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**Project Title:** Online Quiz Management System (web application)

**Faculty in-charge:** Prof. Sindhia

**Abstract:**

This online quiz management system is a web application that helps bypass the tedious process of conducting and evaluating a manual examination. This system is built with integrated group facilities that can be taken advantage of by institutions and organisations. One major highlight of this system is the different levels of abstraction available during quiz/group creation. Users can either join or create groups to share and attend private quizzes or can also search for and attend public quizzes on topics of their own interest. It is equipped with an auto grading system that helps evaluate objective type questions. It is also enabled with a two-way feedback system that can help both the quiz organisers and the quiz takers to take suggestions and review their performance.

**Literature Survey:**

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| **Title** | **Interactive examination management system**  S. Vasupongayya, T. Kamolphiwong, S. Kamolphiwong and S. Sae-Wong |
| **Issue** | * Currently many educational information systems are focusing on developing web-based virtual classrooms to be an interaction place between instructors and students. This setting is not only useful under long-distance leaming systems, but it is also beneficial in conventional classrooms in many institutes. * To handle several online examination settings, a web-based application test management software, namely interactive examination management system (iEMS), is proposed in this paper |
| **Methods** | * Stands as a support for LMS (Learning Management System) * Uses HTTPS protocol * Eight components:   1. Builder: Creates and updates questions. There are seven types of questions available: MCQ, Boolean, matching, ordering, fill-in-the-blanks, short answer and essay (everything except essay is auto graded).   2. Terminal: Manages the creation of examinations. Can choose from two forms: Examination (time limit) and Exercise (indefinite time). Additional features like random shuffling of questions and answers, setting the time limit of the examination, allowing arbitrary scores for the question, negative scores for every question on mistakes are present.   3. Search: Searches and queries the database for the questions and quizzes   4. Player: Manages the examinations, provides authorization, delivery and time limit.   5. Results and analysis: Collects and grades answers. Individual attendee’s performance can be viewed   6. Publisher: Used to export results into excel sheets   7. Shareable content and Object Reference Model (SCORM): To print an offline hard-copy of the question paper.   8. Notification: for alerts and announcements |
| **Advantages** | * Ease of use of the Graphical User Interface (GUI) - simplistic * Pre-defined user-roles on registration * Multi-media can be included in the questions * High degree of transparency to users * Results can be exported to other formats * Hard-copy can also be accessed if need be * Encourages students to attend quizzes and also increases the attendance rate |
| **Disadvantages** | * Pre-defined user-roles can be detrimental if the students want to make and distribute quizzes themselves * Freshman Engineering students and other students with inadequate computer-skills have reported the GUI to be intimidating at first * Scope for GUI enhancement * Questions and answers were encoded using semi-colons ‘;’. In the case of quizzes with programming questions this caused lots of problems. Rectified however in future releases. |

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| **Title** | **A quiz management system based on P2P near-field communication on Android platform for smart class environments**  M. S. Abood, M. Ismail and R. Nordin |
| **Issue** | * Because smartphones are now pervasive, especially among university students, it is tempting to vision scenarios where the exchange of small amount of data on-spot can be useful with no infrastructure requirements other than the NFC-enabled smartphone itself and a smartphone app to process the data. * Although many ideas have been investigated in academia and industry alike, the environment of smart class does not seem to receive much attention among researchers, as yet * The NFC-based applications in the educational domain are still below their real potential, and the use of NFC technology in the context of a university ambient needs to be explored |
| **Methods** | * Primarily based on the utilization of NFC (Near Field Communication) * This is a attributed to the ‘Smart Cards’ in most of the android smartphones which enables wireless communications and transfer of data over small distances * NFC standards to be met for successful connections – ISO/IEC, ECMA and ETSI standards followed |
| **Advantages** | * Helpful for quizzes or examinations for a group/ batch of students * Manual presence is also expected – ensures active participation * Reduction of paper usage – a step towards environmental protection * Removes tedious processes like collecting the answer scripts and correcting them from the equation through automation * Storage is through digital medium * App can be shared via APK |
| **Disadvantages** | * Requires close proximity to connect and share data * Susceptible to disturbance of various sorts * Low data transfer rates * Vulnerable to hacking * Not every smartphone has the proper NFC specifications * Ensuring less power consumption of the mobile device throughout the examination time |

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| **Title** | **A Project on Online MCQ Quiz Application.**  Behamanush, Hamayoon & Thakur, Babita & Daniyal, Vivek & Sharma |
| **Issue** | The process of conducting a manual examination is tedious and time-consuming. Examiners have to go through hundreds of answer sheets and meticulously grade every single one of them. |
| **Methods** | * Support for different types of users, apart from the administrative part (user-roles) * Teachers can ‘punch tests’ and students can ‘attend tests’ * Data is stored and loaded from the database in a very simple fashion * Teachers can view the performance of individual attendee * The students can view their marks but not their performance |
| **Advantages** | * Better data and end-to-end management * Reduced runtime * Simplistic GUI |
| **Disadvantages** | * Very basic functionality * Prone to hacking due to lack of encryption in database * Lack of additional features that other QMSs provide * The student is not shown his/her performance for improvement * Limited GUI * Only objective questions |

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| **Title** | **Enhancement of Moodle learning Management System Regarding Quizzes Security and Stability Problems**  A. Y. Elmaghrabi and S. M. Eljack |
| **Issue** | * In e-Leaning management systems (like the Moodle), quiz responses are lost during online quizzes in case of a sudden short disconnection of network * Confidentiality can be compromised when the same quiz is accessed from more than one browser or computer at the same time. |
| **Methods** | The proposed work of this study is to increase the level of confidentiality of the quizzes performed in simultaneous access to the same e- quiz account from computers other than the computer specified for the Quiz, and also to handle saving the Quiz responses in case of late submission due to network failure.  Two extensions (plugins) were installed in order to enhance the quiz security and the network Stability Problems.   * Quizaccess\_offlinemode plugin: control and solve network disconnection during Quiz access and to avoid losing quiz responses due to network disconnection problem. * Quizaccess\_onesession plugin: when the student first enters the Quiz page, the course information (account, IP address) is recorded. If anyone tries to access the Quiz from another computer or any device simultaneously, the browser will be blocked. Accordingly, any attempt to access the Quiz from any other device will not be allowed. |
| **Advantages** | * The quizaccess\_offlinemode plugin saves user response in case of network failure thus improving reliability. Students were able to continue answering the quiz and save the answers but could not submit them till the network was connected again. When the network resume connectivity, the responses were submitted and all the questions were marked successfully. * The quizaccess\_onesession plugin prevents multiple access of a quiz from different browsers or devices thus ensuring integrity and improving efficiency. When the quiz starts, we try to log in to the quiz using one of students account who is taking the quiz from another computer, the result is that; the access was blocked even if the attempt was implemented by using different browsers. Also, this restricted access data was recorded and this Login is reviewed in the login reports |
| **Disadvantages** | * This study focuses only on the Moodle learning platform and hence the proposed solution was designed exclusively to enhance the security performances of the Moodle quizzes. |

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| **Title** | **Offline web application and quiz synchronization for e-learning activity for mobile browser**  R. M. Ijtihadie, Y. Chisaki, T. Usagawa, H. B. Cahyo and A. Affandi, |
| **Issue** | * some schools do not have an such expensive infrastructure to bring their LMS to the Internet. In addition, at home, some students may have difficulties to get online access. * Exposing LMS service without sufficient security protection to the internet is a potential risk. * Some schools may be unable to provide sufficient bandwidth to provide external access to their LMS. |
| **Methods** | Two main features of HTML5 were used. Web storage and offline web application feature.   * Web storage is a feature that is intended to overcome the limitation of HTTP cookies. Despite its mainly purpose is for state management mechanism, cookies can be used for storing information at client side, at limited size. Using Web storage, client side will have enough space for storing more data. * In order to making it capable to operate while offline, Offline web application feature is used. Offline web application allows set of HTTP objects is able to be accessed from browser without having to connect to Internet. such set is specified by developers through so-called manifest file that is included during deployment of HTML files |
| **Advantages** | * Students who enrolled in a course given a quiz assignment can choose either to do it online (during their time on school) or offline (during their time off the school) using their mobile phone. * At home, the students can view and work on the quiz. Before the deadline date, during their time on school, students can submit their work. After submitting the work, students can still view their work on their mobile phone including the past work they have submitted but they cannot resubmit their work once they have submitted. * To prevent cheating, the quiz question will be packaged and encrypted thus each student only have access to their own quiz |
| **Disadvantages** | * It is based on the assumption that students are using mobile phone capable of Wi-Fi connection. |

**Challenges:**

Security is always a big challenge when it comes to online tests. Regardless of the level of encryption of the system, it will somehow always be vulnerable to cyber-attacks and loopholes. Network connectivity is another major problem. Users need to have a stable network connection while taking quizzes and any disruptions may result in loss of quiz data. Another noticeable shortcoming is the lack of a feedback system. This creates a communication gap between the quiz organizer and the quiz takers. Scalability is also often a challenge. The system’s storage capability and processing efficiency should not waver as the number of responses to a quiz with a lot of questions increases.

**Existing methods:**

The existing quiz management systems are usually found as a part of larger Learning management systems such as the Moodle. These systems are equipped with basic functionalities to handle quiz creation, management and evaluation. Users are allowed to choose from a variety of question types, both objective and subjective. These systems also give importance to the security aspects of their products. Efficient measures are taken to prevent unauthorized or simultaneous access to quizzes. Protocols have been implemented to ensure that the quiz data is not lost in the case of a brief network disconnection. Since network connectivity can be a big issue in this domain, methods have been proposed that allow students to take offline quizzes at home that can later be uploaded to the university server on campus as and when network connection is established. A few ingenious systems even use NFCs and smart cards to securely connect android smartphones within a close range and conduct quizzes.

**Proposed method:**

The proposed method is to build an online quiz management system with integrated group facilities where registered users can either create or attend quizzes. Users can create quizzes containing both objective and subjective questions. Each quiz that is created is grouped under one of three visibility modes (which can be changed by the quiz creator at any point of time).

Public quizzes are globally visible and can be attempted by any registered user on the website. Protected quizzes are also globally visible but are tagged with a unique identifier (a quiz code) and only those users with access to this quiz code can attempt these quizzes. Private quizzes are not globally visible and can only be attempted by the members of the groups that they have been added to.

Users can create groups by adding other users to it as members (each user is uniquely identified on the website using a user ID). Groups can also be public or private. Public groups are open to any user who wishes to join. Private groups have a group code and only those users with access to this group code can join the group.

In addition to creating groups and quizzes, users can also view the list of groups that they are a part of and the list of quizzes that they have created. Quizzes created by the user can be modified and deleted. The responses to these quizzes can be viewed by the creator for evaluation. Users can view the results of all the quizzes that they have attempted under the quiz history section.

Quizzes can be added to a group once it has been created. Each quiz in the group is displayed either under the pending section or the completed section depending on whether a particular user has attempted it. The admin of the group has the power to remove members from the group. Each group has its own quiz history displaying the results of only those quizzes that were/are part of the group.

Both the quiz organiser and the quiz takers can submit feedbacks to each other. The powers of the group admin and the quiz creator are transferrable. A search bar at the top of the user home page allows users to search for quizzes, groups or other users.

**Hardware requirements:**

* i3 Processor Based Computer or higher
* Memory: 1 GB RAM
* Hard Drive: 50 GB
* Monitor
* Internet Connection

**Software requirements:**

* A web browser such as Chrome, Internet Explorer, or Safari

**Recommended Operating Systems:**

* **Windows:**7 or newer
* **MAC:** OS X v10.7 or higher
* **Linux:** Ubuntu

**Schedule:**

Stage 1: Setting up landing page, login/Sign up page and user dashboard – 2 weeks

Stage 2: Enabling quiz functionalities (creating a quiz, attending a quiz and viewing quiz history) – 3 weeks

Stage 3: Introducing group facilities – 2 weeks

Stage 4: Building a feedback system – 2 weeks

Stage 5: Tackling specific design features – 1 week

Stage 6: Final testing and polishing – 1 week

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