Fully Automated Electronic Mock Examination in an Introductory Computer Science Course

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Abstract- *A mock examination is an exam that does not count for credit. It is taken before an official examination and gives students the opportunity to practice for the later, important exam. The mock examination provides students with information on their actual learning progress and gives them in this way the opportunity to fill knowledge gaps. An electronic mock examination is the online variant usually taken unsupervised in the students' own time. In this work we present the setup of an electronic mock exam in the course "Basics of Computer Science". We discuss question types other than multiple-choice that allow for fully automated marking. Furthermore, we present an in-depth analysis of the results of the mock exam. These results demonstrate that students consider the electronic mock exam as valuable help for exam preparation. Half of the students take the mock exam even more than once and use different strategies to make the most out of it. On the other hand, lecturers get invaluable feedback from the results of the mock exam. This feedback covers all learning objectives of the entire course, comes at the right time, and is ideally suited for planning the contents of a recapitulation lecture.*
Keywords: *Electronic Learning; Blended Learning; Computer Science Education; Mock Examination.*

I. INTRODUCTION

A mock examination is "used to practice for the real one" and thus it is taken before an official examination. In such a mock exam the marks do not count, i.e. this "trial examination" does not count for credit. A mock examination is often given to the same standards and under the same controlled conditions as the official examination. Hence, it gives students opportunity to practice for the later, important examination, to get an idea of the types of questions asked, and to get used to regulations and locations of the official examination. Furthermore, students can practice to work under time pressure with only those aids allowed to be used in the official Examination. Another, even more important aim of mock examinations is to provide the students with information on their actual learning progress. Students get an idea of what they still need to learn. Due to the time gap of usually a few days to a few weeks between mock and official examination, there is still the opportunity to fill these knowledge gaps.

An electronic mock examination, i.e. online mock exam is a variant that differs significantly from those taken on paper. Electronic mock examinations can be performed unsupervised. Students can take them at home at a time of their choice. In addition, it is way easier to allow students to take electronic mock exams more than once than for the paper-based version.

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Students take advantage of this opportunity, for instance, to practice only certain parts, e.g. theory questions, of the exam. In all cases of electronic mock examinations, feedback is usually also given electronically. The setup for an automatically marked electronic mock examination for the course "Basics of Computer Science". The question types other than multiple-choice questions that allow for automated marking. The results of a pilot study with three study groups (two taught by F.L., one taught by A.K) carried out in summer term 2015. A detailed analysis of the results of the mock exam for one of these study groups. How well students accepted the mock exam. How well mock exam results correlate with results of the final examination and whether students who took the mock examination get better grades in the final exam than those who did not take part. The student's strategies can be analyzed to make use of the opportunity to take electronic mock exams more than once. The use of this type of mock examination for introductory Computer Science classes can be concluded with recommendations.

OBJECTIVES
The main objective of the project is to design and develop on online mock test with different test modules to help the students to gain more practical exam knowledge before the actual exam.

II. LITERATURE SURVEY

The literature survey is very essential for any project development. Extension of project from old models to new models. Well coming of new technologies and upgrading of new technologies without disturbing its application along with increasing of its overall performances. The literature survey will full fill the complete knowledge of particular domain. It also provides author researches, scholar work and also its future work yet to finish. It also gives information about advantages disadvantages and limitations of the main domain. Hence the literature work is essential to produce new concept to this technology world.

1. "Online Examination System with Adaptive Tests and Learning Structure Analysis for Performance Enhancement using MVC Architecture"
Today internet has flourished exponentially and is doing wondrous modifications in the daily living of the common man. It has incredibly revolutionized the way education is being offered to majority of people. Our online examination system application which provides a user friendly, multi featured and absolutely flexible platform for the smooth functioning of online exams. It is being designed using PHP using MVC architecture and MySQL consisting of six modules. All of these modules greatly contribute to online learning, online examinations and finally exam evaluation. It also helps in doing detailed analysis of a student learning structures by using Markov chain. It supports the computerized adaptive test pattern and also consists of functionalities like random question generation, group and test wise analysis of student performance, setting of difficulty level and text-to-speech for visually challenged people. Our system integrates Markov chain with the adaptive test. It is highly reliable, user friendly, flexible and cost-effective.

2. "E- Exams System for Nigerian Universities with Emphasis on Security and Result Integrity"
The recent employment and eventual widespread acceptance of electronic test in examining students and various classes in Nigeria has created a significant impact in the trends of educational history in the country. In this paper, we examined the impacts, associated challenges and security lapses of the existing electronic-examination system with the aim of ameliorating and developing a new acceptable e-Exam system that takes care of the existing system's challenges and security lapses. Six Universities that are already conducting e Examination were selected across the country for this research work. Twenty (20) students that participated in the e-exams and five (5) members of staff were selected for interview and questionnaire. Based on the analysis of the interviews and study of the existing electronic examination system, some anomalies were discovered and a new e-exams system was developed to eradicate these anomalies. The new system uses data encryption in order to protect the questions sent to the e-Examination centre through the internet or intranet and a biometric fingerprint authentication to screen the stakeholders.

3. " Item-based Approach for Online Exam Performance and Its Application"
Advantage of online item bank can be used to develop effective and efficient systems of examination and tests for assessing the achievement students. In this paper, we introduce a computer system designed to evaluate the quality of online multiple choice items and present our online item exam framework, i.e., building online multiple choice item, testing online item examination, analyzing the performance of item with item based approach, classifying the good item into online exam, and reporting the statistic values. To analyze the online item, a number of experiments are conducted using 1,000 items of Information Technology (IT) which having four choices in each item and evaluated by two groups of students. Based on measures of KR-20 called the reliability value and item-based approach which is composed of difficulty index, discrimination values, and distracter efficiency, the experimental results show that the reliability is good level (0.98) and 410 items of IT multiple choice examinations are good items and can classify the examinees clearly.

4. "Online automatic examination system for digital circuits"

In the era of globalization and the Internet, the Universities must reshape curricula, to include asynchronous e-learning technologies in order to remain competitive and attract the best students and teachers. A technology that should be added to the arsenal of infrastructure programs is tele-examination. In this paper, the construction of a complete online automatic examination system of digital circuits is analyzed. Specifically, open source software was used to construct a dynamic website for automated student examination in order to support asynchronous e-learning, supported by an RDBMS database. The application development language is the dynamic programming language for web applications PHP, while we use the PDO extension for a safe and secure connection to the database. The system supports multiple classes and multiple categories for each lesson, which in turn can contain a number of tests, all of which are managed by the administrator (professor) through the web application. Moreover, questions and answers are constructed randomly by a generator program developed in C language. The professor can supervise an active test in real time, and modify the time period of the submission for each student. After the submission of an exam he has the options to grade the text and file type answers that were included in it, to oversee an analytical list of the answers given by each student and finally to produce PDFs with those answers and view various charts about the results. The exams are accessible either by authenticated students or by students who have received a personal identification number (token) or by free users with limited privileges.

5. "On the Advanced Strategies of Next Generation Online Examination System Implementing Cloud Based Standardization"

Cloud Technology has established as a scientifically, commercially and industrially important technology worldwide on the basis of its huge storage capacity and scalability. Online examinations have gained nationwide popularity and demand from students, guardians and faculties of all academic levels but these online examinations have a serious drawback. After an examinee log into an online examination system, there is a strong possibility of accidental loss of internet connection. In this type of situation, without internet connection, an examinee cannot submit their e-answer paper and the online examinations are cancelled. In this paper, we have proposed an advanced online examination system which can successfully overcome the said drawback. In the system we propose to develop it on the cloud platform. While appearing for any examination through this system, if accidentally the internet connection gets lost, then also an examinee will be able to continue and complete answering the paper fully and finally will be able to submit the e-answer sheet, even in the absence of internet connection.

III. SYSTEM ANALYSIS

EXISTING SYSTEM

Open learning platforms, such as Coarser and Audacity, provide substantial amount of courses to some discipline of Computer Science and Software Engineering, such as programming and algorithms and software architecture. However, to the best of our knowledge, there is no online course focusing on software process. More important, there is no systematic assessment of these courses to verify whether features of online courses really support the learning of software process concepts. Online features have been used to support education of different study topics. Many of these features are also called podcasts. Podcast consists of the application of content availability in a streaming fashion, including audio, video, and text. The use of podcasts to support learning may impact positively on the commitment of students with respect to classes, and increase their skills regarding a specific subject. In general, podcast include theoretical content provided in online platforms, and then face-to-face classes may be dedicated to practical exercises conducted by the course instructor with students, to support assimilation of content. In this study, we investigate podcasts as a way to support learning of software process concepts.

PROPOSED SYSTEM

Development of Smart Case for a health monitoring system with RFduino has been discussed in this section. Dry sensor measurement of electrophysiological signals is of a great interest in healthcare setting. Moreover, it overcomes the disadvantages of conventional gel based sensors. The existing system is not hindering the natural activity of the target and may cause skin irritation but also bulky and expensive. Electric Potential Integrated Circuit (EPIC) sensors can measure the electric field deviation without any physical contact with the skin. It can detect electrocardiograms (ECG) in a non-contact manner. Therefore we have compared the results of our system with EPIC sensor.

MERITS

- Helps the Students to prepare well for the exams.
- User friendly and handy to Use.
- Can store the results for continues improvements.
- Good Resource utilization.
- Efficient.

DE –MERITS
- This Exam is not for writings.
- Every time need to update the database, need minimum technical knowledge.
- Database should be Secured.

IV. SYSTEM REQUIREMENT

HARDWARE REQUIREMENTS

Processor	:	Intel Pentium III or later
Main Memory	:	256 MB
Cache Memory	:	512 KB
Keyboard	:	108 Keys
Monitor	:	17" Color Monitor
Mouse	:	Optical Mouse
Hard Disk	:	1 TB

SOFTWARE REQUIREMENTS

Operating System	:	Windows 8.1 OS.
Front End	:	HTML, JavaScript, JSP, CSS.
Back End	:	My-sql, PHP.
Hosting Servers	:	Xamp& Wamp.
Software Tools	:	NETBEANS IDE, Sublime & Notepad++.
Data Base	:	My-sql.

V. SYSTEM ARCHITECTURE
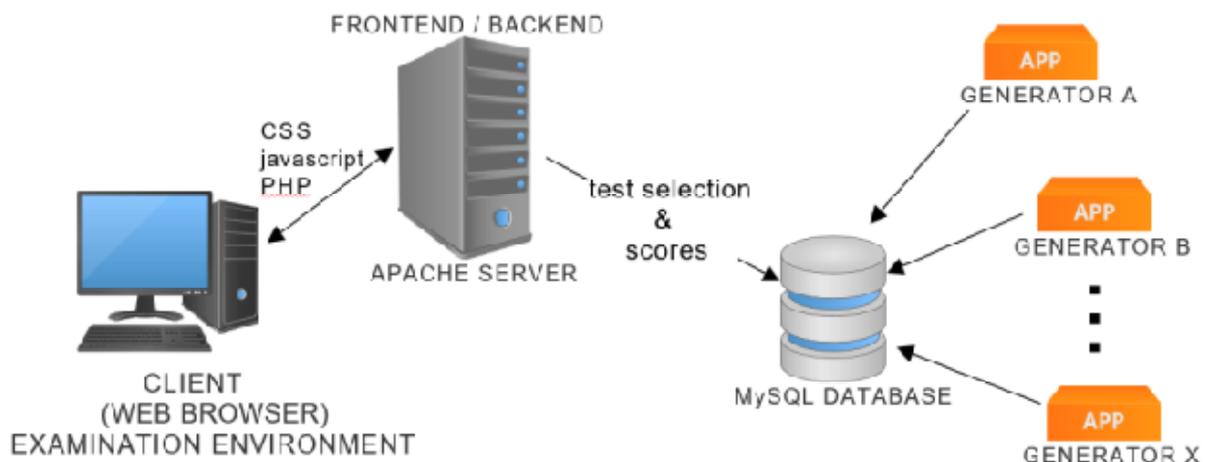
VI. PROBLEM ANALYSIS

INFORMAL APPROACH
The informal approach to analysis is one where no defined methodology is used. The information about the system is obtained by interaction with the client, end users, questionnaires, study of existing documents, brainstorming, etc. The informal approach to analysis is used widely and can be quite useful because conceptual modeling-based approaches frequently do not model all aspects of the problem and are not always well suited for all the problems. The SRS is to be validated and the feedback from the validation activity may require further analysis or specification choosing an informal approach to analysis is not very risky. The errors that may be introduced are not necessarily going to slip by the requirements phase. Hence such approaches may be the most practical approach to analysis in some situations. Various fact finding methods are used to collect detailed information about every aspect of an existing system.

SHADOWING
Shadowing is a technique in which you observe a user performing the tasks in the actual work environment and ask the user any questions related to the task. You typically follow the user as the user performs tasks. The information obtained by using this technique was first hand and in context.

INTERVIEWS
Interview is a one-on-one meeting between a member of the project team and a user. The quality of the information a team gathers depends on the skills of both the interviewer and the interviewee. An interviewer can learn a great deal about the difficulties and limitations of the current solution.

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Interviews provide the opportunity to ask a wide range of questions about topics that you cannot observe by means of shadowing.

VII. CONCLUSION

Due to the small number of students in our study, all our results have to be treated with some care. Nevertheless, our observations clearly demonstrate the value of mock examinations and, in particular, the fully automated electronic variant. There are numerous advantages for the students.

- Students have the opportunity to test their learning progress under exam conditions. From the score obtained and the feedback they get, they can decide, which part of the teaching content they have to recapitulate or practice. Students agree that this is helpful for their exam preparation.
- In the fully automated setup, students get the feedback immediately after completing the electronic mock examination. This is a big advantage over a mock exam on paper that has to be handed in, marked manually, and returned.
- From the feedback of the students and the participation rate of 71% we can conclude that students see a benefit that is at least worth spending 90 minutes of their time.
- A big advantage of the electronic mock examination is that it easily can be taken more than once. Students can decide how often they take parts of the exam and which parts they focus on. The opportunity to take the mock exam more than once was used by half of the students. Our analysis shows that students use a number of strategies to make the best out of this opportunity.
- Of those students, who take the mock exam more than once, taking it in full at every attempt gives significantly better mock exam results than any strategy that involves at least one inspection/incremental attempt. Also, all students who applied any of the strategies FF, FFF, or FFFF and showed up for the final.

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