

Adaptive Learning Quiz Application on GRE Insightfor Informatics and Information System

Rashmi Amardeep¹, Sudeepa R², Sukanya V², Swetha
Jagatha², Tejas Kumar C²

¹ Associate Professor, Department of Information Science and Engineering, Dayananda Sagar Academy of
Technology and Management, Bengaluru, India

² B.E. Students, Department of Information Science and Engineering, Dayananda Sagar Academy of
Technology and Management, Bengaluru, India

Date of Submission: 15-12-2023

Date of Acceptance: 25-12-2023

ABSTRACT: In a digital age craving interactive and engaging educational tools, this paper introduces a cutting-edge Quiz Platform. This platform transcends conventional learning methods by offering a dynamic and immersive quiz experience. Users will navigate a user-friendly interface, accessing a diverse range of online quizzes that not only assess but captivate and calculate the score. This project will be designed to address the time-consuming issues with the manual system, such as the examiners' time being wasted examining answer sheets after tests, by developing an application that would check accurate answers, save examiner time, and conduct exams efficiently. The tests use automated marking to evaluate students' competencies at different points throughout a study session. We'll decide which questions are appropriate for evaluating and differentiating between the knowledge levels of the students. The user will be provided with wide ranges of quizzes like easy, medium and hard where the user can choose one option and take up the test. Marks will be evaluated based on the type of quiz the user has chosen.

Keywords: Quiz Platform, Dynamic and immersive Quiz experience, Online Quizzes, Automated marking.

I. INTRODUCTION

Globally, education has become more effective and advanced as a result of the rise in online learning and quizzes in recent decades. In this paper, we delve into the realm of the modern education with introduction of an

innovative Quiz Platform. As we navigate the digital age, traditional learning methods are being redefined by this cutting-edge platform, providing an interactive and engaging avenue for educational quizzes. Within the landscape of education, the Quiz Platform stands as a beacon of technological advancement and reshaping the assessment paradigm. By offering a diverse range of quizzes tailored to various difficulty levels, the platform ensures a nuanced evaluation of student competencies throughout the different stages of their study period.

This study examines the platform's complex architecture and considers how well it works to evaluate and differentiate users' degrees of knowledge. The three-level quizzes—easy, medium, and hard—offer consumers a personalized experience by letting them choose tests that correspond with their learning objectives. In this study, the platform's role in overcoming the difficulties presented by manual systems is a crucial topic covered. In addition to speeding up the evaluation process, the automated marking method helps examiners and instructors save important time. This more efficient method for the online tests helps to run the exams more smoothly, marking a significant change in the way that educational assessments are conducted.

Insights regarding the Quiz Platform's creation, operation, and possible influence on the educational landscape are to be gained from this in-depth analysis of the platform.

The goal of this extensive investigation is to provide insightful information that will aid in the advancement of educational technology,

especially with regard to interactive assessment.

II. LITERATURE SURVEY

A. Game-Based Digital Quiz as a Tool for Improving Students' Engagement and Learning in Online Lectures

In light of the COVID-19 pandemic at the start of 2020, remote instruction and learning are becoming more and more common. This has led to the adoption of online learning by numerous colleges, universities, and schools throughout the world. During the lockdown, demand for eLearning resources and online education platforms was high. For many institutions that already had digital infrastructure in place and had experience with distance learning, the transition from in-person lectures and classes to online teaching and learning was simpler. Nevertheless, many found that in addition to adjusting to new tools and technologies, the shift also presented difficulties in maintaining students' enthusiasm, engagement, and interest. This study uses a digital quiz tool with a game-like interface for people and computers to capture data on students' motivation and engagement levels as well as the learning curve when acquiring knowledge online.

B. Gamified Smart Objects for Museums Based on Automatically Generated Quizzes Exploring Linked Data

With the preservation of cultural heritage, museums have evolved into the cultural conscience of their countries. Even though cultural heritage offers an invaluable way to learn about humanity, visitors may not be captivated by the exhibits on display. Many technologies have been incorporated into museum spaces to create interesting and captivating experiences. In particular, the Internet of Things (IoT) is showing promise as a technology that can be used to implement smart objects and give exhibits advanced capabilities. In order to further capture visitors' attention, the gamification strategies are frequently employed in scenarios involving cultural heritage. In this regard, a number of museums provide interactive games that ask questions. Unfortunately, because this process isn't automated, it takes time to renew these questions on a regular basis.

C. Optimizing Moodle quizzes for online assessments

Higher education makes extensive use of computer-assisted learning management

systems (LMSs), which are seen to be advantageous when switching from traditional from in-person training to entirely online courses. Although LMSs offer special tools for knowledge transfer and assessment, more research is needed to determine how well they can engage and evaluate learners. This paper centers on an investigation into the LMS "Moodle" to determine the efficacy of "Moodle quizzes" in enhancing, evaluating, and differentiating knowledge in an Australian university's civil engineering program. There are Quiz questions: 62 formative, 61 summative in the course database containing audio, video, text, and images embedded. This study looks into how these test questions are used with 169 students across four course cohorts. The tests evaluated students' knowledge at different points in a study session using computerized marking. Employing a psychometric analysis grounded in the facility index (FI) and discrimination index (DI) data integrated into the Moodle assessments, the appropriateness of the questions to assess and categorize students' levels of knowledge were determined.

D. Adaptive quizzes to increase motivation, engagement and learning outcomes in first year accounting unit

Instructors can now offer learning opportunities that are customized to the unique needs of each student thanks to adaptive learning. Therefore, adaptive learning may help to raise student motivation and engagement levels while also enhancing learning outcomes. The results of an adaptive quiz pilot program in a course offered entirely online by an Australian higher education institution are presented in this paper. Findings show that students believe adaptive quizzes help them learn, and that they also increase student motivation and engagement. Interestingly, our findings show that the addition of adaptive quizzes did not significantly raise student scores, suggesting that students might not be the best people to assess their own educational achievements. In spite of this, we draw the conclusion that adaptive tests are useful for raising student interest and motivation.

E. Using Edmo online application as a supplement to enhance student level of performance and critical thinking in the learning process of Thermodynamic course.

In this study, the impact of utilizing an online learning technology platform on students'

effectiveness and critical thinking in a thermodynamics course is assessed. In this study, Edmodo— a free online learning environment — was utilized to facilitate virtual communication between the instructor and students. The study, which involved two cycles and lasted for about five weeks, was carried out during the first semester of the 2018–2019 school year. Thirty-eight students taking an introduction to thermodynamics course were the participants in this study. The University of Bahrain's B.Sc. program in Chemical Engineering requires completion of a mandatory undergraduate course called Thermodynamics. Nearly half of the students were female, and they all appeared at ease using online tools and had varied experiences with social media. Tests, questionnaires, and interviews were the three techniques utilized to gauge how successful the online strategy was. Edmodo can be used as an extracurricular learning tool because students' attitudes toward it were found to be positive. Impact on students was evident, and I think if Edmodo is used for the entire session, improvements and more encouraging comments are possible. Grading online tests and assignments would increase student motivation to participate in online learning activities and raise the degree of student engagement.

F. AsKME: A Feature- Based Approach to Develop Multiplatform Quiz Games

Numerous methods have been put forth to control the variability of the game domain in various situations and tactics. It can be deceptive to assume that there is a single game architecture that works for all target subdomains; instead, reference game architectures must be constructed. The Assessment of Knowledge Cross-platform Environment, an attribute-driven method for creating multiplatform quiz games, is presented in this paper. Based on features found in the quiz game dimension, it offers a subdomain game architecture in a Controller for Model View approach carried out by feature artifacts modified to run on different software platforms. Consequently, a reusable method for creating multiplatform quiz games was offered, along with the creation of lighthearted and instructional quiz games for testing purposes.

G. Development and Assessing MATLAB Exercises for Active Concept Learning

Innovative approaches to new problems in teaching and learning are made possible by new technologies like MOOCs. However,

because of things like less direct student-instructor interaction, they also present challenges for assessment and course delivery. These difficulties are particularly acute in the field of engineering education, which mainly depends on hands-on activities and computer simulations to help students grasp concepts. Therefore, for engineering MOOCs, the design of the experiential learning components is crucial.

H. Increasing Interactivity and Collaborativeness in MOOCs using Facilitated Groups: A Pedagogical Solution to meet 21st century goals

Educational technologies known as Massive Open Online Courses (MOOCs) have the capacity to instruct thousands of students simultaneously. MOOCs emphasize decentralized learning through video lectures, quizzes, assignment submission, and forum discussions. The didactic approach to teaching is the main focus of this pedagogy. But in order to learn efficiently in the twenty-first century, students are more networked and connected. The workforce of today and tomorrow needs critical thinking, communication, teamwork, and creativity, but MOOC pedagogy does not help to upskill the necessary. A facilitator-driven group learning methodology that draws inspiration from MOOCs is presented in this study. To comprehend current models, the pedagogies underlying seven distinct MOOC platforms were examined. To suggest and create the model conceptually, a survey of the literature pertaining to empirical research of MOOC success factors was conducted. This will foster greater student interaction and give them a platform for creative expression and teamwork. The paper provides an explanation of the specific design objectives and feature analogies.

I. Designing Educational Games on E-learning SMANAS Based Learning Experience Design

In the field of education, the push towards e-learning is more and more as a replacement for traditional teaching methods. A variety of open-source platforms, like Chamilo, are used in schools to implement e-learning. A type of learning management system called Chamilo allows users to create courses, quizzes, and upload materials in addition to supporting multimedia learning. Even though instructional video games are a well-liked form of multimedia that aid in learning. Through the use of

instructional games in e-learning, Learning Experience Design (LXD) provides a solution for challenging learning experiences. The research's objectives are to develop a teaching game for an online learning platform on the SMANAS case study system of linear equation in three variables (SPLTV) and evaluate the user experience of the instructional game through the use of the User Experience Questionnaire (UEQ). First, educational games fit in with online learning environments, as our study's results verify. Second, educational games create great impressions of the group's perspective, dependability, efficiency, attractiveness, and novelty. This indicates that learning experiences were obtained by students through educational games built on Learning Experience Design.

J. Automatic generation of quizzes for Java programming language

Platform-neutral object-oriented programming is available in Java. It is frequently used for Internet programming because of this. When learning the Java language, a beginner must first understand how a constructor is used to create an object, how to use a different class to invoke a public method using both the class name and its signature, how to call a public and static method, how to use the way to access a constant defined in one class and the public instance variable in a method defined in a different class. This paper presents an automatic method for coming up with arbitrary questions related to these fundamental topics. The student is given these questions, and he must revise his responses. Additionally, an automated method for confirming the accuracy of the responses is presented in the paper.

III. PROPOSED SYSTEM

Our proposed system presents a novel solution to the recognized shortcomings of conventional educational assessment techniques, with the potential to completely transform the field of knowledge evaluation. This groundbreaking system aims to rectify major inadequacies and implement efficiencies that meet the ever-changing demands of contemporary education.

1. **Automated Quiz Evaluation:** The heart of our proposed system lies in its automated quiz evaluation mechanism. This feature alleviates the time-consuming burden associated with manual grading, ensuring swift and accurate assessment of student responses.

2. **Adaptive Quiz Categories:** The system introduces a dynamic range of quiz categories, adaptable to varying difficulty levels. This flexibility allows educators and learners to tailor assessments to specific learning objectives, providing a personalized and comprehensive evaluation experience.
3. **User-Friendly Interface:** Ease of use is paramount. Our proposed system boasts an intuitive and user-friendly interface, ensuring accessibility for both educators and learners. Navigating through quizzes, analyzing results, and managing the platform's features are streamlined for a seamless experience.
4. **Comprehensive Subject Coverage:** Recognizing the diverse academic landscape, the proposed system accommodates a wide spectrum of subjects and topics. This inclusivity aims to provide a holistic evaluation, making the system applicable across various educational disciplines.
5. **Real-Time Feedback:** To enhance the learning experience, the system offers real-time feedback to users. This feature not only informs learners of their performance but also provides educators with valuable insights for adaptive teaching strategies.
6. **Scalability and Sustainability:** Our proposed system is built with scalability in mind. Whether deployed in traditional classrooms or online learning environments, the system is designed to evolve with the changing landscape of education, ensuring long-term sustainability.
7. **GRE Pattern:** The proposed system will be designed with a pattern similar to GRE exam i.e., it involves structured sections, adaptive assessment, efficiency and time management etc.
8. **Efficiency and Time Management:** Emphasize how your system contributes to efficient knowledge assessment, aligning with the GRE's focus on providing a timely and effective examination experience.
9. **Integration Possibilities:** Discuss the potential integration of your proposed system with educational platforms or learning management systems, facilitating a seamless incorporation into existing educational infrastructures.
10. **Enhanced User Engagement:** The user interface is designed with a focus on engagement, incorporating interactive elements, multimedia, and gamified features.

This promotes a more immersive and enjoyable learning experience, overcoming the engagement challenges observed in previous platforms.

In summary, the proposed system outlined in this endeavor seeks to usher in a new era of educational assessment, blending technological innovation with pedagogical efficacy. Through its features and capabilities, the system aims to contribute to a more efficient, adaptive, and user-centric approach to knowledge evaluation in the contemporary educational landscape.

IV. CONCLUSION

In conclusion, the proposed system stands as a transformative solution in the realm of educational assessment, embodying the principles of efficiency, adaptability, and user-centric design. With structured sections mirroring the GRE pattern, an automated evaluation process, and a commitment to real-time feedback, our system seeks to redefine the learning experience. Looking ahead, the suggested system is more than just a technological development; it is a symbol of our dedication to supporting an all-encompassing and successful approach to education. Our system seeks to significantly influence the direction of educational assessment by emphasizing user experience and adhering to the GRE pattern's tenets. A dynamic and all-encompassing assessment tool is becoming more and more necessary as we navigate the digital age. In addition to addressing the shortcomings of conventional approaches, this suggested system foresees how education will change in the future. With an emphasis on flexibility, scalability, and integration options, we envision a platform that will not only satisfy learners' and educators' present needs but also change to meet the needs of the educational ecosystem in the future. Through the creation of this suggested system, we set out to improve education as well as knowledge assessment. The intuitive interface and automated features are ready to support a smooth and interesting learning experience in both traditional classroom settings and virtual ones. To conclude, the suggested system invites cooperation with educators, organizations, and stakeholders. Our goal is to collaboratively refine and improve the system by creating a feedback-driven and collaborative environment. This inclusive strategy emphasizes a shared commitment to advancing the field of

educational assessment and guarantees that the platform changes in step with the demands and expectations of the educational community.

REFERENCES

- [1] Krenare Pireva Nuci et al., (Member, IEEE) ,“Game-Based Digital Quiz as a Tool for Improving Students Engagement and Learning in Online Lectures ”, Received May 29,2021, accepted June 3, 2021.
- [2] Alejandro Lopez-Martinez et al., “ Gamified Smart Objects for Museums Based on Automatically Generated Quizzes Exploiting Linked Data”, ©2020 IEEE, September 28, 2020 at 04:17:19 UTC from IEEE Xplore.
- [3] Sithara H. P. W. Gamage et al. ,“Optimizing Moodle quizzes for online assessments ”, Gamage et al. International Journal of STEM Education ,(2019) 6:27
- [4] Bella Ross et al., “Adaptive quizzes to increase motivation engagement and learning outcomes in first year accounting unit”, Ross et al. International Journal of Educational Technology in Higher Education (2018).
- [5] Sabri M Mrayed , Chemical Engineering Department, Faculty of Engineering, “Using Edmodo online application as a supplement to enhance student level of performance and critical thinking in the learning process of Thermodynamic course. 2020 Sixth, International Conference on e-Learning ©2020 IEEE.
- [6] Victor T. Sarinho et al., “AsKME: A Feature – Based approach to Develop Multiplatform Quiz Games”, 2018 17th Brazilian Symposium on Computer Games and Digital Entertainment (SBGAMES), ©2018 IEEE.
- [7] S. H. Song, Member, IEEE et al. “Developing and Assessing MATLAB Exercises for Active Concept Learning”, IEEE Transactions on education, Vol. 62, No. 1, February 2019.
- [8] Dilrukshi Gamage et al., Department of Computer Science and Engineering University of Moratuwa, “ Increasing Interactivity and Collaborativeness in MOOCs using Facilitated Groups: A Pedagogical Solution to meet 21st century goals” , 2018 IEEE Global Engineering Education conference.
- [9] Ashri Dinimaharawati School of Electrical Engineering Telkom University, et al.,

- “Designing Educational Games on E-learning SMANAS Based Learning Experience Design”, 2018 International Seminar On Research of Information Technology and Intelligent Systems, ©2018 IEEE.
- [10] Yuwei Tu Advanced Research Zoom Inc., et al. , “ An Adaptive Content Skipping Methodology based on User Behavioral Modeling ” , 2020 54th Annual Conference on Information Sciences and Systems, ©2020 IEEE.
- [11] Alexandru Ene Department of Electronics, Communications and Computers University of Pitesti , “Automatic generation of quizzes for Java programming language” , ECAI 2019 – International Conference – 11th Edition Electronics , Computers and Artificial Intelligence 27 June -29 June,2019 ©2019 IEEE.
- [12] Yiyi Wang Graduate school of Information Science and Electrical Engineering yushu University, Fukuoka et al., “Automatically Generate E - Learning Quizzes from IoT Security Ontology”, 2019 8th International Congress on Advanced Applied Informatics (IIAI-AAI), ©2019 IEEE.
- [13] Irina O. Kotlyarova Institute of Continuing Education South Ural State University Chelyabinsk et al. , “On- line Education Resources for the Optimization of On - line Continuing Professional Education ” ,2020 International Conference on Quality Management, ©2020 IEEE.
- [14] Jorge Brandao et al., “Game Quiz – Implementing a serious Game Platform based in quiz games for the teaching of Information and Technology. ” ,2014 11th International Conference on Remote Engineering and Virtual Instrumentation, ©2014 IEEE.
- [15] Li Dan Cheng , Xiao Cheng Wang , “Mobile Application Tools For Learning And Quiz Based On Android.”, 2013 IEEE 63rd Annual Conference International Council for Educational Media (ICEM).
- [16] I- Han Hsiao, P. Brusilovsky and S. Sosnovsky, "Web- based parameterized questions for object-oriented programming", <https://pdfs.semanticscholar.org>
- [17] F. García et al. , “ A practice - based MOOC for learning Electronics , ” in Proc. IEEE Glob. Eng. Educ. Conf. (EDUCON), Istanbul, Turkey, Apr. 2014, pp. 969–974.