Comparison of online and offline examinations

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Abstract

Education and examinations are mutually dependent parts of the overall education system. Examinations play a crucial role in the lives of students in India since these serve to evaluate their understanding and proficiency in the content students have learned. Assessments are widely believed to be necessary for learners to enhance their learning efficiency. This study examines the historical development of education and the contemporary surge in online learning, with a specific emphasis on the increasing rate of cheating in online exams. The study focuses on providing a comparison between online and offline assessment systems. The main purpose is to review which system of conducting examinations is more effective, offline, or online.

Keywords: Online Exams, Portals, Offline Exams, Exam Reforms

1. Introduction

Education is commonly recognized as an essential skill that individuals may possess. It is widely acknowledged as crucial in the battle against severe poverty [1]. Education has become highly valued since the beginning of the millennium. Cambridge University and other comparable institutions have provided officially registered examinations since the beginning of the nineteenth century. A crucial concern inside the educational system is the honesty of research findings, the methodologies employed to showcase expertise in a particular area, and reasons for encouraging others to trust the individual's conclusions[2]. The Curriculum for Elementary School Reform aims to equip students with the necessary skills and abilities to excel in global competition. They achieve their aim by providing a quality-focused education that promotes various aspects of human development, including moral principles, creative thinking, interpersonal and intrapersonal skills, cognitive abilities, and non-cognitive abilities [3].

The main objective of the examination is to assess the student's level of comprehension. Grades would be assigned to individuals based on how they performed on the examination. Competition examinations are known for being extremely challenging. They are designed to assess students' abilities and determine the most competent candidates for specific roles [4]. Online examinations offer the advantage of flexibility and prompt feedback, while offline examinations provide an ordinary atmosphere with reduced dependence on technology and improved security safeguards. The selection will depend on factors such as the type of assessment and the available resources, with an increasing trend towards hybrid approaches.

This study examines the distinct environments of online and offline exams within the framework of modern education. The study begins by providing a comprehensive account of the historical progression of education and the recent boom in online learning. It then focuses specifically on the urgent matter of cheating in online examinations. The study introduces the efficiency of a cutting-edge multimedia analytics system designed specifically for real-time

monitoring of online tests, utilizing advanced video monitoring techniques. During this investigation, the research highlights the long-term significance of traditional education and highlights the importance of a detailed analysis of the fundamental differences between online and offline assessments. The study effectively combines knowledge from historical perspectives, technological advancements, and the proposed multimedia analytics system. This significantly contributes to the ongoing discussion about the effectiveness, security, and reliability of various examination methods in the changing field of education.

1.1 Online Education

The idea of remote education was first proposed in the 1800s when students and professors at the University of Chicago were spread out across several locations. During the 1920s and 1930s, the advent of radio as a means of communication enabled universities like Wisconsin's School of the Air to initiate distance education programs, even well after the war had ended [5]. In the 1950s, the widespread use of televisions helped the early implementation of distant video education, allowing students and instructors to participate in training from a remote location. In 1982, the Western Behaviour Sciences Institute introduced its inaugural distance learning program, which corresponded with the launch of the first fully online education program [6].

The exponential growth of online education in the United States and globally is an inherent outcome of promoting inventive approaches. Many colleges are increasingly offering courses that are either fully online or hybrid, which combines distance learning with classroom instruction. Based on the findings of a study conducted by the Pew Research Centre in 2011, many four-year higher education institutions provided courses that were delivered exclusively online, in a hybrid or combined online format, or through other methods of distance or non-face-to-face instruction during the academic session of 2010-11 [7]. In 2013, 32% of undergraduate students were registered in an online course [8]. The advantages of studying online are illustrated in Fig. 1 below.
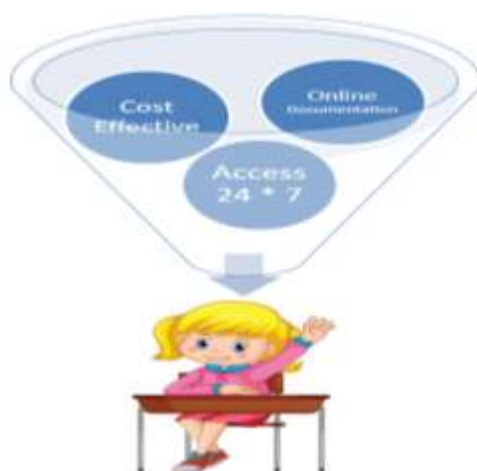

Figure 1. Benefits of Online

The incidence of academic fraud among students is increasing [9]. According to approximately 74% of students in 2013, cheating on online exams would be quite effortless. In 2013, approximately 29% of students admitted to performing academic fraud via cheating

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on online examinations. This study discusses a multimedia analytics system that can automatically and continuously monitor online examinations (OEP). Utilizing real-time proctoring, this system strives to preserve the educational quality of exams by identifying most cheating actions exhibited by test-takers. OEP is imperative to employ audio-visual surveillance to detect any occurrences of cheating among test takers. Choosing to apply this technical methodology was based on the extensive research performed in the field of multimedia systems [10,11], which have successfully investigated human behavior by analyzing audiovisual data aspects. Figure 2 provides a detailed explanation of the functioning of OEP.
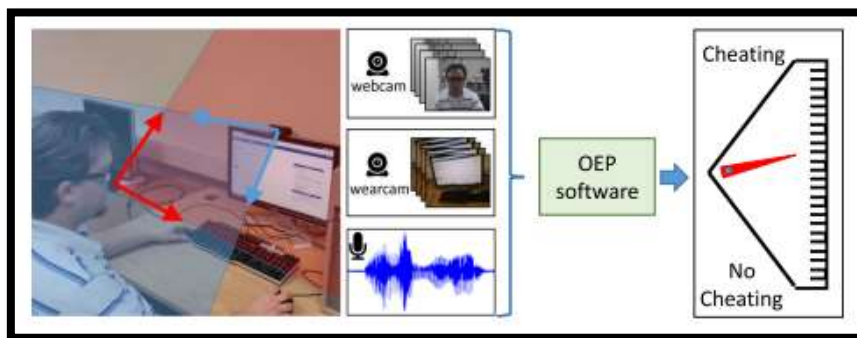

Figure 2. Using the audio-visual data streams obtained from a wearcam equipped with a built-in microphone [12].

OEP technique employs two cameras and a microphone to observe the exam taker's living surroundings to detect such signals. The initial camera, depicted in Figure 2, is positioned either on the top of or integrated into the monitor that the individual uses. Both cameras are denoted as "webcam" and "wearcam" [12]. As the second camera is either placed or attached to the task taker's eyeglasses, it captures the visual perspective of the topic. Due to the pandemic, conducting in-person lessons is not practical; however, distance learning and online education can still be implemented simultaneously. Concluding the online assessments, let us now explore the conventional curriculum. Offline lessons include face-to-face teaching, which promotes greater participation, direct communication, and hands-on experience, hence strengthening the individualized nature of education. Now, let's examine the benefits of this conventional approach.

1.2 Offline Learning

Offline learning can be done without the requirement of a computer, phone, or tablet that has internet connectivity. Helping poor students to continue their education is one advantage of offline learning. Participation in education is still possible for students from a variety of geographic locations, including both urban and rural ones. Books, modules, instructional material, and other resources are more extensively needed in an offline learning environment. Students can study on their own time both at school and at home with the help of these resources. Teachers can play a more active part in their students' learning when they use student-owned facilities. Learning during the current COVID-19 pandemic is taking place both online and offline, according to preliminary observations [13]. Offline learning is taking place in classrooms with five or six kids at a set time [13].

Previous research has focused on topics such as examination malpractice [14] and the use of knowledge engineering tools to detect fraud in selecting examinations [15]. Previous research has concentrated on online exams that aid in ongoing student monitoring using a multi-model authentication technique [16,17]. Various ways of visualization are employed to depict the student's activity.

2. Literature Review

This section describes the study of various authors on the topic of comparison between online and offline Examinations.

Salokhiddinovna et al., (2023) [18] investigated the possibility of using internet resources in psychology study by comparing Web-based evaluation methods with traditional paper-based procedures of measuring different aspects of the Uzbek population's attitudes and behaviors toward the World Wide Web. The acquired data was analysed to discover differences between the two samples and the questionnaires' psychometric qualities. The study found significant shifts in online attitudes and behaviors across the two groups, but the author couldn't find any differences in the psychometric properties of the surveys. It is even more remarkable that this outcome, which is consistent with prior findings in Web-based assessments of personality traits, was obtained without any control over the characteristics of the online sampling. Incorporating sampling control and validity assessment into online surveys makes them a viable alternative to traditional paper-based assessments, according to these data.

Veeraiyan et al., (2022) [19] examined the effectiveness of periodontics courses taught using online and offline interactive learning platforms for Bachelor of Dental Surgery (BDS) students at an Indian dental school. The 49 participants in this prospective investigation were divided into two groups: one that met online (Group I; n = 24) and another that met in person (n = 25). The study broke the material down into three sections and finished the whole thing in a week. Both groups had access to the same curriculum, including the same lectures, exercises, and themes. The written examinations that students took during the module counted towards their formative assessment mark, while the final exams counted against their summative assessment grade. Regarding formative evaluation, a statistically notable change was seen between Group I (77.88 ± 12.89) and Group II (77.80 ± 16.09) (p = 0.98). Furthermore, when comparing Group, I (80.54 ± 8.39) with Group 2 (80.28 ± 11.57) in terms of summative assessment, no statistically significant difference was found (p = 0.93). In sum, the results revealed that undergraduate dental learners performed similarly when exposed to interactive teaching methods in periodontics using offline and online systems.

Oyewola et al., (2022) [20] demonstrated that students' academic performance has been better in the online learning mode in comparison to directly, even though the difference may be extremely small. Based on the information provided, it appears that students who are given all four mechanical engineering courses online were not experiencing any detrimental effects on their performance. The outcomes of this study indicated that online platforms could serve as a feasible alternative to in-person interactions or, at the very least, a valuable complement to in-person interactions in a hybrid mode that combines offline as well as online elements.

Najib et al., (2022) [21] assessed the effectiveness of online and offline learning by employing a two-factor analysis of different approaches. Undergraduates majoring in history education at FKIP PGRI Banyuwangi University participated as participants in this study. The approach A quasi-experimental design consists of two components: the online group and

the offline group. However, neither group can fully control the external variables that can affect the experiment. Up to 132 students from the Faculty of Teacher Training and Education make up the population of this study. The study may conclude that Learning Effectiveness based on study programs at the teaching and learning institutions is not different since the two-way analysis of variance (ANOVA) test yielded a significance result of 0.056> from 0.05. However, a significance level of 0.00 may be observed from the results.

Chang et al., (2022) [22] hoped to learn more about why some students choose not to take online classes instead of more conventional classroom settings in this research. Three hundred and eighteen students from Xi'an Jiaotong-Liverpool University (XJTLU), as well as nine interviewees, were surveyed by the researchers. Here are the key findings: 1) students tend to prefer in-person classes over online ones; 2) while deciding between options, both internal and external considerations, such as program and trainer qualities, cost, and student's gender and age, are significant; 3) Too little is done to integrate digital techniques with online classes for them to be as effective as they can be. Based on their findings, the researchers concluded that the training agency's failure to adequately consider students' viewpoints is the primary challenge.

Rawat et al., (2021) [23] examined the COVID and post-COVID assessment processes in the Indian context, this study draws on data samples and analyses the organizational framework of several educational institutions. The point of this discussion and subsequent conclusion was to weigh the benefits and drawbacks of both online and offline testing. To gain research insights, the author was comparing the offline and online testing methods. To protect the student's finest interests, the evaluation and testing processes must be completed efficiently and accurately.

Kaymak et al., (2022) [24] aimed to compare the effectiveness of online and offline learning environments for mathematics students. There was a group of 58 students who learned entirely online, and another group of 58 who studied entirely offline. Freshmen from Taraz, Kazakhstan's Jambyl Innovative Higher College (JICH), participated in the research. After week 18, the last control task was conducted, which examined every aspect of the issue for both groups. The study analyzed the mean scores of students who studied online with those who studied offline. To keep things clear, the researchers also ran and analyzed a separate t-test. pupils' academic performance differs significantly between online and offline pupils, according to the results. To enhance the learner's understanding of mathematical topics, consider implementing remote instruction.

Choi et al., (2021) [25] aimed to create an action naming test and compare its performance based on assessment modality (online vs. offline) and stimuli presentation type (animation vs. sequence picture). Using 36 selected verbs, 197 participants were divided into groups for online and offline assessment, with stimuli presented as animation or sequence pictures. Results revealed a significant effect for verb argument, but no significant differences in performance based on assessment modality or presentation type. The study suggested the action naming test is versatile for clinical use, with potential implications for developing online language assessment systems in Korea.

HUNEIF et al., (2020) [26] examined that medical learners face ongoing pressure to rapidly expand and refresh their knowledge due to the explosion of healthcare information available online. Limitless learners may be able to save money, which has contributed to the rapid growth of online degree programs. The experiments involved the passive assignment of

students to either the experimental or control groups. Exams administered both online and offline are compared in this research.

Gupta et al., (2020) [27] compared Online and paper-based testing. Two online exams with identical problem standards were administered to a subset of undergraduates from Sarsuna Colleges. The two online exams were separated by fifteen days. To administer the online test, the Moodle learning management system (LMS) was utilized. Short, descriptive, and multiple-choice inquiries made up the bulk of the tests. Parametric and non-parametric tests are conducted to compare the averages and middle values of the scores. The findings indicate that while the average score for the initial online test is considerably lower than that of the paper-based examination, there is no notable gap between the results of the second online test and the written test. This paper further elucidates the benefits and drawbacks of online tests.

Pei et al., (2019) [28] conducted an analysis by combining papers on the knowledge and skill results of students applying an approach called random effects. A total of sixteen papers have been found out of a pool of 3,700, of which published publications. Meta-analyses have shown a clear and statistically significant gap between offline and online education in terms of outcomes related to skills and knowledge. This difference is supported by the post-test scores, with a Standardized Mean Difference of 0.81 (95% Confidence Interval: 0.43, 1.20; $p < 0.00$ significant difference 01), based on a sample size of 15. The only result of the comparison, which relied on retention test scores, exhibited a major gap result (SMD = 4.64; 95% CI: 3.19, 6.09; $p < 0.00001$). The meta-analyses found no statistical in the pre-and post-test score improvements The standardized mean difference (SMD) was 3.03, with a 95% confidence interval ranging from -0.13 to 4.13. The p-value was 0.07, and the sample size was 3. Online learning offers the benefit of boosting the knowledge and abilities of undergraduates, in comparison to offline learning. Hence, it can be regarded as a promising approach to undergraduate medical education.

Enochsson et al., (2018) [29] investigated the impact of student teachers' incorporation of oral classroom discussions and writing online forum exchanges on their reflective practice. The objective is to compare the outcomes of these two modes and determine their respective facilitative capacities. Information was gathered from a group of 11 student teachers who were actively involved in the study. Verbal conversations were captured on camera, while written online conversations were stored as Word documents. The depth of the reflections was determined using Clinchy's levels of knowing, and qualitative evaluations influenced by Harasim were conducted as a complement. The results indicate that there were no meaningful differences in performance when considering the levels of reflective thinking among the group. Both models include benefits and limitations. However, it is important to provide student instructors with a wide variety of options to improve their ability to reflect on their teaching practices. The paper delved into a deeper analysis of how modal preference and modal performance interact and examined the potential Implications of online peer coordination.

3. Conclusion

The study discusses the benefits of online education and acknowledges worries about fraud to examine the lasting importance of traditional offline learning. It emphasizes the importance of traditional education in promoting active participation, face-to-face communication, and hands-on experience. Essentially, the study not only answers for ensuring secure online

assessments but also emphasizes the enduring significance of traditional offline learning methods. This detailed study provides valuable insights for educators, policymakers, and stakeholders in the field of education, moving the discussion toward a more knowledgeable understanding of the complicated interactions between online and offline testing techniques.

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