

An Integrated Platform for Automated Management in Educational Institutions

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ABSTRACT- The system proposed combines grading, attendance monitoring, and session management to consolidate educational workflows. It offers a one-stop portal that integrates lab activities to address inefficiencies in attendance management, assignment submissions, and performance assessment in educational Institutions. By automating back-office tasks, the platform lightens educators' workload, improving operations. Research highlights that joint platforms minimize administrative burden and boost institution productivity. Attendance Monitoring is effortless, enhancing student tracking. This system enhances grading and attendance tracking, making it scalable for large institutions. This paper outlines the characteristics of the proposed platform, highlighting its contribution to updating learning workflows.

Keywords: learning management systems, automated grading, attendance tracking, session management, real-time performance tracking

INTRODUCTION

In such a quick progression of educational technology, ways educational institutions manage and present learning experiences have undergone drastic changes. While traditional learning management systems have proved helpful in the delivery of the curriculum and monitoring attendance more. They are often efficient but can fail to capture critical laboratory management issues such as combining session management, real-time grading, and attendance tracking on one platform. In laboratory learning settings, such disparity is much more

evident due to the effectiveness of learning because it depends so much on coordinated assessment, attendance, and students' performance in a smooth coordination. This makes educational institutions increasingly seek solutions beyond the confines of a standard LMS with scalability, usability, and adaptability in the face of diverse academic processes. The development of hybrid and online learning environments, accelerated during and after the COVID-19 epidemic, further underscores the necessity for creative approaches that will reduce administrative burdens while enhancing student participation and responsibility. This review study explores the current state of educational technology, focusing on the limitations that occur in labs and how an integrated platform could help bridge the gaps.

LITERATURE REVIEW

The management of learning environments in educational institutions has been significantly altered by the digital transformation of education, especially in laboratory classrooms. Traditional learning management systems (LMS) have made curriculum delivery and attendance tracking easier. Examples of these systems are Moodle [1] and MyClassCampus [2]. The inability of these systems to combine grading, performance monitoring, and session administration into a single system, however, emphasizes the need for more complete solutions.

In order to overcome the shortcomings of conventional learning models, Azlan et al. [3] underlined the

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significance of Internet-based e-learning systems during the COVID-19 pandemic. Even while these systems are good at providing instruction remotely, they frequently struggle to integrate necessary features like real-time grading, session administration, and attendance tracking. In order to close this gap, frameworks like PerLCoI, which was put out by Al Abri et al. [4], and collaborative learning strategies, which were emphasized by Al-Kindi and Al-Khanjari [5], show how scalable and customized platforms can improve learning results.

Even with these developments, connecting theoretical and practical knowledge still presents many obstacles. In order to promote deeper involvement, Posthuma-Coelho [6] noted that effective teaching technologies must link experiential learning with conceptual learning. Al-Khanjari et al. [7], for example, showed how beneficial it is to incorporate programming tools into online learning environments in order to help students become better coders. In a similar vein, Hamada et al. [8] investigated how to use augmented reality (AR) into e-learning platforms to enhance the interactivity and immersion of practical exercises.

Further demonstrating the significance of matching interactive activities with digital platforms, Bylieva et al. [9] found a correlation between the practical components of coursework and overall e-learning success. Platforms like PerLCoI [10] have been created to provide individualized and cooperative e-learning solutions in order to achieve this goal. Furthermore, the use of virtual laboratories in software engineering education was investigated by Alam and Mohanty [11], who showed how well they worked to solve domain-specific problems. The significance of incorporating cutting-edge technologies into educational systems was emphasized by Kanika et al. [12], who also examined resources and methods for teaching programming.

This study expands on these discoveries by suggesting a single platform that combines real-time session administration, automatic grading, and attendance monitoring. The suggested system provides a scalable, effective, and all-inclusive solution for contemporary educational institutions by resolving the drawbacks of conventional LMSs.

METHODOLOGY

Our system methodology is founded on an integrated approach that creates a single integrated system by integrating multiple essential learning management functions. By tracking student behaviour during lab time,

the software seeks to improve student engagement, streamline tracking, and automate the grading process. The purpose of these features is to boost the engagement and productivity of both teachers and students.

A. Automated Grading System:

By giving teacher the tool, they need to effectively review and record student work, the automated grading system simplifies the assessment procedure. The system evaluates student work by using preset standards to determine how well it is submitted. This makes assessments more impartial and consistent. Teachers created the predefined rubrics, which assess a number of factors like accuracy, clarity, task achievement, and presentation. This technique lowers human bias during evaluation, improves fairness, and saves teachers' time by standardizing the grading process.

B. Real-Time Session Management:

Real-time session management is a new and innovative aspect of the system. Traditional classroom or lab settings use direct observation to track student involvement, which has drawbacks. However, this technology continuously analyses student activities and provides quick feedback on their involvement levels. It may monitor a variety of variables, including time spent on tasks, interaction frequency, and overall engagement. The technology aggregates this data into a thorough scorecard, which teachers may see via their dashboard. This allows educators to react in real time if a student falls behind or is not completely engaged.

C. Integrated Attendance Tracking:

The system integrates attendance tracking, which is a direct correlate to student achievement. Attendance is captured through biometric verification or manually entered and matched with grading data. This allows for a full view of what a student has been doing in class. A student who consistently misses courses will see their performance decline overall, even if they are performing exceptionally well on certain assignments. This approach focuses on the importance of consistent participation and references statistics that indicate that consistent attendance is correlated with improved achievement. This strategy emphasizes the value of regular engagement, citing data that suggests that constant attendance is associated with better academic achievement.

1. TECHNOLOGY CHOICES:

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React: React was selected first as it allows for scalability and rapid rendering for the development of an interactive and user-friendly interface.

ASP.NET: With React, ASP.NET is used for secure backend processing and easy front-end and third-party tool integration.

SQL: SQL was integrated at the last mile to enable reliable and structured storage of grading, performance, and attendance records.

2. DATA FLOW:

Step 1: Students submit assignments via the portal [9].

Step 2: Automated grading algorithms evaluate submissions [10].

Step 3: Attendance data is logged during sessions [11].

Step 4: Teachers access performance analytics in real-time [6].



Fig. 1- Data Flow Diagram for Integrated Learning Platform

3. INNOVATION AND IMPACT:

The proposed approach, which incorporates session management, attendance tracking, and marking of assignments into a live session, counters the limitations of typical learning management systems like Moodle (Moodle LMS, n.d.). Distributed work is quite challenging for lecturers in massive universities; most of them are resolved by this integration. There is literature that discusses how lecturers get overburdened with administrative tasks (Azlan et al., 2020). Our system frees time for teachers to spend more on instruction and student involvement because it reduces their administrative burden. This is especially helpful in large organizations since the workload related to managing several systems often leads to errors and inefficiencies (Al Abri et al., 2020).

In order to make the digital learning resource more effective, the online portal's interactive interface is developed keeping it in an interactive mood with the user. Value of user experience in digital learning: According to one report, engagement in digital learning develops when one has an intuitive system (Posthuma-Coelho, 2016). The students are encouraged to be responsible for themselves and engaged in action, which is likely to bring out better outcomes of engagement and learning. This ensures that learning institutions meet the current standards and raises the general standard of education. This approach will greatly affect colleges and schools. This technology reduces the time it takes to manage the institutions, enhanced performance by the students, and high production because administrative tasks are minimized. From the research above, the result is an extremely impactful and efficient education system for both parties involved (Azlan et al., 2020; Al-Kindi & Al-Khanjari, 2017).

4. QUANTITATIVE OUTCOMES

The proposed system effectively addresses the challenges highlighted in the introduction:

- **Efficiency:** Teachers can concentrate on teaching since automated grading saves time [3][4].
- **Accountability:** Real-time performance monitoring boosts student involvement [8].
- **Scalability:** Although preliminary experiments show promise, optimization is necessary for larger-scale implementations [4].

CONCLUSION

Our platform itself holds tremendous promises and proves to revolutionize the way laboratory management is done by putting grading, attendance, and session tracking on a single site. Being innovated this much, technology now minimizes the involvement of almost all manual efforts, aids in reinforcing learner engagement, and keeps pace with the much-renowned developing education standards. The platform solves the key challenges of traditional LMSs by combining grading, attendance, and session management into a single integrated system. It increases efficiency and meets the needs of contemporary education by reducing textbook load and engaging students in class. This helps students track their learning more effectively by providing them with fast and accurate feedback. Virtual classroom monitoring allows for teachers to connect with students

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who are in the lab, therefore improving the whole learning process while ensuring effective engagement.

So, for future AI and IoT work, this platform will set the standards for new efficiency and effectiveness in the process of education.

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