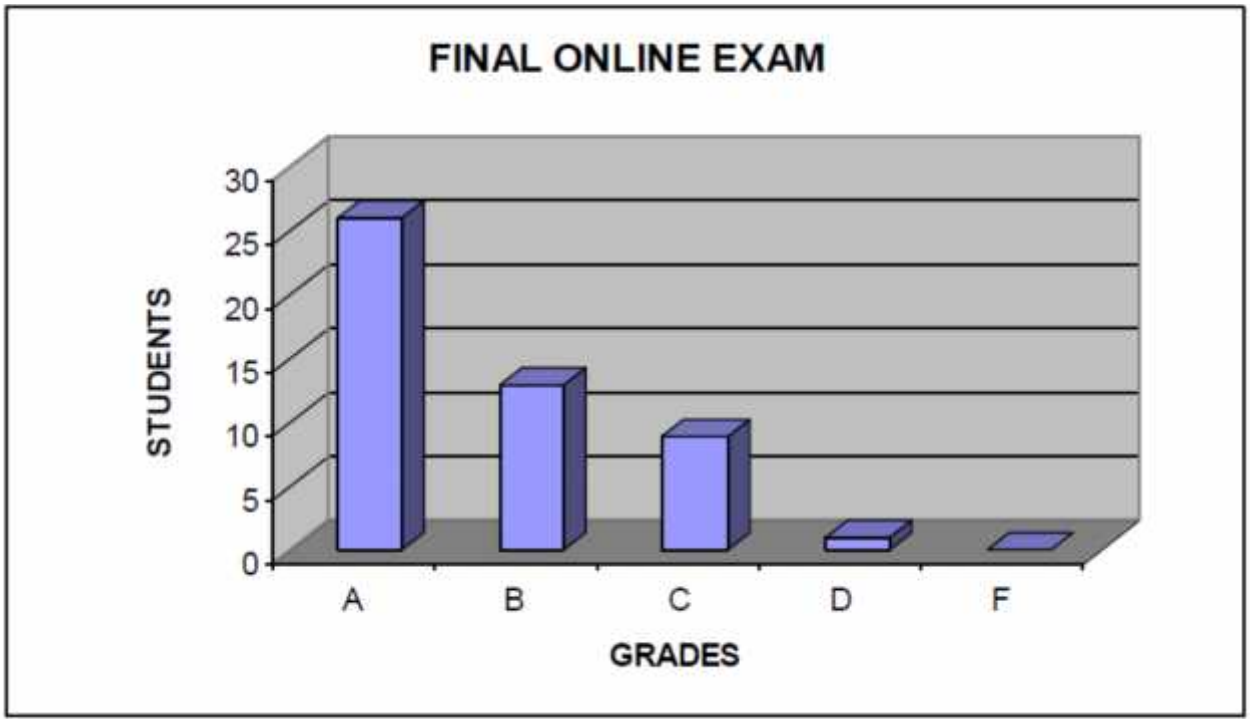


Figure 2 – Final Online Exam

Forty-one percent of the students, which is twenty students, earned the same letter grade on the midterm as the final. For example, if they got an A on the midterm they got an A on the final. Eleven of the students scored one grade lower on the final than the midterm. An additional three students scored two letter grades lower. Therefore, approximately twenty-nine percent of the students performed worse on the Final Exam when compared to the midterm. Thirty-one percent of the students improved their scores on the final over their scores on the midterm. Nine students improved it by one letter grade. Four students improved it by to letter grades. Two students even improved their grade by more than two letter grade. Furthermore, the differences can be studied further by examining the actual percentage difference in grades (See Figure 3). Forty-five percent of the students scored within five percent on their final of their grade on the midterm. For example, if they scored 88% on their

midterm they have scored between 83% and 93%. Thirty-one percent of the students had a difference in their scores of 5% to 10%. Ten percent had a difference in score of 10% to 15%. Eight percent had a difference in score of 15%-20%. Six percent of the students had a difference of more than 20% in their scores.

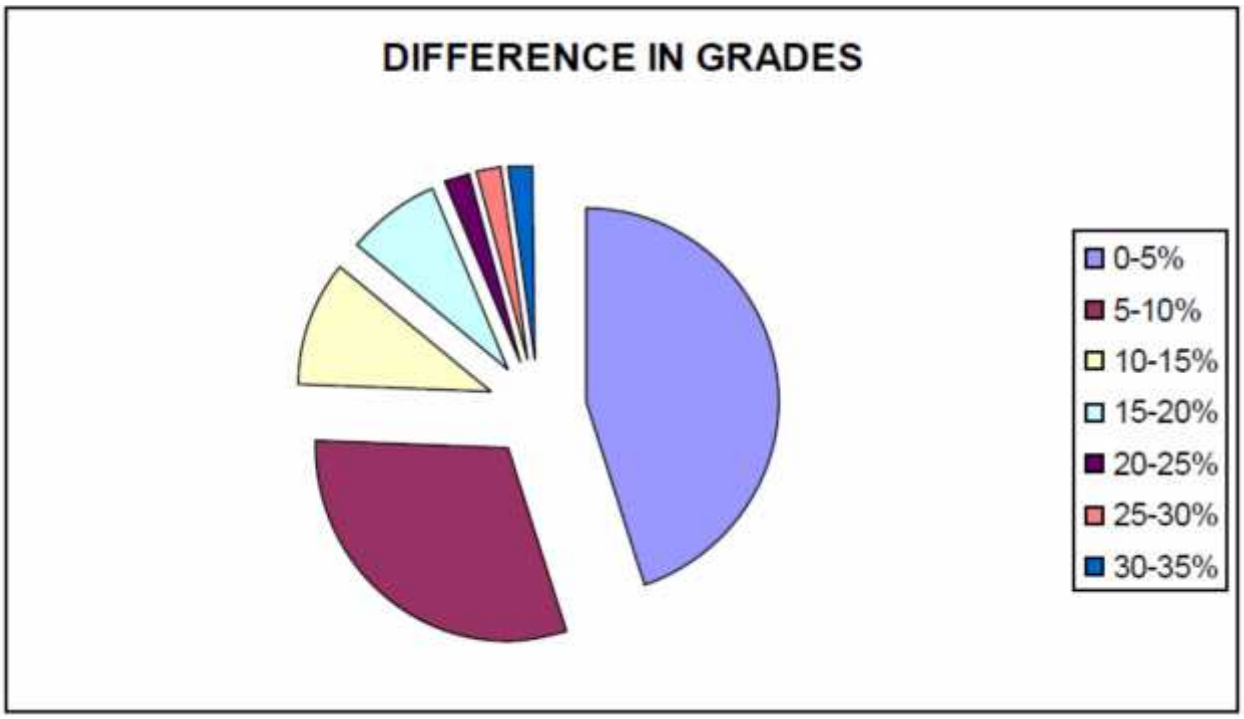


Figure 3 – Differences in Midterm and Final Exams Scores

Examining the statistics of the two exams provides more information on the exams (See Figure 4). The midterm and Final Exams resulted in a relatively similar maximum score of an A with a 98% on the midterm and a 100% on the final. The minimum is notably different on the midterm from the final. The minimum on the midterm was a F and on the final the minimum was a D. There is not a considerable difference in the mean or the median scores of the midterm or the final.

	MIDTERM	FINAL
MINIMUM	58	68
MAXIMUM	98	100
MODE	92 & 98	93
MEAN	86.4	87.8
MEDIAN	88	90

***Figure 4* – Midterm and Final Exam Statistics**

Faculty and Student Feedback

This implementation of an online exam is the first time the instructor ever utilized any exam other than a traditional paper and pencil exam taken with a proctor to oversee the students completing the exam. The instructor indicated the following concerns to the use of an online exam:

- Cheating
- Reliability of technology
- Ease of use for instructor
- Ease of use for students
- Student satisfaction with online exam

Cheating. The biggest concern for use of an online exam is cheating. With the paper and pencil exam, students are constantly monitored to assure that each student is taking the exam without the assistance of other individuals. By putting the exam online and allowing the students to take the exam at their leisure creates an opportunity for students to get assistance

on the exam. The instructor addressed this concern by using a random exam so that each student has a completely different exam so students cannot share answers. The instructor does acknowledge that the random exam does not completely address the issue and the instructor must use the honor system to hope that students do not cheat.

Reliability of technology. The professors indicated that they did have a fear of the reliability of the technology. In order for the students to complete the exam online the students must have access to the internet and log into blackboard. The implementation of the online exam using blackboard allowed to professor the option of using a randomized test so that every student got a unique test. From the professor's perspective the technology proved to be very reliable although three students had problems they were not due to the technology being unreliable.

Ease of use for instructor. The textbook used by the professor provided a test bank that was compatible with blackboard. This allowed the testbank to be quickly and easily uploaded. The exam can then be created in blackboard with a variety of options. The instructor was able to use the following options on the test:

- Forced completion (students had to complete in one sitting)
- Scheduled availability for the exam
- Number of questions from each chapter
- Total number of questions on the exam
- Time limit for the exam
- Random questions for each student
- Immediate scoring reported to students.

The instructor reported that these options were very easy to incorporate into the exam. The instructor also had the ability to reset an exam and receive statistics including amount of time

each student took to take the exam and their scores on the exam throughout the exam as well as at the end of the exam time period.

Ease of use for students. Students are becoming more and more proficient in the use of technology as jobs are now requiring these skills to meet the demands of their everyday job. Three students reported technological problems during the exam.

One indicated that when he submitted the exam he received a message stating that not all questions had answers and did he want to review before submitting but when he reviewed the exam all questions had answers so he submitted anyway. He notified the instructor and the instructor verified that all questions did indeed have answers. When surveying the students after the exam, several students had the same problem. The exam is designed so that a student can save after every question or wait until the end of the exam and save. Several students started saving after each question but when this proved to be extremely time consuming stopped and opted to just save at the end. These are the students that received the missing answer message. The students that saved after each and every question or only at the end did not receive the message.

One student reported that the exam stopped timing her session in the middle of the exam. She therefore indicated that she used the honor system and timed herself to assure she did not go over the three hour time limit. Although, the instructor was not able to determine what caused the student to feel that the timer had stopped, the instructor verified that the timer did in fact work.

The final student had an actual problem taking the exam. While taking the exam the student navigated away from the exam thus preventing her ability to finish the exam. Using the computer for anything else while in the middle of the exam ends the exam session. This

aspect although unexpected provides extra reassurance to the instructor that students have fewer opportunities to cheat by access the internet during the exam. With this new knowledge, students can be warned so that they know not to navigate away from the site during the exam. In this case, the instructor was not able to give the student access to the exam she had in progress but was able to reset the exam and the student was able to retake the exam from the beginning.

Student Satisfaction. Students were surveyed after completion of both the midterm and Final Exam. Of the forty-nine students, an overwhelming forty-one, eighty-four percent, indicated that not only would they like to take an exam online again they stated they would actually prefer it. The other eight students indicated they prefer the traditional paper and pencil exam in a monitored prescheduled setting (see Figure 5).

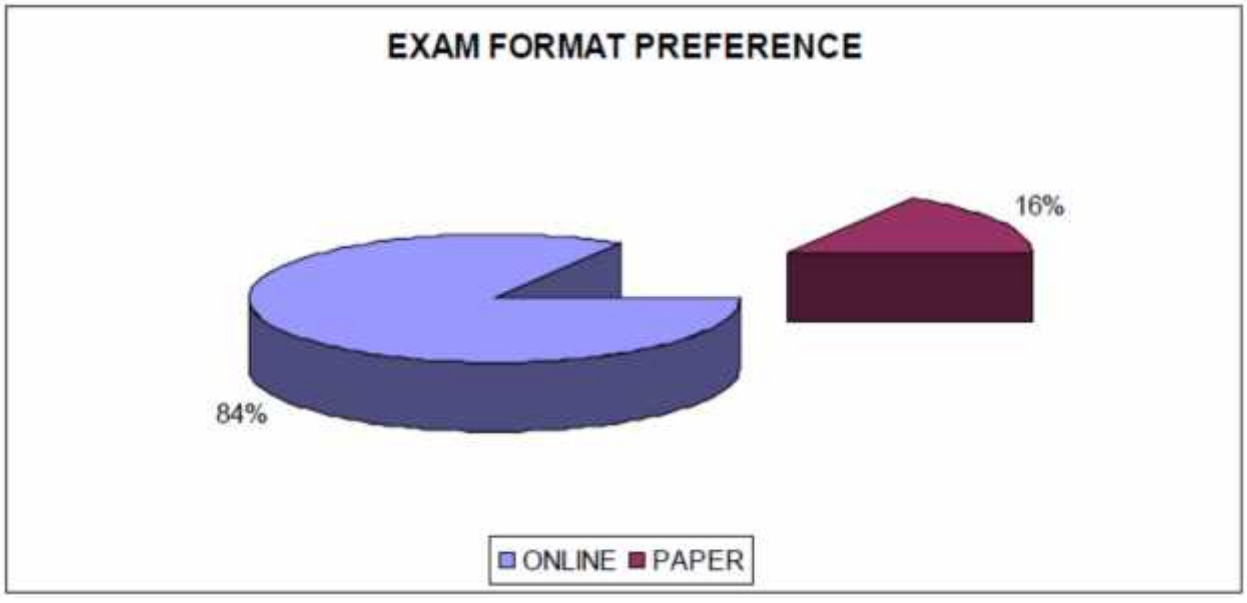


Figure 5 – Student format preference

Students that preferred the online exam shared that the exam reduced some of their stress generally associated and expected when taking an exam. The traditional paper and pen exam required students to take the exam during class time which generally in the evening after a long day of work. Students are tired and distracted from their work day. The online exam

allowed students to choose the time and place they took the exam. Many of students particularly like the fact that they could get up on Saturday morning when they were fresh and relaxed and take the exam. In addition, the students really liked the fact that they received their scores instantaneously and did not have to wait a week to get their scores. The online exam was easy to use and many of the students actually felt that the online exam was easier to use. The students indicated that in the traditional paper and pencil exam students have accidently marked an answer on the wrong line on the answer sheet thus messing up all of their answers and even some times greatly affecting their grade on the exam. The format of the online exam prevents this from happening. The few technological problems caused some students to prefer the paper and pencil exam. In addition, a few of the students stated they just prefer things in written form rather than reading everything on a computer screen.

HAY (2002) CONCLUSION & FUTURE IMPLICATIONS

An online Final Exam was implemented with minor complications resulting in an overall satisfactory experience for both the instructor and students. The specificities of the blackboard online exam that occurred during this implementation provide insight to help alleviate even the minor complications that occurred.

After the online exam has been implemented in more courses it would be beneficial to compare and contrast the scores from the previous courses that were paper and pencil with the scores from the newly administered online exams to determine if there is a significant difference in student outcomes. In addition, instructors need to continue to monitor and evaluate the issue of cheating on online exams and find safeguards against such behavior. According to Kelsey (2009), online learning can be defined as presenting instruction using the internet as the primary form of delivery. In other words, it refers to integrating

Information and Communication Technologies (ICT) in education. In essence, e-learning entails: presentation, demonstration and manipulation of data using productivity toll and usage of educational curriculum–specific application types which include educational games, drill, practice, simulations, tutorials, virtual laboratories, visualization, graphical representation of abstract concepts, musical composition and expert systems. It also involves the usage of information and resources of CD Rom or online encyclopedias, interactive maps, atlases, electronic journals among other references.

Kelsey (2009) asserts that online learning can take two formats: Synchronous and Asynchronous. Synchronous refers to situations where the instruction is delivered and received in real time with examples being satellite, Skype, VOIP and live chat. Asynchronous on the other hand is when the instruction is delivered and received at different times with an example being CMS (Content Management System) which incorporates e-mail, text, and recorded lectures. Content Management System, in particular, allows the teacher to present content to students.

2.3 COMPETITION TO THIS WORK

A number of online self examination software for students has been developed throughout Ghana. Among them are the following:

1. E- learning for me
2. Online test for Junior High School
3. Electronic English Examinaton for J.H.S.

Almost all online self examination software have similar methodology but with different purpose base on the institutions' recommendation. They are also limited to only persons in the institution and Ghana .They do not have the choice of level and question to be selected.

Although this project work may have limitation due the advancing in technology, it will overcome the limitation of the existing ones. Since it will have past question on WASSCE , all the WEST AFRICAN COUNTRIES students participating in the WAEC examination can Access them self online by this system.

CHAPTER THREE

METHODOLOGY

3.0 INTRODUCTION

The establishment and use of sound engineering principles in order to obtain economically developed software that is reliable and works efficiently on real machines is called *software engineering.*

Software engineering is the discipline whose aim is:

1. Production of quality software
2. Software that is delivered on time
3. Cost within the budget
4. Satisfies all requirements.

Software process is the way in which we produce the software. Apart from hiring smart, knowledgeable engineers and buying the latest development tools, effective software development process is also needed, so that engineers can systematically use the best technical and managerial practices to successfully complete their projects.

A **software life cycle** is the series of identifiable stages that a software product undergoes during its lifetime .A software lifecycle model is a descriptive and diagrammatic representation of the software life cycle .A life cycle model represents all the activities required to make a software product transit through its lifecycle phases .It also captures the order in which these activities are to be taken.

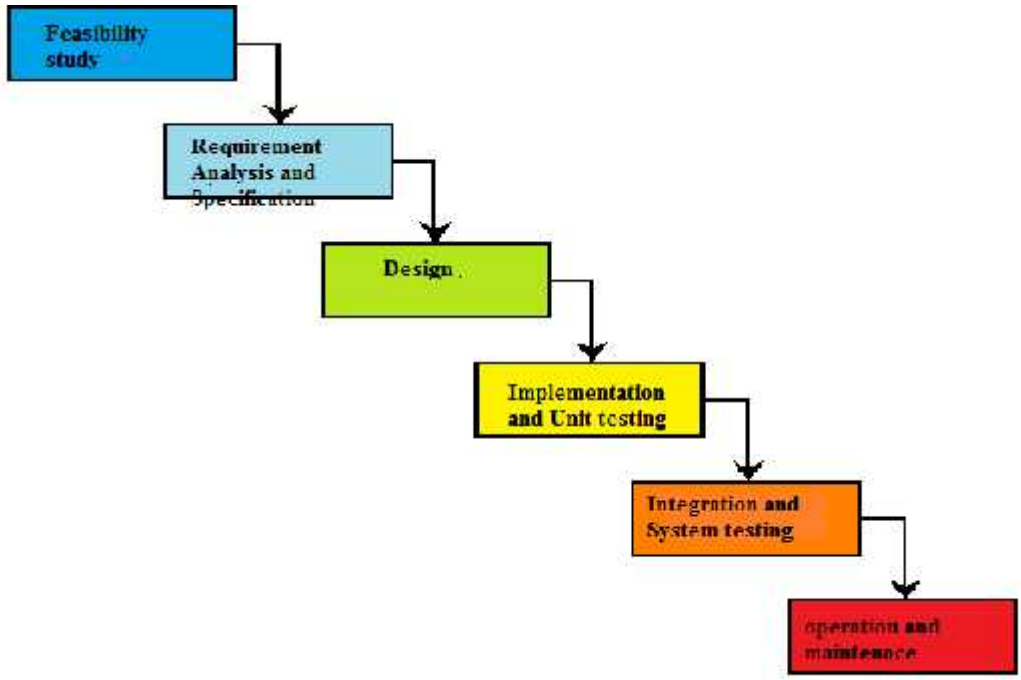
3.1 LIFE CYCLE MODELS

There are various life cycle models to improve the software processes.

- Waterfall Model
- Prototype Model
- Iterative Enhancement Model
- Evolutionary Model
- Spiral Model

In the project, **Waterfall model** is followed.

WATERFALL MODEL



3.1.1 Waterfall Model

This model contains 6 phases:

3.1.1.1 Feasibility study

The feasibility study activity involves the analysis of the problem and collection of the relevant information relating to the product. The main aim of the feasibility study is to determine whether it would be financially and technically feasible to develop the product.

3.1.1.2 Requirement analysis and specification

The goal of this phase is to understand the exact requirements of the school and to document them properly.(software requirement specification, SRS)

3.1.1.3 Design

The goal of this phase is to transform the requirement specification into a structure that is suitable for implementation in some programming language.

3.1.1.4 Implementation and unit testing

During this phase the design is implemented. Initially small modules are tested in isolation from rest of the software product.

3.1.1.5 Integration and system testing

In this all the modules are integrated and then tested altogether.

3.1.1.6 Operation and maintenance.

Release of software inaugurates the operation and life cycle phase of the operation.

The phases always occur in this order and do not overlap.

3.1.2 Objective

The objective of the project is to integrate technology more effectively into learning and revising practice across disciplines.

3.1.3 Data Collection Methodology

For this project, Documentary Method Data Collection is an appropriate method of data collection. That is, reviewing an existing data which is normally in the form of a secondary data. What was done was to collect past questions from the school, review them and store them in the database system. This method was adapted because we will get accurate and carefully documented data and also minimise cost and this method is less time-consuming. The Interviews would be semi-structured, with the aim of allowing students to adjust and contribute their own line of thought whenever they wished.

3.1.4 Study Area

The data collection method used in developing **ONLINE EXAMINATION SYSTEM FOR S.H.S** was based on some selected schools in Kumasi metropolis where KUMASI SECONDARY TECHNICAL HIGH SCHOOL (K.S.T.S) was the main area studied

3.1.5 Population

Kumasi Secondary Technical School has a population of about two thousand, one hundred (2100) students in all. The final year student ranges from seven hundred (700) to eight hundred (800) students

The data to be analyzed was collected through,

- Questionnaire
- Interviews

- Research and site visits
- Observation of the work environment
- Sampling of existing documentation, forms and databases

3.1.6 Questionnaire

In all 400 questionnaires were distributed to the final year students to know how often they use and also search for past questions on the internet At the end of the field study, 398 out of the 400 questionnaires were collected representing 56.8%. The table below shows responds levels for the questionnaires are given in the table below.

NUMBER OF QUESTIONNAIRE	STUDENT RESPONSE LEVEL	PERCENTAGE RESPONSE LEVEL
400	398	56.8%

TABLE 3.1 Response level

3.1.7 Interviews

Some of the teachers including the I.C.T teachers in the school were interviewed to know how important this software will help both the student and the school as a whole to pass the examination successfully. Some of the WASSCE candidates from all levels will be interviewed and to get first hand information on their thoughts and wishes about the project. In all 15 people will be interviewed (8 were teachers and 7 were students) availed themselves for the interviews.

3.2 RESEARCH AND SITE VISIT

Some other institution with the same learning platform were also be contacted for possible information and experience with regards to system development. Articles, journals, books of reference and internet are explicitly viable medium for research. NIIT, an information and technology training school was visited to ascertain the smooth take off in developing the platform for the System.

3.2.1 Observation of the Work Environment

Some observation will be made on how examinations are conducted for the students. Some observation would also be done in the computer laboratory to know how much interest the students show when using the computers to learn.

3.2.2 Requirements

Developing software goes with requirement and specifications. The requirements for a system are the descriptions of the services provided by the system and its operational constraints. It shows the functionality or characteristic of a system. It gives more insight of what the client really “wants” in the system and the performance and functionality of the system.

There are different kinds of requirements and this includes

- Functional requirement
- non-functional requirement

3.2.2.1 Functional Requirements

For the proposed system to work effectively and efficiently, these are necessary conditions that must be available to state precisely what the school wants in the system.

The functional requirements are:

- The system user should provide user credentials for authentication, (user name and password).
- No unauthorized person can access the system.
- The system would be user friendly and easy to use.
- The database can be manipulated by the administrators
- The system would produce a result immediately at the end of examination

3.2.2.2 Non-Functional Requirements

Non-functional requirements are usually some form of constraint or restriction that must be considered when designing the solution. We considered a few non-functional requirements of the proposed system. These are some of them:

Product requirement

This part includes the system performance and how fast the system must execute and how much memory is needed. It was noted that to increase system performance, efficiency and speed, file system employed in storing the various data in the database itself should be basic.

Organizational requirement

They are associated with the policies and procedures of the organization and the software developers. Examples include, process standards, programming language, design method used and delivery requirements.

External requirement

This would cover all the requirements which are derived from factors external to the system and its development process. External requirement include taking into consideration ethical and legislative requirements, which would include not disclosing any personal information about the students. External requirements are based on:

- Application domain information.
- Organizational considerations.
- The need for the system to work on regulations.

3.2.2.3 Hardware requirements

The computer system hosting the proposed software should have the basic components of any computer system (keyboard, mouse, system unit and monitor). In addition it should have the following requirements

- A minimum of 512MB of RAM recommended.
- Intel® processor Pentium III 900MHz or equivalent or higher.
- Minimum: 1.6 GHz CPU, 384 MB RAM, 1024x768 display, 5400 RPM hard disk
- Recommended: 2.2 GHz or higher CPU, 1024 MB or more RAM, 1280x1024 display, 7200 RPM or higher hard disk

3.2.2.4 Software requirements

The computer system hosting the proposed software should be running preferably on Windows XP Service Pack 2 or above (for 2010 release, Service Pack 3), Windows Server 2003 Service Pack 1 or above, Windows Server 2003 R2 or above, Windows Vista, Windows 7. The host computer should have MySQL Server or wamp sever installed as this would be the database server to be used.

3.2.3 Programming Language Used

The programming languages used for the **ONLINE EXAMINATION SYSTEM FOR S.H.S** were;

Front End:

- HTML,(hypertext mark-up language),
- PHP,(hypertext preprocessor)
- FLASH

Back End:

- MYSQL
- WAMPSERVER
- Operating System: Windows,

CHAPTER FOUR

IMPLEMENTATION OF SOLUTION

4.0 INTRODUCTION

Due to some changes in the schools' requirements, there were some modifications made to the requirement (functional and non- functional requirement) as the system was in progress. Prototype was made to the users to access and make necessary changes in the requirements

4.1 TESTING

The proposed system had been tested by the users as a standalone system. Because of the regular prototype delivery to the users, it was achieved through testing and recommendation. Some unregistered student were ask to enter any username and password, the system prompt them to check username and password. Validations were also checked as indicated on FIG 4.1

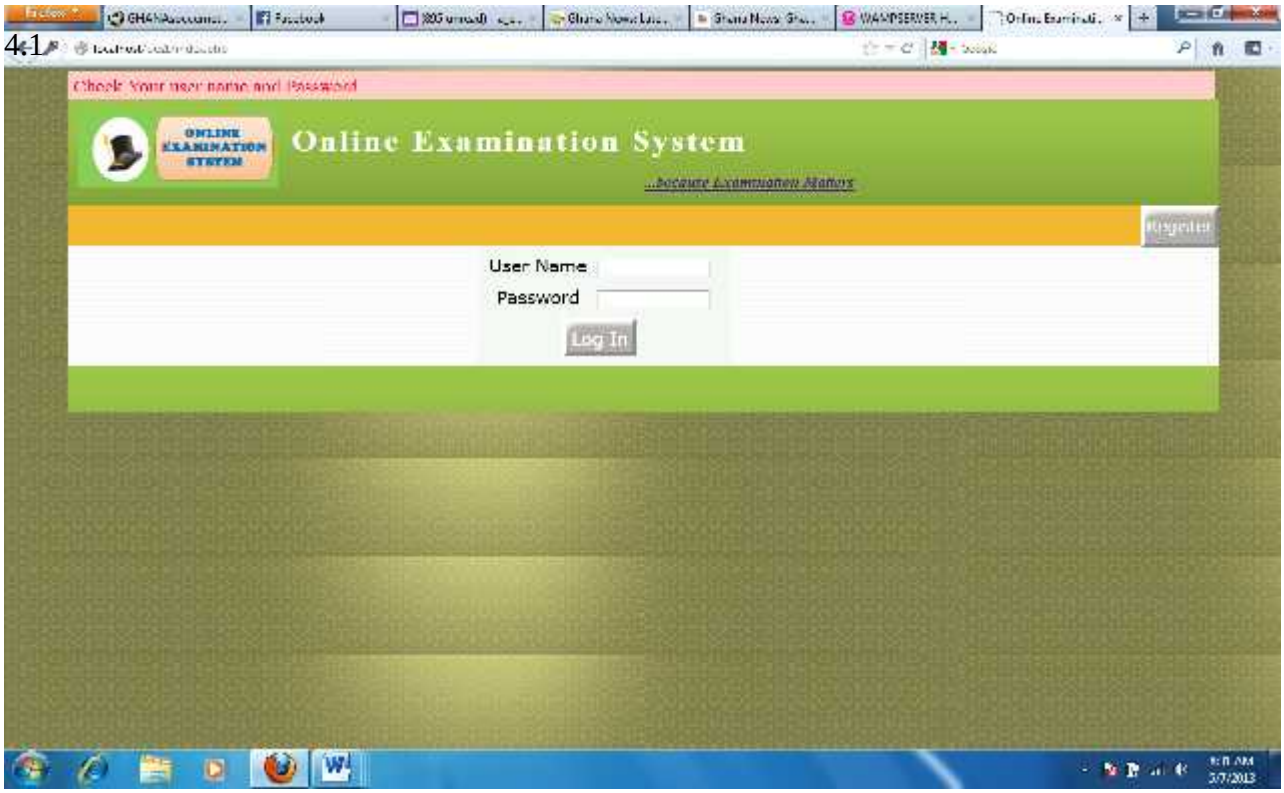


Figure 4.1Validation check

In Figure 4.1, an authorized person was trying to enter the system but failed

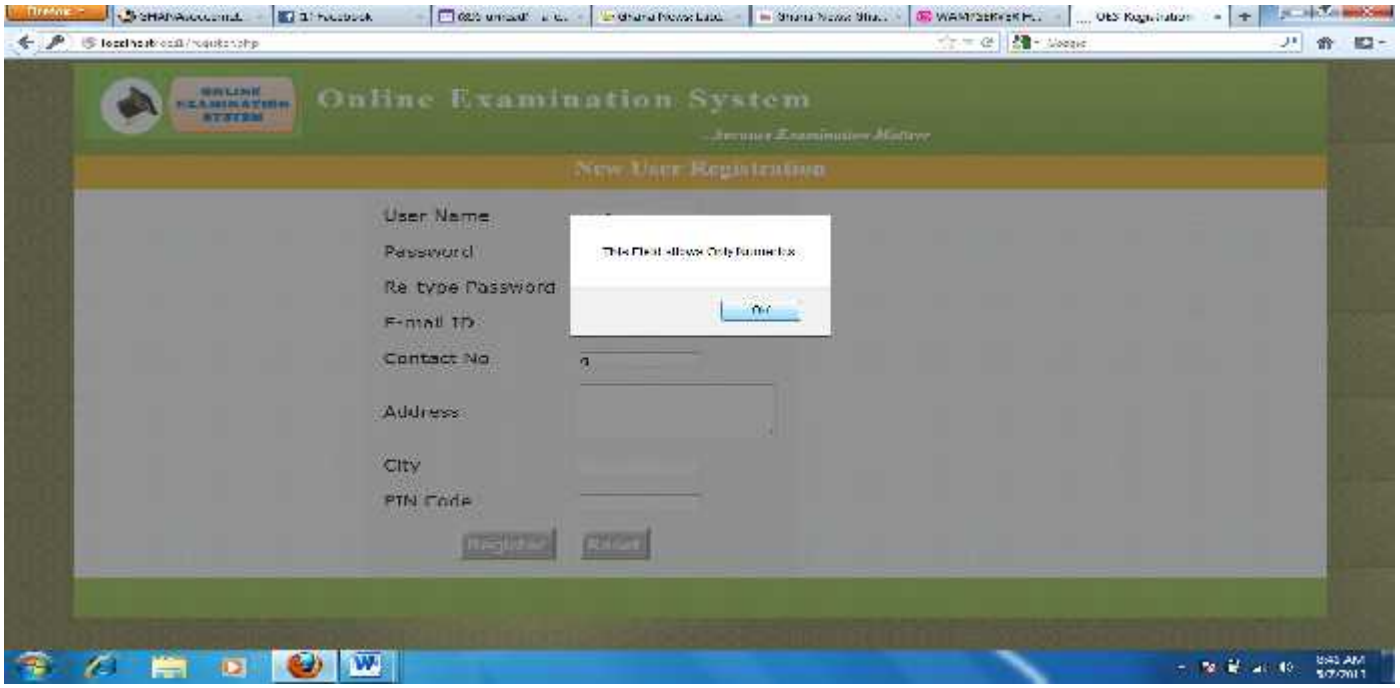


Figure 4.2 registration interface

In Figure 4.2, a user was trying to enter an alphabet in the Contact no. textbox which the system disallowed.

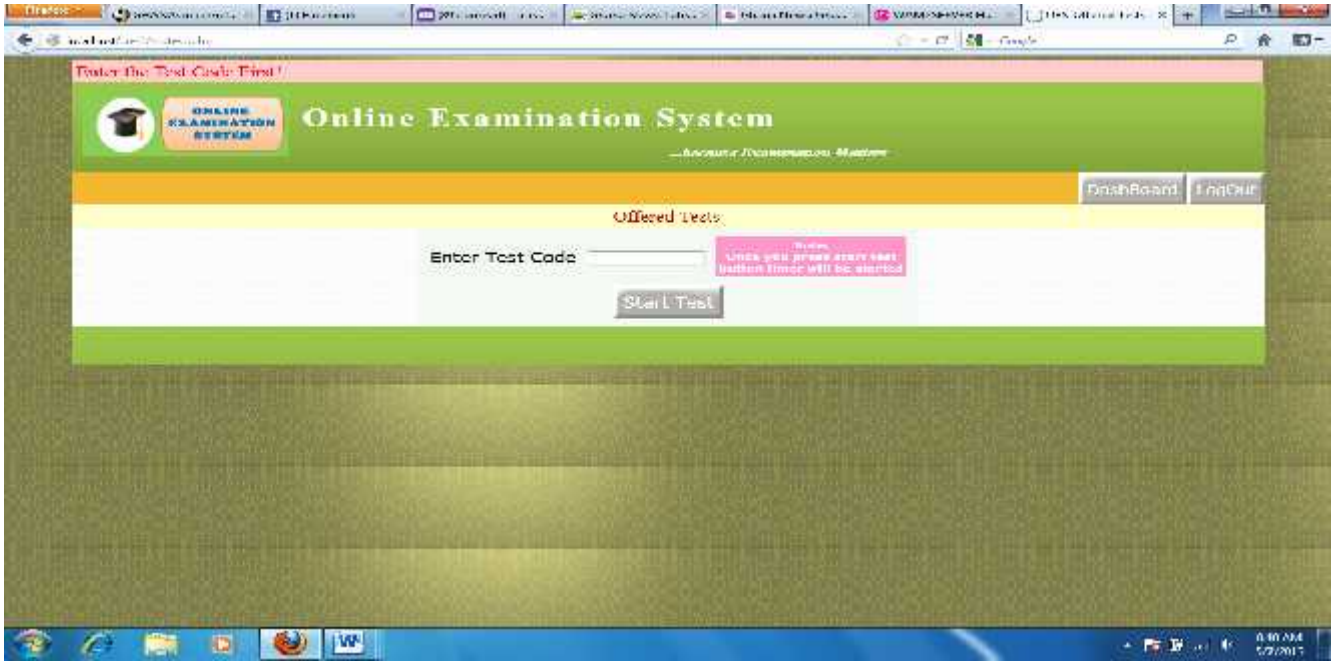


Figure 4.3 enter test code interface

In Figure 4.3, a student tries to participate in the examination without code but this warning message was shown on top as “Enter the Test Code First”.

4.2 RESEARCH QUESTIONS AND ANSWERS

- Will the student be able to pass the West African Senior Secondary Certificate Examination (WASSCE) after using the software?

  The students should be able to pass the West African Senior Secondary Certificate Examination because the software would provide the students with similar questions that are asked in the West African Senior Secondary Certificate (WASSCE.).

- Will the system enhance the passes in the Core Subject of students or WASSCE candidates?

  The system would enhance the passes in core subjects of the students because the system would help them solve similar questions

4.3 EVALUATING THE PROJECT

After meeting all the requirement of users, the aim of carrying out this project has been achieved. The system takes charge of most of the manual operations being performed by the users. Some manual operations like producing reports about the student’s information, Result and others. Security of the system has been taken care of, with regard to users and administration.

4.4 EVALUATING THE SOLUTION

The expected solution of the projected was achieved and could be implemented. The system could be easily used by users with little IT background

CHAPTER FIVE

5.0 CONCLUSION

The system examines the abilities of the students or candidates in the core subjects and also teaches the students something which might be new to them. The system is also automated to mark the script right away after a student finishes with it. For security purpose, password will be needed to get access to the website in order to participate in the examination. This is to check the authenticity of each and every candidate whether he/she has registered to participate in the exam with the system. The system will be secured from hackers and fraudsters to prevent the leakage of questions to the students or candidates.

Initially, getting sample of forms and document that were relevant for the project were some of the problems that we faced but with time, the problem was minimized.

The greatest achievement has been the ability to put all that was learnt both in class and outside for the project into practice which meets the needs of the users.

5.1 LESSON LEARNT

We have learnt to work as a team together with the workers at the Kumasi secondary technical high school to achieve all their requirements thus making the system acceptable. Through this research, we have also learnt much about PHP(hypertext preprocessor) that how it runs on different platforms(windows, linux, unix) and compatible with almost all the servers(Apache, IIS). Also we did some additional study and researches which offered us an additional knowledge aside what we were taught. It helped us build self-esteem.

5.2 RECOMMENDATION

With the advance in technology, the system can be improved to the highest level. To improve the software, Developers can incorporate finger print data storage and a picture data storage. Finally to be able to develop other systems, we recommend this software product to all interested stakeholders for use in various institutions. Moreover, new features can be added to meet some specific tasks.

REFERENCES

Bugeja, M. (2007). Distractions in the Wireless Classroom. *Chronicle of Higher Education*, rning 53,

Connors, S. (2007). 21st Century Tools, *Phi Delta Kappan*, 89, 320.

Davies, G., „ICT and Modern Foreign Languages: Learning Opportunities and Training Needs", *International Journal of English Studies*, vol. 2 (2002) no.1 pp1-18

Davies, G., Bangs, P., Frisby, R., & Walton E., Setting up effective digital language laboratories and multimedia ICT suites for MFL, CILT, The National Centre for Languages and the Association for Language Learning, www.languages-ict.org.uk, 2005

Hale, S. (2007). Being Online. *Academe*, 93.

4. Hay, I. & Bull, J. (2002). Passing Online Exams. *Journal of Geography in Higher Education*, 26, 239-244.

How Professors Are Using Technology: a Report From the Trenches. (2007) *Chronicle of Higher Education*, 54, pB21-B23.

Luecht, R. M. (2001). Challenges of web-based assessment. American Educational Research Association Proceedings, Seattle, WA.

Patterson, D. (2006). A large-scale, Asynchronous, Web-based MSW Comprehensive Exam Administration:Outcomes and Lesson s Learned. *Journal of Social Work Education*, 42, 14.

Ralph, D. L., Buskirk, B. D., Schmidt, S. M.P. (2007). Online Projects VS the 3 Ring Binder: A Case Study. *The Business Review, Cambridge, 9*, 106-111.

Rowh, M. (2007). E-Learning: The Anytime, Anywhere Option. *Career World*, 36, 22-25.

Schmidt, S. M. P., Ralph, D. L., & Buskirk, B. (2006) E-Portfolios: Improving Education or a Cumbersome Fad? College Teaching and Learning Conference Proceedings, Electronic Publication.

Steinman, D. (2007). Educational Experiences and the Online Student. *TechTrends: Linking Research & Practice to Improve Learning*, 51, 46-52.

Walker, C. & Kelly, E. (2007). Online Instruction: Student Satisfaction, Kudos, and Pet Peeves. *Quarterly Review of Distance Education*, 8, 11.

CHRISTIAN SERVICE UNIVERSITY COLLEGE
KUMASI

DEPARTMENT OF COMPUTER SCIENCE

TOPIC : ONLINE EXAMINATION SYSTEM FOR S.H.S

QUESTIONAIRES

Please tick as appropriate [√]

1. Which SHS level are you?
   SHS LEVEL 1 [ ] SHS LEVEL2[ ] SHS LEVEL3 [ ] SHS LEVEL4 [ ]

2. Do you use past questions when learning?
   Yes [ ] No [ ]

3. If YES where do you get the past questions from?
   FRIENDS [ ] BOOKSHOP [ ] OTHERS……

4.Do you get help easily when solving them?
   Yes [ ] No [ ]

5. If yes where do you get help from? …….

6. If NO what will you recommend helping student solve past questions easily?

   ……..

7. How often do you use the internet?
Daily [ ] Weekly [ ] Monthly [ ] Not often [ ]

8. Do you search for past questions online?
   Yes [ ] No [ ]

9. If yes do you get some past questions related to the subjects of study?
   Yes [ ] No [ ]

10. Will you recommend Online/Web-base examination system for SHS student to access themselves on various past questions?
   Yes [ ] No [ ]

11. Do you think that Online Examination System will totally replace the paper-based past question for SHS student if implement online?

Yes [ ] No [ ]

12. Would you recommend the use of online examination system to all students in Ghana?

Yes [ ] No [ ]