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## A Survey on Designing a Secure Exam Management System (SEMS) for M-Learning Environments

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**ABSTRACT:** M-Learning has enriched the e-learning by making the learning process considered as learner-centered. However, enforcing exam security in open environments where each student has device or computer connected to a Wi-Fi network or internet through which it is further connected to the Internet can be one of the most challenging tasks. In such environments, students can easily exchange information over the network during exam time.

**KEYWORDS:** Access control, m-learning, e-learning, proctor.

### I. INTRODUCTION

Students' mobile/tablet devices or computer/ laptop are connected to the school's Wi-Fi or LAN network through which they may illegally exchange information during an exam. Applying simple policies, such as turning the network down during exams to cut off any possible communication between students, is not a practical solution as students in different classes may not take their exams at the same time. Moreover, the network has to be up during exams in order to be able to submit students' answers to the Exam Server. A dynamic network access policy has to be generated and applied on each student's device according to predefined conditions. Employing an identity based firewall with dynamic access policy seems to be a good solution to be adopted in such a scenario.

### II. LITERATURE SURVEY

#### 1. Designing and implementing an adaptive online examination system

**Author:** Mustafa Yağci, Menderes Ünal

**Description:** A design and application of adaptive online exam system are accepted in this paper. Adaptive exam systems determine dissimilar question sets automatically and interactively for each student and measure their ability on a certain area of discipline instead of comparing their gains with each other. Through an adaptive exam system, a student's disruption and motivation loss that is led by the questions with quite lower toughness level than his/her ability is prevented. In addition, negative effects of questions requiring higher knowledge than his/her ability over a student's self confidence and morale are dismissed. Since questions are focused so that they can allow making clear deductions about student gains, they are able to notice student competencies more effectively. Requiring less total time for calculating and being more flexible in the exam management system are among the advantages provided by the system. Self sufficiency of the system in terms of arrangement, repeating and assessment of the measurement process especially allows itself to be used in the individual education sets. Through this system, student competencies can be determined more effectively in cases such as distant-learning, in which some challenges are experienced frequently.

#### 2. Security Risks and Protection in Online Learning: A Survey

**Author:** Yong Chen and Wu He

**Description:** This paper describes a survey of online education which attempts to determine online education providers' awareness of potential security hazards and the protection measures that will reduce them. The authors use a mixture of two methods: blog mining and a traditional literature search. The findings specify that, while scholars have identified



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diverse security hazards and have proposed solutions to mitigate the security threats in online education, bloggers have not deliberated security in online learning with great frequency. The modifications shown in the survey results generated by the two different methods check that online learning sources and practitioners have not considered security as a top priority. The paper also deliberates the next generation of an online education system: a safer personal learning environment which needs a one-stop solution for authentication, assures the security of online assessments, and balances security and usability.

### 3. Information Security Management in E-Learning

**Authors:** NajwaHayaatiMohdAlwi and Ip-Shing Fan

**Description:**E-learning is a new system of learning and it depends on the Internet in its execution. Internet has become the place for a new set of prohibited activities and E-learning environment is now uncovered to the threats. In this paper the advantage and growth of e-learning is explained. This paper deliberates the security elements desired in e-learning. In addition, explains the circumstance and existing research on security in e-learning. Information security management is advised to contribute in preparing the secured e-learning environment.

### 4. Security & Privacy Challenges in E-Learning 2.0

**Author:** Edgar Weippl, Martin Ebner

**Description:**E-Learning 2.0 uses Web 2.0 tools for e-learning. New amenities on the Internet can be swiftly combined into existing applications; students can create MashUps, for illustration, using a variety of amenities on the Internet. The main risk comes from the fact that students and teachers are not entirely aware that their organization does not control these services. The servers are located in a variety of countries, thus secrecy laws also differ. In addition, as most Web applications are built as three-tier architectures, typical security weaknesses exist, such as unacceptable input, a lack of server side checks, and excessive rights.

### 5. Security in the Online E-learning Environment

**Author:** Ruth Raitman, Leanne Ngo, Naomi Augar and Wanlei Zhou

**Description:**This paper reports the role of security in the collaborative e-learning background, and in particular, the social aspects of security and the significance of identity. It also represents a case study, completed in Nov 2004, which was conducted to test the logic of security that students experienced whilst using the wiki platform as a means of online collaboration in the tertiary education environment. Fully editable websites, are easily accessible, require no software and allow its contributors (in this case students) to feel a logic of responsibility and ownership. The difference between two wiki studies will be made whereby one group employed user login and the other maintained anonymity throughout the course of the study. The results consider the independent participation and evolution of the work requirements over time, which in fact determines the no validity of administrative identification.

## III. EXISTING SYSTEM

The Quiz Engine embedded in Moodle is not built based on Service Oriented Architecture. It is implemented as a bulk of PHP code which has to be accessed through standard web browsers that are a bit slow on mobile devices and cannot address the exam security issues that exist in m-learning environment. Moodbile services extension to Moodle does not touch the Moodle's Quiz Engine. Thus, we need to develop a new Quiz Engine that can be deployed as a service oriented application, so that its services can be consumed by a mobile application designed to cater to m-learning specific security requirements. As well, it should be integratable with Moodle/ Moodbile in order to have a complete LMS which suites the m-learning environment and addresses all of its security issues.

### DISADVANTAGES OF EXISTING SYSTEM:

1. Slow services.
2. There is a security issues for exam.
3. Not service oriented.



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## IV. PROPOSED SYSTEM

This aims to identify various vulnerabilities that may violate exam security in m-learning environments and to design the appropriate security services and countermeasures that can be put in place to ensure examination security. It also aims to integrate the resulting secure exam system with an existing, open source and widely accepted Learning Management System (LMS) and its extension to the m-learning environment, namely “the Moodbile Project”.

To design a Secure Exam Management System (SEMS) that meets the distinct security requirements of m-learning environments and to integrate it with the current Moodle/Moodbile platform. This will result in a complete LMS that is both equipped with secure exam services and suitable for m-learning. Our intention of integrating SEMS with a well-known LMS such as Moodle is so to get the benefits of Moodle’s readymade services in other learning aspects such as course material administration, documentation, etc. which have been experienced and appreciated for the last 15 years. However, the proposed SEMS can also work as a standalone secure exam management system for m-learning environments without integration with Moodle.

### ADVANTAGES OF PROPOSED SYSTEM:

1. It has a Service Oriented Architecture.
2. Provide better security.
3. Can be access more lightly.

## V. MATHEMATICAL MODEL

Let ‘S’ be the set of whole system i.e.  $S = \{\text{input, process, output}\}$ .

Where,

- Input is the set of inputs given to the system.
- Process is step or techniques applied to the system.
- Output is outcome of the system.

1. Input:

Input = {U, QR, K, Q}.

Where,

- U be the user.
- QR be the QR generated from users details.
- K be the secret key to decrypt the encrypted QR code.
- Q be question paper.

2. Process:

Step1: In this registration phase every candidate or user has to register themselves in order to give an exam.

Step2: After registration the will get an QR code image which is encrypted information of user information. The same information will be stored at the server side for admin/ examiner record.

The secret key K is send to admin record, which is used for decryption purpose.

Step3: user will bring that QR code image while coming for exam then, admin. Examiner will scan that QR code image to check whether authenticated candidate has come for exam or not, the verification process done by that user information stored on server or examiner record, upon verified the admin will send the question paper ‘Q’ to user account.



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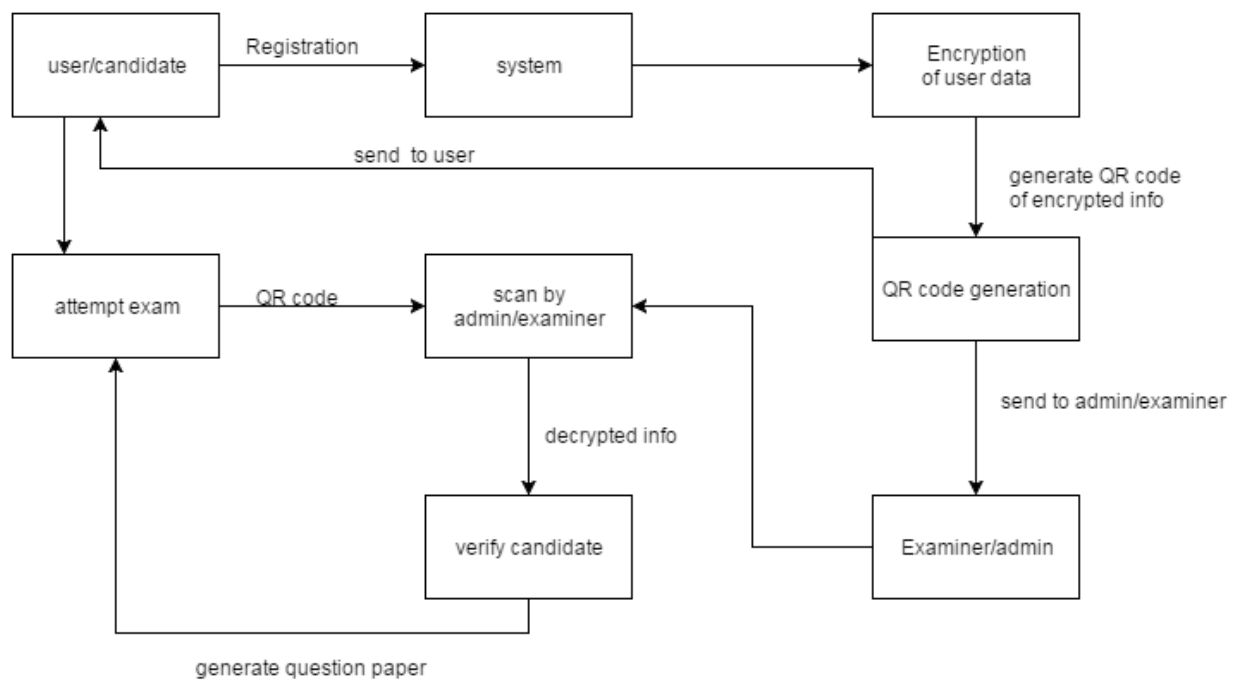
Step 4: user will login to system, to attempt an exam.

3. Output:

Secure Exam Management System (SEMS) to mitigate the unique exam security threats that exist in m-learning environments.

## VI. SYSTEM ARCHITECTURE

To design a Secure Exam Management System (SEMS) that meets the distinct security requirements of m-learning environments and to integrate it with the current Moodle/Moodbile platform. This will result in a complete LMS that is both equipped with secure exam services and suitable for m-learning. Our intention of integrating SEMS with a well-known LMS such as Moodle is so to get the benefits of Moodle's readymade services in other learning aspects such as course material administration, documentation, etc.



## VII. CONCLUSION

In this the design of a Secure Exam Management System (SEMS) to mitigate the unique exam security threats that exist in m-learning environments. SEMS offers many exam services such as: secure and random distribution of examination questions and turbo-mode assessment. This also helps in prevention of the "unattended exam" issue, QR code based authentication system design, preventing students from exchanging their devices during an examination, conducting exam securely through online or offline strategies and auditing.



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