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AI Based Online Assessment by Using Smart Infrastructure

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Abstract: ***We know MCQs and true/false Questions in online exams but now we are going to implement unique question-answer types like fill-in-the-blanks, String matching, Ordering / Sequence, etc. These types of questions are not used in today's competitive exams due to lack of application this is available in pen-paper-based exams, in online examinations with single-session access on any type of device to prevent malpractices here unique session ID is created. The admin can check from where the exam is accessed and monitor the test taker, speed, Completed Status, Percentage, Score, Accuracy, and IP by using Artificial Intelligence (AI). Also, assign a fixed and flexible schedule for every exam, at a time we can run multiple exams on the same server.***

Keywords: Parallel programming, String matching, JavaScript, MySQL, Sequence matching, Artificial intelligence

1. Introduction

The introduction of fill-in-the-blank questions in online exams has revolutionized the assessment process, offering a more comprehensive evaluation of a student's understanding and knowledge. Fill-in-the-blank questions require test-takers to recall information and apply it within a specific context, making them an effective way to assess comprehension and critical thinking skills. These types of questions are particularly beneficial in online exams due to their versatility and adaptability to various subjects and levels of complexity. They can cover a wide range of topics, from factual recall to conceptual understanding, allowing instructors to test a student's depth of understanding in a particular subject matter.

The inclusion of string-matching type questions in online exams presents a valuable opportunity to assess a student's ability to associate and link information, particularly in subjects that involve categorization, matching concepts, or identifying relationships between different elements. String matching questions typically involve matching items from one column (such as phrases, terms, or definitions) with corresponding items from another column (e.g., descriptions, explanations, or categories). Students are required to draw connections between these sets of information, demonstrating their comprehension and ability to pair related elements.

Categories of E-exams

E-Exams can be categorized into three types: diagnostic, formative, and summative test [22], [23]. A diagnostic test is given before the lesson proper to assess students' prior knowledge. A formative test is given during the discussion to identify whether further discussion or revision is needed. A summative test is given after the course to define the student's grade. Currently, e-exams are usually given at the end of the course.

Outlying E-exams

There are many types of questions in the e-exam that has been exercised during COVID 2019, including multiple-choice, sequencing, matching, true or false, fill-in-the-blank, and identification [15], [24]. It is worth mentioning that many factors affect the layout of an e-exam, such as the objective of the educational stage, the specialty of the learners, skills of the learners, the purpose of the examination, and forms of electronic assessment.

2. Research Method

An online examination system for sequence ordering type questions offers several advantages and fulfills specific needs compared to traditional examination methods. Here are some reasons why a proposed system for sequence ordering questions in an online examination format might be beneficial. Enhanced Assessment of Critical Thinking: Sequence ordering questions assess a student's ability to organize and sequence items logically. An online system allows for the creation of diverse question sets that challenge students to think critically and apply their understanding in arranging items in a particular order. Real-time Evaluation and Feedback: With an online system, immediate evaluation of sequence ordering answers becomes possible. This facilitates quicker feedback to students, allowing them to understand their mistakes, learn from them, and improve their understanding of sequencing concepts. Reduced Chance of Error in Grading: Automated grading in an online examination system minimizes human error in evaluating sequence ordering responses. Algorithms can be designed to precisely assess the correctness of the sequence, eliminating subjectivity in grading. Scalability and Flexibility: Online examination systems can accommodate a large number of students simultaneously. They are flexible in terms of question variety, allowing educators to create a diverse range of sequence ordering questions that can be randomly assigned to different students. Time Efficiency: Conducting exams online saves time for both students and educators. Students can take the exams remotely, eliminating the need for physical presence. Educators can also save time in grading, as the system can automatically score sequence

ordering questions. Data Analytics and Insights: Online systems often come with analytics tools that provide educators with insights into student performance. They can track individual and group progress, identify challenging concepts, and tailor teaching methods accordingly. Adaptive Learning: Some online examination systems employ adaptive learning techniques. Based on students' responses to sequence ordering questions, the system can adaptively provide more challenging or supportive questions, customizing the learning experience for each student.

Accessibility and Convenience: Online exams allow students to access the assessment from anywhere with an internet connection, promoting accessibility and convenience. This is especially beneficial for remote learning scenarios or students with diverse needs. Security Measures: Online examination systems can implement various security measures to prevent cheating, ensuring the integrity of the assessment process.

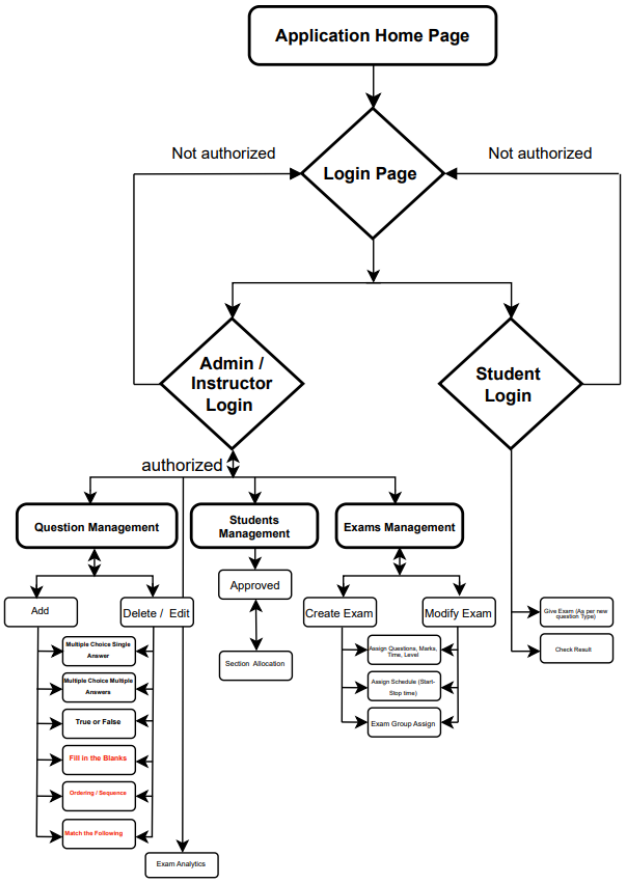

Figure 1: System architecture

3. Results and Discussion

In considering all these trials, we can easily conclude that the real experiences are those of Canadian, British and American Universities; this is due to widespread participation in distance education and the vast dispersion of students all over the world. However, there is a question of reliability regarding student's answers and identities, which constitutes a core challenge of open e-exam, those universities used e-exam in a closed system of rooms, which helped them control the problem of cheating that occurs in the traditional examination. This is the definite merit of e-exam in a confined environment. In this way, the universities benefited from e-exam by increasing academic attainment through repetition of exams and by promoting continuous communication with the faculty.

New technologies have been added at some universities to solve the challenges of e-exam authentication. These technologies include browser software, fingerprint authenticators and Eye Tribe trackers, a multimodal biometric framework and Data Guard, and WEB application server load balancing. Despite these efforts, we can say that e-exam authentication will remain a partially unresolved issue.

As a result of a data survey for 120 different e-exam centers around Khartoum, the survey shows that there was a challenge of almost all the requirements. Especially in the learner of the examination.

A learning management system (LMS) is a computer program application for the organization, documentation, following, announcing, robotization and conveyance of instructive courses, preparing programs, or learning and improvement programs [1]. The learning administration system concept developed specifically from e-Learning. Although the primary LMS showed up within the higher instruction segment, the larger part of the LMSs nowadays center on the corporate market. Learning Administration Frameworks make up the largest section of the learning framework advertise. The primary presentation of the LMS was within the late 1990s.

Learning administration frameworks were planned to distinguish preparing and learning holes, utilizing expository information and detailing. LMSs are centered on online learning conveyance but bolster a run of employments, acting as a stage for online substance, counting courses, both nonconcurrent based and synchronous based. An LMS may offer classroom administration for instructor-led preparing or a flipped classroom, utilized in higher instruction, but not within the corporate space. Cutting edge LMSs include brilliant calculations to create mechanized suggestions for courses based on a user's expertise profile as well as extricate meta-data from learning materials in arrange to create such suggestions indeed more precisely.

Fig. 2 illustrates the percentages of each requirement. Technological improvements of learning management systems (LMSs) that are used for distance and electronics education platforms and systems such Blackboard, Moodle, ATutor, Claroline, Dokeos, Desire2Learn (D2L), eFront, OLAT, etc., have been a driving force yielding new delivery methods. Among the others, Blackboard and Moodle are the two most well-known web-based LMSs increasingly being used in institutes, schools, and higher education platforms. These new learning methods used to deliver distance learning (DL) are thriving dramatically in different learning programs, and leading researchers and experts to expect that the conventional face to face (F2F) based model of education, in the form of students attending classes at predefined times and space, would dissolve shortly. These techniques are rapidly progressing with various forms of DL in concept, practice, and experience from anywhere, to anytime, to any mode delivery method convenience with an instructor as well as the learners. Fig. 3 shows the most

available platforms in the surveyed 120 centers. Some of the centers are preferred to use proprietary and custom-made e-exam platforms, which are software packages that have been locally developed. The main advantage of these packages it giving you exactly the functions and are fully adapted to meet the stakeholder's need with a high level of authenticity and security that may not be ensured in the ready-made standard LMSs.

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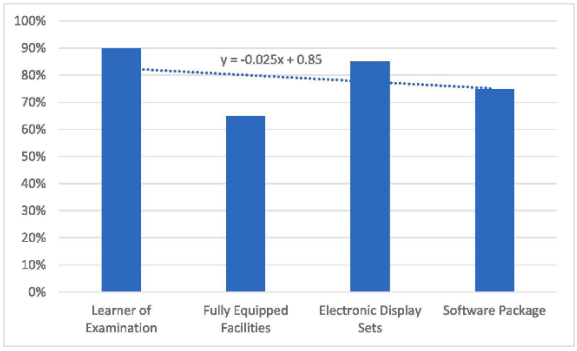

Figure 2: Evaluation of the requirements

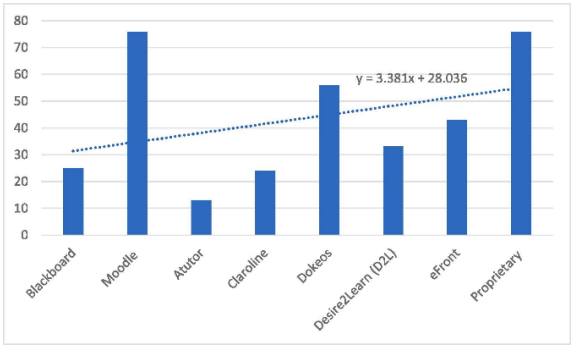

Figure 3: Evaluation of the common LMSs utilized in exam centers.

Although by end of 2020 the internet penetration should exceed 50% of the global population, there is a need for greater broadband connectivity and telecommunication services in communities, rural and remote areas that are underserved. Distance learning and e-exam would work properly in urban areas and rich cities due to high Internet penetration. To cope with the special requirements of e-exam methods for students living in rural communities, the Internet needs to operate in acceptable quality. Fig. 4 shows some of the challenges faced the centers for conducting e-exams.

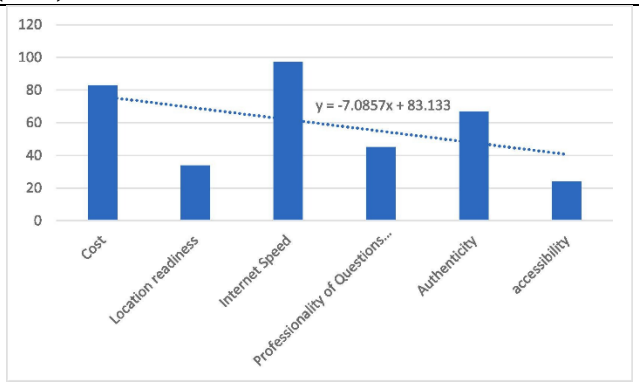

Fig 4. System architecture of the challenges faced the centers for conducting exams.

4. Conclusion

The increase in implementation of e-education during COVID − 2019 has resulted in the invention and generalization of various methods of assessment. Indeed, the system of e-exam is a valid method of evaluation due to its continuous availability and interactivity through the internet. In this paper, various studies indicated the positive effects of continuous electronic assessment on academic attainment. The combination of an electronic system and a closed system of assessment implemented by King Abdul Aziz University is worth studying from April to June 2020 in the mid waves of COVID 2019. This is because of its effect of increasing close dent attainment and solution to the problem of cheating on examinations in close systems. As well, the experiences of the Sudanese College of Medicine are similar to those of King Abdul Aziz University, joining closed education with a closed assessment to use e-exam for continuous assessment. The studies from these various universities show that technology is worth using, but that there are still some challenges. This paper suggests conducting the exam inside a closed environment, if necessary, only for final exams during the final year. Otherwise, intensive continuous exams supported by all available authentication algorithms in place of final exams may be a good solution to this dilemma. The results show that the internet speed, cost and authenticity were the most challenges faced e-exams centers, which were 99%, 82%, and 68%, respectively. More studies comparing the final results of students' evaluation using this solution and the closed environment solution are needed. The use of facial recognition technology may be accepted as a secure means of exam authentication in the future.

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