Capstone Project Evaluation & Management System

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Abstract- *Capstone projects are a defining element of higher education, but their success can be hampered by the burden of manual work for both students and faculty. This paper examines the challenges associated with traditional, manual approaches to capstone project management, highlighting issues such as excessive administrative tasks, inefficient communication, and unsustainable faculty workload. Through a review of relevant literature and potential solutions, the paper argues for the integration of technology-driven tools and systems to streamline processes, automate repetitive tasks, and enhance collaboration between students and project related faculties. Examples of promising areas include user-friendly project management platforms, management of the previous year's projects and tools for notifying students about the deadlines of the project related tasks. The paper's conclusion highlights the necessity for further research to evaluate the effectiveness of these solutions and their potential impact on student learning outcomes, faculty satisfaction, and overall project success. By embracing technology and innovation, we can alleviate the burden of manual work and usher in a new era of more efficient and enriching capstone project experiences.*

Keywords- Capstone projects, project management, manual work, automation, technology, student workload, faculty workload, academic innovation.

I. INTRODUCTION

Capstone design projects serve as a cornerstone of higher education, offering students an excellent opportunity to apply their accumulated knowledge and skills to a complex, real-world challenge. However, the path to successful completion can be marred by a significant obstacle: the burden of manual work. Effective project management is hard, especially for undergraduate students who don't have working experience of managing a team-based project. Both students and faculty are often bogged down by tedious administrative tasks, inefficient communication channels, and a reliance on outdated, paper- based processes. This results in wasted time, frustration, and a potential compromise in the quality of the learning experience.

A few courses in our program do call for projects that must be completed by students in groups. However, due to the small scale and short timespan of course projects, students cannot be really exposed to the complexity of project management until they come to the capstone projects Numerous studies in educational technology have highlighted the potential benefits and challenges associated with incorporating digital systems into academic evaluation. Research by Smith et al. (2019) emphasised the efficiency gains achieved through the automation of evaluation criteria, allowing for quicker assessments and more focused feedback.[1] Similarly, the work of Johnson and Brown (2020) underscored the transparency brought about by predefined criteria, contributing to fair and standardised assessments for students.This paper delves into the complexities of manual work within capstone projects, analysing its impact on students, faculty, and evaluation processes. And also discusses the proposed system to overcome these inefficiencies.[2]

II. LITERATURE REVIEW

The capstone course is a project-based learning opportunity that uses open-ended design tasks to simulate a real-world challenge. Thus, students are expected to combine and apply knowledge gained from previous courses and laboratory work. Projects are frequently funded and supported by business, giving students firsthand experience with design issues encountered by business and encouraging them to gain professional and technical skills through working with seasoned engineers. Capstone courses are and should be used to develop students' professional skills, such as project management, communication, and teamwork [3]. Conditions for project management Student teams are required to take charge of managing their projects over the whole term of the project and to create and keep track of fundamental project management documents, such a project schedule and risk register.

Since this is a co-op program, it is assumed that students will have gained some project management skills in prior work experiences.The capstone project is an excellent opportunity to teach project management principles through a bona fide project-based learning experience. Keeping projects on schedule helps student teams, and sponsors and stakeholders witness a rise in projects that are completed successfully. Implementation of project management

techniques also results in more evenly distributed workloads throughout the course, often reducing the student complaint of being overworked[4]. The integration of digital technologies into educational assessment has been the subject of extensive research, exploring its impact on efficiency, fairness, and overall educational outcomes. Noteworthy among these investigations is the study conducted by Wang et al. (2018), which delves into the advantages of automated evaluation systems, particularly focusing on how such systems contribute to streamlined grading processes and provide timely feedback to students.[5]

III. PROBLEM STATEMENT

The current capstone project management system in our institution relies on manual and paper-based processes, leading to inefficiencies. Administrative tasks such as student registration, project approval, and grade submission are time-consuming, error-prone, and particularly cumbersome for larger student cohorts. Communication between stakeholders is fragmented, with students resorting to multiple emails or calls, leading to confusion and delays. Tracking student progress is challenging due to the manual management of various paper documents, hindering insights into performance trends. Resource allocation, including project assignments and budgeting, is inefficient as advisors must manually review applications. The pressing need for a more streamlined and digitally-driven capstone project management system within our institution is evident.

IV. PROPOSED SYSTEM

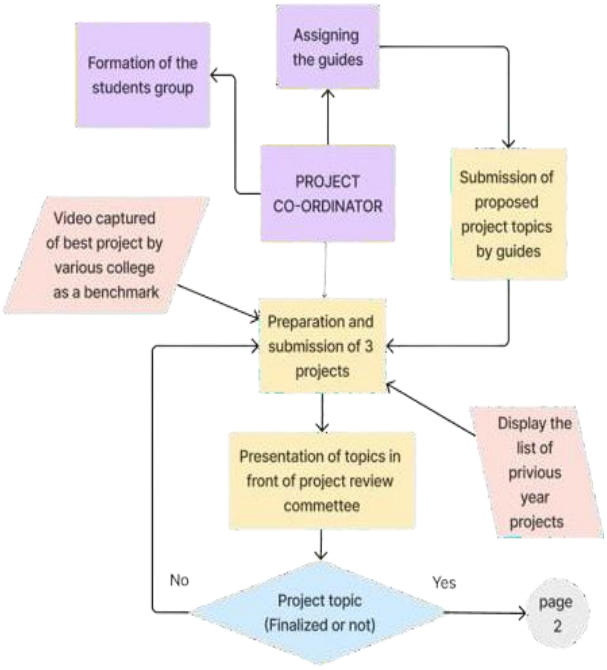
The Capstone Project Evaluation & Management System, centralised web-based system, streamlines the process of project management at institute and student level. CPEMS will provide an interactive platform for both students and the project related faculties. In the faculty's perspective, this system will help in reducing the burden of managing multiple paper files throughout the year, which mainly consists of a list of student's groups, their project topics, associated guides, weekly performance data, and so on..

Another hefty task is to inform each group of students about the important deadlines and review schedules. CPEMS will specially focus on this area so that communication between the project related faculties and students will be more effective and faster. For this, a specially designed notification module will ask faculty to create a format for the notification based on the different related contexts, then the system will be scheduled to send messages, notices. A special API for WhatsApp will be used to send the centralised notifications from the institute to each group and related members.

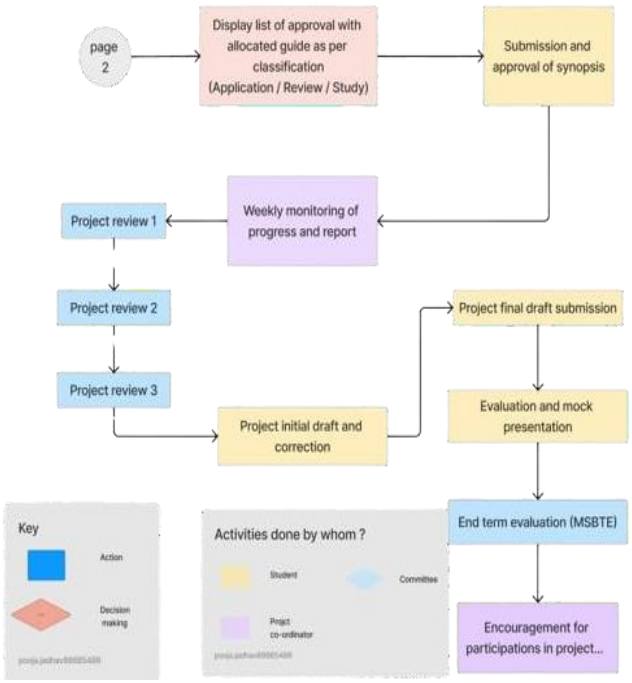
This will significantly reduce the communication gaps.This System will be equivalently useful for the students in their journey of capstone project development. Students will get the idle project topics to choose from, videos of the best projects of different institutes as a benchmark and reference to improve their project quality. On this platform, the students can do their temporary submissions, which will be assessed by project related faculties and suggestions for any improvement. The platform will be the one where students can perform all the submissions of the project related PPTs and the documentations.

V. PROJECT FLOW

a. Phase 1: Project Planning



b. Phase 2: Project Evaluation



VI. BENEFITS AND LIMITATIONS

This paper investigates the implementation of a digitised capstone project evaluation system, assessing its potential benefits and challenges. The primary goals include streamlining the assessment process, increasing transparency, and providing accessibility to all stakeholders. Automation has been shown to significantly improve efficiency by reducing manual efforts and expediting the evaluation process [63]. The advantages of this system are multifaceted. Firstly, it enhances efficiency by automating the evaluation criteria and reducing manual efforts, allowing evaluators to focus on providing valuable feedback. Transparent and predefined evaluation criteria have been found to contribute to fairness and clarity in assessments, positively influencing the quality of project submissions [4]. Additionally, real-time progress tracking ensures timely completion of assessments, benefiting both students and evaluators. The customizable nature of evaluation forms accommodates diverse project requirements and allows for the evolution of criteria over time. Furthermore, data analytics provide valuable insights into project trends and areas for improvement, facilitating data- driven decision-making.

However, the implementation of a digitised evaluation system comes with its set of challenges. There is an initial learning curve for stakeholders, particularly evaluators and instructors, who may require time to adapt to the new digital environment. Technical issues, such as system downtimes or glitches, pose risks to the seamless operation of the evaluation process. Privacy and security concerns have been extensively discussed in literature, emphasising the need for robust measures to protect sensitive evaluation data . The potential resistance to change from stakeholders accustomed to traditional methods and the associated costs of system implementation and maintenance further add complexity to the adoption process. Finding the right balance between automation and human interaction is essential, as an overemphasis on the former may neglect the importance of personalised feedback and nuanced evaluations.

VII. FUTURE SCOPE

The future scope of enhancing the capstone project management system is both vast and promising. The transition towards a fully digital and automated system holds the potential to address existing inefficiencies comprehensively. Implementing a centralised communication platform can streamline interactions between students, advisors, and stakeholders, fostering seamless collaboration. Future iterations could incorporate advanced analytics tools to extract actionable insights from student data, aiding advisors in identifying trends and providing targeted support. Additionally, exploring cloud- based solutions can enhance data accessibility and security. The incorporation of mobile applications could offer on-the-go access, further facilitating efficient communication and progress tracking. Furthermore, advancements in data visualisation technologies can enable a more intuitive presentation of project-related information. Overall, the future evolution of the capstone project management system presents an opportunity to embrace cutting-edge technologies for a more efficient, transparent, and student-centric approach.

VIII. CONCLUSION

Keeping projects on schedule helps student teams, and sponsors and stakeholders witness a rise in projects that are completed successfully. The study identifies key objectives, including the development of an electronic submission system, automated evaluation criteria, and real-time progress tracking. The system leverages digital rubrics, customizable evaluation forms, and advanced analytics for standardised grading and insightful reporting. The advantages of the proposed system encompass increased efficiency, transparency, and consistency, while also offering improved accessibility and customization. But obstacles including a learning curve for participants, possible technical problems, and worries about data security need to be addressed. The paper underscores the importance of a balanced approach, emphasising human input alongside automation, and advocates for ongoing monitoring, user training, and adaptability to ensure the successful implementation and

sustainability of the digitised capstone project evaluation system.

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