



# A study on Online Examination System for Higher Education

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## Abstract:

This paper examine a study on online examination system for higher education. An open-web exam, a unique form of online assessment allowing Internet use, presents both advantages and drawbacks. While offering a more authentic experience, it may pose challenges in assessing if students have completed their own work. In this research, the authors share insights from a study on online exams, drawing from the perspectives of numerous students and faculty who participated in surveys. The findings aim to assist instructors in selecting the format most suitable for their classes.

**Keywords:** *Online examination, Higher Institutes, Education, Computer, Web.*

## Introduction

As education increasingly shifts towards a computer-based format, the traditional on-paper exams are starting to appear outdated. The allure of online delivery is undeniable, but it brings with it various implications that might not be immediately evident. It influences the types of questions that can be posed, adds complexity to exam administration, yet it holds the promise of expediting the grading process. While online exams don't inherently make cheating easier, they necessitate novel approaches to prevent academic dishonesty.

The conventional method of assessment, particularly examinations, often grapples with issues like question leakages and human errors in marking and score recording. The rise of technology, particularly in computer science, has prompted the integration of computers into various aspects of human life, including the education sector. This led to the creation of the Web-based Examination System (WES), designed to address the

challenges inherent in the traditional paper-based examination system. Developed using CSS, HTML, PHP, SQL, MySQL, and Dreamweaver, WES aims to provide a campus-wide service for electronic assessment that minimizes irregularities, ensures fairness to examinees, and facilitates instant feedback. By reducing the workload on examiners in terms of examination, grading, and review processes, WES enables the swift and error-free release of examination results. This system emerges as a viable solution for large-scale educational evaluations, offering unique features like real-time data collection, management, and analysis, as well as distributed and interactive assessment to promote distance education.

The online examination system is a web-based platform for conducting exams, accessible through either the internet or intranet using computer systems. This paper involves researching and comparing various web examination systems within the specific field, suggesting a set of design principles for a comprehensive examination platform applicable in colleges and universities. It delves into the analysis of key technologies, proposing enhanced schemes to refine and perfect the system. The primary objective of this paper is to develop an online examination system application that leverages network laboratories available in any college setting.

In the past decade, there has been an exponential increase in e-learning in higher education, primarily driven by its undeniable advantages in critical situations such as natural disasters (e.g., the COVID-19 pandemic) and wartime circumstances. The reliable, fair, and seamless conduct of online exams in the realm of e-learning holds paramount significance. Notably, online exams take place on e-learning platforms, eliminating the need for physical presence of students and instructors in the same location. However, this remote setting presents challenges related to integrity and security during online exams. Researchers have proposed various techniques and tools to address these challenges, yet a comprehensive study summarizing and analysing the latest developments, specifically in the area of online examination, is notably lacking in the literature.

Online examinations have become a prominent web-based assessment method in the educational domain. This system creates exams based on subjects and categories, assigning questions accordingly. The administration dashboard acts as the central hub for overseeing the MYSQL database, managing data efficiently. A dedicated

student dashboard is provided for registered students, allowing them to participate in available exams. Exam reports are automatically generated, eliminating the need for examiners to manually check and saving valuable time. Admins set time limits for each exam. The system is designed to be user-friendly, catering to individuals of standard proficiency. Security is maintained through the utilization of the session layer in PHP, and data integrity is upheld through JavaScript for both front-end and back-end validation.

Academic integrity remains a major concern for instructors, particularly in the context of online testing. The perception is that unproctored online exams may provide ample opportunities for collusion among students. However, it is possible to address this issue by implementing proctoring measures, especially in classrooms where students are required to use their laptops. Software solutions like SecurExam or Exam Soft can secure browsers, preventing communication or unauthorized site visits during exams.

According to Bilen, Matros, and Organization (2021), the issue of online cheating can be addressed by incorporating a front-facing camera that allows administrators to monitor the examinee's every move and observe the surroundings in which the exam is being conducted. Another approach, as suggested by Moten Jr, Fitterer, Brazier, Leonard, and Brown (2013), involves minimizing cheating by designing essay-type questions with an optimal time limit. This time constraint reduces the opportunity for examinees to search for answers on the internet. Even if students attempt to search online, cheating can be further mitigated by creating a deceptive website that provides incorrect answers, discouraging further internet searches after receiving misleading information.

Furthermore, the implementation of a class mode, as proposed by Cluskey Jr, Ehlen, Raiborn, and Ethics (2011), proves helpful in minimizing cheating. Online exam control procedures (OECF) play a crucial role in this regard, allowing only one multiple-choice question (MCQ) to be available to the student for a specific period. Once the student completes a question, the next MCQ is then provided, significantly reducing opportunities for cheating. Additionally, limiting students to a single attempt at the exam and disallowing

resets, except for genuine cases, prevents potential exploitation that could compromise the integrity of the assessment.

Today, the Online Examination System is recognized as a rapidly evolving examination method due to its precision and speed. It requires less manpower for examination management, leading many organizations to adopt this system. The efficiency of online examinations reduces the time students spend on assessments. Organizations can easily track and assess student progress through this system, resulting in quicker result calculations. Additionally, the online approach contributes to reducing the reliance on paper, aligning with environmentally friendly practices.

The exponential growth of the Internet has introduced radical new means of communication, impacting various sectors such as business, entertainment, and education. While conventional methods persist, the Internet offers unique advantages (Rahneva, 2004). A notable application of web technology is observed in the development of web-based testing and assessment (Iyilade & Adekunle, 2005). In the pre-Information Technology era, student academic performance assessment relied on paper-based assignments and tests. With significant advancements in IT, educational products are now electronically available, including through web technologies, giving rise to new methods of educational assessment.

The World Wide Web (WWW) has become widely embraced in the educational sector as a cost-effective and easily accessible tool for communication, information dissemination, teaching, course examinations, and research. This shift has led to a notable preference for web-based testing and assessment over the traditional paper-based assessment method, which has long suffered from issues such as question leakages and human errors during scoring and recording (Akanbi & Adetunji, 2012). Web-based testing and assessment systems offer greater flexibility, allowing tests to be taken by students at different times and locations.

The e-Examination system capitalizes on the substantial success of Information and Communication Technology (ICT) and its key features such as security, reliability, and consistency. This system streamlines the examination process through computer-aided control and automatic marking, reducing the complexity of

paperwork (Meng & Lu, 2011). In the current era of ICT adoption for promoting distance education, where geographical distance is no longer a hindrance, the Web-based Examination System (WES) emerges as an effective solution for mass education evaluation. The system operates on a Browser/Server framework, conducting examinations and auto-grading objective questions.

guiding and counselling students, selecting candidates for awards and employment, and grading for certification purposes. One essential purpose of a test in the education system is to assess whether a learner has achieved specific educational goals. The outcomes of such tests assist instructors in analyzing the efficacy of their instructional methods, understanding learners' strengths and weaknesses in a subject, and refining the instructional environment or methods to enhance teaching performance (Chen et al., 2005).

Ayo et al. (2007) define e-examination as a system that conducts examinations through the web or intranet. They proposed a model for e-Examination where all applicants undergo online entrance examinations, aiming to address issues such as impersonation and other forms of examination malpractices highlighted by bodies like the Joint Admissions Matriculation Board (JAMB). Their findings suggest that e-Examination has the potential to eliminate some of the problems associated with traditional examination methods.

Gardner et al. (2002) introduced a computer-supported learning system called CECIL, incorporating a valuable 'self-assessment' function to enhance students' learning effectiveness. This feature includes item pools, allowing teachers to easily administer and construct examinations through the Internet. The authors highlighted the benefits of item pools, emphasizing that teachers can seamlessly incorporate large question banks from textbook publishers with minimal manual effort. Additionally, Gardner et al. (2002) noted that teachers using the Internet for examination administration and construction offer students the advantage of checking their understanding of learning materials at any time.

In a related context, Wang et al. (2004) developed an assessment system based on the Triple-A Model (assembling, administering, and appraising). This model aims to provide a comprehensive form of Computer-

Based Test (CBT) or Web-Based Test (WBT) specifically tailored for teacher education, ensuring suitability and effectiveness in the learning process.

Zhenming et al. (2003) proposed a web-based operational skills examination and evaluation system specifically designed for computer courses. In another study by Rashad et al. (2010), a web-based online examination system was introduced. This system conducts examinations, automatically grades student submissions, and generates reports for the tests.

### **Online examination**

An examination can be administered either on a computer or on paper, with students having the option to browse the web or not. These two aspects are independent, and it's possible to conduct an open-Web exam where students write their answers on a test paper, bypassing the technological challenges discussed earlier.

The Online Examination Portal comprises two main sections: Admin Login and Student Login. The Admin login provides three functionalities, including student enrollment, result viewing, and exam creation. To enroll a student, the admin requires general information such as enrollment ID, name, contact number, branch name, year, password, and a photo, which can be uploaded from a local file or captured using the camera. Creating an exam is a straightforward process where the admin fills in details like branch, year, semester, subject, time, adds multiple-choice questions (MCQs), and saves the exam information in the database.

Student login allows registered students to log in using their credentials. Upon successful login, the camera activates, initiating face recognition, and the exam begins with AI proctoring running simultaneously. Once the student completes the exam, they can submit it by clicking the submit button, and the result will be evaluated automatically.

The Online Examination System serves as a web-based solution for various organizations to conduct both objective and subjective exams. The study highlights key aspects of the online examination system, emphasizing its accuracy, automation, and security features, contributing to the system's overall effectiveness.

This innovative approach to exams eliminates the traditional method, reducing paper usage and saving time. Challenges associated with data preservation and security, prevalent in conventional techniques, become more manageable with this system.

Whether delivered via computer or not, open Web exams come with distinct advantages and disadvantages. The environment closely resembles students' daily work settings, providing a more authentic assessment of their knowledge (Wiggins, 1990). However, questions requiring simple recall may not be suitable, as answers can easily be looked up. Instructors need to carefully frame questions to assess genuine understanding of concepts. Some students may spend excessive time searching for information online, potentially impacting their performance. This observation aligns with findings from previous studies (Boniface, 1985; Ioannidou, 1997), as mentioned by Rakes (2008), indicating that certain students may perform less effectively in open-book exams due to extensive time spent on reference materials. Subsequent exams may benefit from clear instructions to prioritize answering questions over extensive browsing. In a pioneering study by Williams and Wong (2007) on open-Web exams, students were only marginally more inclined to believe that the exam structure facilitated cheating.

## **Discussion**

Open-Web exams offer a distinct advantage in scenarios where students require access to extensive material during the test. These exams find applicability in various contexts, ranging from distance education classes to those undergoing accreditation processes. While Open-Web exams lack apparent drawbacks, the issue of academic integrity is subject to debate. The ability to present students with different versions of the same question can potentially enhance the difficulty of cheating. However, online exams face technological challenges, particularly in dealing with the input of diagrams and equations. The application's development involved utilizing diverse programming models and languages. HTML, CSS, and PHP were employed for the front-end interface, while MYSQL served as the backend, all of which were delivered through the APACHE web server. HTML and CSS, functioning as a markup language and styling language, respectively, facilitated

the design and layout of the user interface. PHP, a web scripting language, played a crucial role in generating dynamic content based on user interactions and corresponding data stored in the backend database, managed by MySQL. The web server, powered by APACHE, served webpages as needed, interpreting PHP scripting commands embedded in the pages. Essentially, the computer served as the medium for students to take examinations, for teachers to construct tests, and for the transmission of test papers.

## Conclusion

Online and open-Web exams offer numerous advantages, with automated grading being a notable strength. However, the associated overhead may be challenging to justify in smaller classes, making open-Web exams on paper a potential alternative for such settings. Academic integrity remains a significant concern, but evidence suggests that it can be effectively addressed in either format. The COVID-19 pandemic has accelerated the adoption of online examination systems, providing a means for institutes to assess students remotely. However, the increased risk of cheating during online exams requires effective solutions. Learning Management Systems (LMS) and other monitoring software can help identify cheating behaviors, triggering alarms for invigilators. Open-book exams with limited time and the inclusion of multiple-choice questions with equations are proposed strategies to minimize cheating. Additionally, the practice of students sharing screens with invigilators can enhance monitoring, ensuring greater visibility into students' activities and discouraging cheating.

## References

1. Boniface, D. (1985). Candidates' use of notes and textbooks during an open-book examination. *Educational Research*, 27(3), 201–209.
2. Gehringer, E. F.. (2010). Online vs. on-paper exams. ASEE 2010. Presented at the American Society for Engineering Education Annual Conference, Louisville, KY. 1010-1150.
3. Ioannidou, M. K. (1997). Testing and Life-Long Learning: OpenBook and Closed-Book Examination in a University Course. *Studies in Educational Evaluation*, 23(2), 131–39.

4. McDaniel, M. A., Roediger, H. L., & McDermott, K. B. (2007). Generalizing test-enhanced learning from the laboratory to the classroom. *Psychonomic Bulletin & Review*, 14(2), 200–206.
5. Rakes, G. C. (2008). Open book testing in online learning environments. *Journal of Interactive Online Learning*, 7(1), 1–9.
6. Wiggins, G. (1990, December). The Case for Authentic Assessment. ERIC Clearinghouse on Tests Measurement and Evaluation: ERIC ED328611.
7. Williams, J. B., & Wong, A. (2007). Closed book, invigilated exams versus open book, open web exams: An empirical analysis. *Proc. ASCILite 2007*, 1079–1083.
8. Akanbi, C.O., & Adetunji, A.B (2012). An Online Essay-Based Examination Assessment Model Using Double Blind Marking Tecnique. *African Journal of Computing and ICT*, 5(6), 104-108.
9. Ayo, C., Akinyemi, I., Adebisi, A., & Ekong, U. (2007). The Prospects of E-Examination. *Turkish Online Journal of Distance Education-TOJDE*, 8(4), 125-134
10. Burd, B. (2005). *Beginning Programming with Java for Dummies*, 2nd ed. Indianapolis, Indiana: Wiley Publishing, Inc.Indianapolis, Indiana.
11. Chen, D.J., Lai, A.F., & Liu, I.C. (2005). The Design and Implementation of a Diagnostic Test. *Journal of Information Science and Engineering*, 21, 1007-1030.
12. Gardner, L., Sheridan, D., & White, D. (2002). A Web-based learning and assessment system to support flexible education. *Journal of Computer Assisted Learning*, 18, 125–136.
13. Iyilade, J. S., & Odekunle, W. O. (2005). A Web-based Student Testing and Assessment System. *Teaching, Research and Administration, AICTTRA*, 1, 16-24.
14. Olga D. R. (2004). Multilingual Graphical Authoring Editor in a Distributed e-Testing Cluster. *Proceeding of Electronics' 2004*, Sozopol, Bulgaria.
15. Rashad, M. Z., Mahmoud S, K., Ahmed E, H., & Mahmoud A, Z. (2010). An Arabic WebBased Examination. *International Journal of Electrical & Computer Sciences*, 10(1), 48-54.
16. Wang, T. H., Wangw, K. H., W. L. Wangz, Huangz, S. C., & Chen, S. Y. (2004). Web-based Assessment and Test Analyses (WATA). *Journal of Computer Assisted Learning*, 20, 59-71.
17. Zhaozong Meng & Joan Lu (2011). Implementing the Emerging Mobile Technology in Facilitating Mobile Exam System. *Proceedings of 2nd International Conference on Networking and Information Technology*, Singapore.
18. Zhenming, Y., Zhang, Z., & Zhan, L. (2003). A novel web-based examination system for computer science education. *33rd ASEE/IEEE Frontiers in Education Conference*, S3F-7 – S3F-10, 2003.
19. Bawarith, R., Basuhail, A., Fattouh, A., Gamalel-Din, S. J. I. J. o. A. C. S., & Applications. (2017). E-exam cheating detection system. *8(4)*, 176-181.

20. Bilen, E., Matros, A. J. J. o. E. B., & Organization. (2021). Online cheating amid COVID-19. 182, 196-211.
21. Cluskey Jr, G., Ehlen, C. R., Raiborn, M. H. J. J. o. A., & Ethics, B. (2011). Thwarting online exam cheating without proctor supervision. 4(1), 1-7.
22. Keegan, D. (1996). Foundations of distance education: Psychology Press.
23. Moten Jr, J., Fitterer, A., Brazier, E., Leonard, J., & Brown, A. J. E. J. o. E.-I. (2013). Examining online college cyber cheating methods and prevention measures. 11(2), 139-146.
24. Nizam, N. I., Gao, S., Li, M., Mohamed, H., & Wang, G. (2020). Scheme for Cheating Prevention in Online Exams during Social Distancing.
25. R. Albastroi, A. Iova, F. Goncalves, M. C. Mihaescu, and P. Novais, "An e-Exam platform approach to enhance University Academic student's learning performance," in Proc. Int. Symp. Intell. Distrib. Comput., vol. 798. Cham, Switzerland: Springer, Sep. 2018, pp. 404–413.
26. J. Jiang, B. Wu, L. Chang, K. Liu, and T. Hao, "The design and application of an Web-based online examination system," in Proc. Int. Symp. Emerg. Technol. Educ. Springer, 2019, pp.246–256.
27. Guzman et al. (2005): They developed a online examination system called as SIETTE; (System of intelligent Evaluation using Tests for Tele education).
28. Devidas Thosar, Review on Advanced Graphical Authentication to resist shoulder surfing attack. DOI: 10.1109/ICACAT.2018.8933699, 19 December 2019, Published by IEEE.
29. Devidas Thosar, Review on click points graphical passport, International Journal of Research and Management (IJERN), Volume 5 issue 2, August 2018.