Equitable Assessment in Capstone Projects: Combining Peer Review and AI-Driven Meeting Log Analysis.

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Abstract

The capstone project in Computer Science and Engineering disciplines typically serves as the culminating experience and final integrative component of an academic program. Its primary objective is not only to solidify students' disciplinary expertise but also to provide authentic and hands-on experience in Computer Science and Engineering disciplines. By engaging students in applied, often industry-driven projects, capstone courses cultivate essential professional skills such as communication, teamwork, and project management that significantly enhance graduates' preparedness for the workforce. Despite these benefits, the design, implementation and assessment of meaningful capstone and project-based learning experiences present significant challenges. Faculty must balance multiple learning objectives while ensuring project quality and success, managing large student cohorts, facilitating open-ended projects, and assessing individual contributions equitably. Effective capstone design must ensure that students not only apply technical skills but also develop key professional competencies in project planning, communication, collaboration, and teamwork. Teamwork remains a cornerstone for capstone and project-based learning models, valued for its ability to replicate professional environments where collaboration is essential. Group projects enhance academic learning by fostering problem-solving, cooperation, and collective decision-making. However, teamwork in group projects also introduces challenges that may lead to student dissatisfaction. Common issues include logistical coordination, interpersonal conflicts, and uneven participation, with some students contributing disproportionately less while relying on peers to complete the work. Such inequities undermine both fairness and the quality of student learning.

To address challenges in teamwork, peer evaluation has been widely adopted as a mechanism to promote student accountability and ensure a fair distribution of effort among team members. Yet, peer evaluations alone may not fully capture the complexities of team dynamics or accurately reflect individual contributions. To strengthen both accountability and transparency, this paper explores the use of meeting logs as an additional data source for assessing participation. Specifically, we examine the integration of ChatGPT to analyze weekly team meeting logs and generate reports and contribution scores for individual team members based on predefined criteria. A range of predefined criteria is tested to evaluate how different inputs affect the accuracy, consistency, and perceived fairness of AI-generated assessments. The findings indicate that integrating peer evaluation with AI-assisted analysis of team meeting logs can enhance transparency, provide a verifiable record of participation, and support more equitable assessment practices. Ultimately, this hybrid approach has the potential to strengthen accountability, improve team dynamics, encourage individual contribution while fostering collaboration, and enrich the overall capstone learning experience in higher education.

Keywords: *Capstone Project, Teamwork, Peer Evaluation, Group Project Assessment, AI-Generated Assessment*

1. Introduction

Capstone experiences may take many forms, including design projects, research studies, portfolios, case analyses, and industry-sponsored initiatives. Regardless of format, an effective capstone enables students to demonstrate mastery of disciplinary knowledge through an authentic learning experience that engages them in solving real-world problems situated within their field of practice. These experiences emphasize applied learning, critical thinking, collaboration, and professional communication, thereby reinforcing the practical relevance of the academic program.

Distinct from traditional lecture-based courses, the capstone project course emphasizes integration and application rather than content acquisition. Students synthesize knowledge and skills developed across the curriculum within a realistic, practice-oriented setting, strengthening both technical competence and professional readiness. Through sustained engagement in a capstone project, students enhance their professional portfolios and position themselves as competitive candidates in the job market. Moreover, capstone courses provide hands-on experiences that are often limited or absent in conventional coursework, supporting the development of discipline-specific and transferable skills such as teamwork, communication, adaptability, and problem-solving that are highly valued by employers [1, 2, 3].

Capstone experiences are widely implemented across undergraduate and graduate programs, with broad consistent learning objectives and pedagogical foundations. However, their structure and execution vary based on institutional context, program goals, and disciplinary expectations. These differences give rise to diverse capstone models, which can be categorized according to their rationale, organization, and intended outcomes [4]. Team-based capstone projects, in particular, closely resemble professional and industry environments where collaboration across roles and areas of expertise is essential. At the same time, learning outcomes in team settings may vary depending on individual responsibilities, levels of engagement, and the effectiveness of team coordination [5].

As a culminating academic experience, the capstone requires students to move beyond producing a technical solution by engaging in the full project lifecycle, including planning, analysis, documentation, and professional communication of results [6]. The central purpose of capstone and project-based courses is to provide a structured opportunity for students to integrate, synthesize, and apply their accumulated knowledge to authentic, discipline-relevant problems [7]. In doing so, the capstone occupies a unique and essential role in higher education by emphasizing practice-oriented or industry-driven problem contexts that differ fundamentally from traditional classroom instruction [8].

The experiential nature of capstone courses also underscores the importance of professional or “soft” skills. Effective planning, communication, teamwork, leadership, and project management frequently distinguish the most successful capstone teams [9]. Accordingly, the primary objective of the capstone course is to enable students to gain practical experience within their discipline while functioning effectively in team environments involving multiple stakeholders [10]. In practice, students collaborate on a single, industry-relevant project over the duration of the course [11], independently acquire new technical skills as needed, design and implement solutions that meet project requirements, and produce high-quality technical documentation and project demonstrations. Assessment strategies, therefore, must evaluate not only technical proficiency, but also critical thinking, collaboration, and communication skills [12]. By integrating professional competencies such as technical writing, presentation, teamwork, and project management alongside discipline-specific skills, the capstone experience fosters abilities best developed through sustained practice in authentic settings rather than lecture-based instruction alone [13, 14].

In this paper, we present lessons learned and insights gained from many years of teaching capstone and other project-based courses at XXX University. Drawing on sustained instructional practice and iterative course refinement, we identify effective strategies, recurring challenges, and instructional approaches that support student learning and successful project completion. Our goal is to share practical guidance that may inform faculty designing or teaching capstone and project-based courses in similar teaching-focused institutional contexts. The remainder of the paper is organized as follows. Section 2 describes our current approach to managing capstone projects. Section 3 examines key challenges associated with group-based capstone work. Section 4 details the implementation of our proposed approach. Section 5 explores the use of large language models (LLMs) to assess individual contributions to teamwork. Section 6 presents results and analysis, and Section 7 concludes the paper with directions for future work.

2. Our Current Approach

One persistent challenge in teaching capstone and project-based courses is the limited time available to complete meaningful projects within a single academic term. The extensive preparation, supervision, and individualized feedback required in these courses often generate workload demands comparable to those of developing and teaching a new course. The impact on faculty time and well-being is significant: recent studies report increased teaching demands for at least 60% of faculty [15], with 64% experiencing symptoms of burnout [16]. These pressures are frequently amplified at teaching-focused institutions, where limited access to graduate assistants, substantial advising and service responsibilities, and fewer institutional supports further constrain faculty capacity. Consequently, instructors may modify capstone course structures to manage workload, sometimes by compressing or omitting essential components such as project design, iterative revision, assessment, or dissemination of results [17].

In this paper, we address these challenges by presenting practical strategies and shared resources that support more sustainable approaches to teaching capstone and project-based courses. Our approach emphasizes managing time constraints, reducing instructional workload, and preserving a strong focus on student learning outcomes and individual accountability. In addition, we introduce an AI-based evaluation approach designed to assess individual team member contributions within group projects.

Across disciplines, academic programs commonly include a culminating, or "capstone," experience that serves as the final integrative component of the curriculum. Successful completion of the capstone demonstrates students' ability to synthesize the knowledge, skills, and experiences acquired throughout their program, functioning both as a summative assessment of learning and as a bridge between academic preparation and professional practice [18]. Despite its importance, capstone implementation presents substantial challenges for both students and instructors. Project outcomes are shaped by a complex interaction of factors, and without careful design and oversight, capstone projects may fail to achieve their intended technical, educational, or professional objectives [1].

Effective time management is critical to capstone success. Although a semester may appear sufficient, students with limited experience managing long-term projects often underestimate task complexity or postpone key milestones. Faculty therefore play a crucial role in promoting realistic planning, setting intermediate deadlines, and monitoring progress throughout the project lifecycle. Clear and thoughtful task distribution further enhances efficiency by enabling parallel work, aligning responsibilities with individual strengths, and reducing ambiguity. Such structure not only improves productivity but also supports healthier team dynamics by minimizing workload imbalances and conflict.

Beyond considerations of process and product, student engagement and commitment remain central determinants of capstone success. Teams that demonstrate initiative, motivation, and self-direction are more likely to achieve high-quality outcomes; however, creating learning environments that consistently foster these attributes across diverse student populations remains a complex and nontrivial instructional challenge [8].

3. Issues in Group Projects

All degree programs at National University, California, USA require students to complete a three-course sequence of three-credit-hour capstone courses taught by full-time or part-time faculty. Instructional experience with these courses has revealed two persistent challenges: the constraints of a single-semester timeline and the substantial faculty workload associated with supervising multiple teams and providing timely, high-quality feedback. To address these issues, the capstone course design clearly defined milestones with flexibility in content coverage, enabling faculty to adapt instruction to student needs while keeping projects on track for successful completion within the term. A particularly challenging aspect of capstone instruction is assessing individual student contributions within team-based projects. Because capstone work spans multiple deliverables and relies heavily on collaboration, accurately distinguishing individual effort and assigning fair grades can be difficult for instructors.

To address this issue, peer-to-peer evaluation was previously implemented in the graduate program capstone courses. At each major deliverable, students evaluated their teammates using a five-point scale and provided brief written justifications addressing factors such as task ownership, meeting participation, quality of contributions, and responsiveness to team communication. Initially, this approach showed promise, as some students offered detailed feedback highlighting leadership roles, technical contributions, or coordination efforts. However, after several evaluation cycles, the effectiveness of this approach declined. Peer ratings quickly became inflated, with most students assigning uniform scores of 5/5 to all teammates regardless of actual contribution. This trend stood in stark contrast to informal feedback received by instructors through emails, office-hour discussions, and private messages, which often reported uneven participation, missed deadlines, and minimal engagement by some team members. In several cases, a small subset of students carried most of the technical workload, yet peer evaluations failed to reflect these imbalances. These outcomes suggest that students may be reluctant to provide candid evaluations due to social pressure, fear of conflict, or concern about harming team relationships, ultimately rendering peer evaluation largely symbolic rather than diagnostic.

A similar pattern has emerged in undergraduate capstone courses, where peer evaluations are used to assess individual contributions across dimensions such as preparation, attendance, communication, contribution to the project, and teamwork. Although these criteria align well with professional expectations, peer ratings again tend to cluster at the high end of the scale, offering little differentiation among team members. As a result, the evaluations provide limited actionable insight for instructors and do not reflect variations in effort or engagement. To enhance the effectiveness of peer evaluation, several refinements warrant consideration. Replacing purely numeric ratings with behavior- or evidence-based prompts may encourage more substantive responses by requiring students to describe specific contributions, leadership behaviors, or unmet responsibilities. Incorporating forced-choice mechanisms such as distributing a fixed number of points across team members may further reduce score inflation and prompt clearer distinctions among contributions. Additionally, implementing formative peer evaluations at multiple points during the semester could help surface issues earlier and normalize constructive feedback. Finally, triangulating peer evaluations with instructor observations, individual milestone deliverables, and reflective assignments may provide a more balanced and reliable framework for assessing teamwork and individual accountability in capstone courses.

4. Use of LLM in Assessing Teamwork Contribution.

Evaluating individual contributions in online capstone courses remains challenging because much of the collaborative work occurs outside the instructor's direct view. As discussed earlier, existing approaches such as peer evaluation, instructor judgment, and presentation-based scoring tend to focus on outcomes rather than the collaborative process itself. To address this gap, we propose a process-oriented approach that leverages structured online meetings and large language models (LLMs) to provide more consistent and evidence-based evaluation of teamwork.

In the proposed approach, each project team is required to meet weekly using a Zoom meeting link created by the course instructor and maintained throughout the duration of the course. Teams schedule meetings of at least 45 minutes, during which they actively work on core project activities, including requirements definition, design decisions, technology selection, task distribution, coding progress, debugging, and project coordination. Students are expected to use Zoom's screen-sharing features to demonstrate completed work, such as implemented features, diagrams, test results, or repository updates, and to clearly discuss their individual contributions during the meeting. This requirement encourages transparency and ensures that each student's work is visible and discussed within the team context.

At the conclusion of each meeting, Zoom automatically generates a meeting summary. These summaries are made available to the course instructor and serve as a structured record of team interactions, decisions, and progress. The instructor then submits the meeting summary to an LLM, such as ChatGPT, along with a predefined rubric that specifies the criteria for evaluating teamwork and individual contribution. The role of the LLM is to analyze the meeting summary strictly based on documented evidence, without making assumptions beyond what is recorded, and to produce a structured assessment of each student's participation, collaboration, and task ownership.

Prompt design plays a critical role in ensuring that the analysis is fair and meaningful. The LLM is explicitly instructed to distinguish between completed work and planned tasks, to identify concrete evidence of individual contributions, and to note when evidence is missing or insufficient. Evaluation criteria typically include task ownership and follow-through, evidence of completed work, collaboration and support of teammates, communication clarity, and initiative or leadership. Based on these criteria, the LLM generates preliminary individual scores, along with brief justifications and suggestions for improvement. Importantly, these scores are intended to support, not replace, instructor judgment, providing instructors with a consistent and scalable way to review teamwork across multiple teams.

This approach offers several advantages over traditional methods. By analyzing meeting summaries, the LLM captures aspects of teamwork that are often invisible in final deliverables or version-control logs, such as problem-solving discussions, mentoring, decision-making, and peer support. It also reduces reliance on potentially biased peer evaluations and alleviates the burden on instructors to manually track weekly reports. From a student perspective, the approach promotes accountability and encourages more active participation, as contributions must be articulated and demonstrated during meetings to be reflected in the evaluation.

Overall, requiring regular online meetings and using LLMs to analyze meeting summaries represents a practical and scalable strategy for improving the evaluation of individual contributions in online capstone and project-based courses. By shifting the focus from outcomes alone to the collaborative process, this approach provides richer evidence of teamwork and supports fairer, more transparent assessment in distributed learning environments.

5. IMPLEMENTATION

We propose the use of structured team meeting logs as a supplemental and objective data source for assessing individual student participation in capstone projects. Specifically, this approach explores the integration of ChatGPT to analyze weekly team meeting logs and generate individualized contribution reports and quantitative scores based on predefined assessment criteria. Multiple sets of evaluation criteria are tested to examine their effects on the accuracy, consistency, and perceived fairness of AI-generated assessments.

To support the consistent collection of meeting data, we evaluated various Zoom configuration settings to ensure that students could independently start and stop meetings throughout the semester and share their screens as needed during discussions and demonstrations. After several rounds of testing and refinement, we identified a set of Zoom settings that reliably support these requirements while minimizing instructor intervention. The recommended configuration is shown in Figure 1 and should be applied prior to creating Zoom meetings for the course to ensure uniform data capture and a smooth workflow across teams.

ZOOM →Settings (Left most Column) → Meetings (Top of the screen)

Then make selections as shown in the figure below.

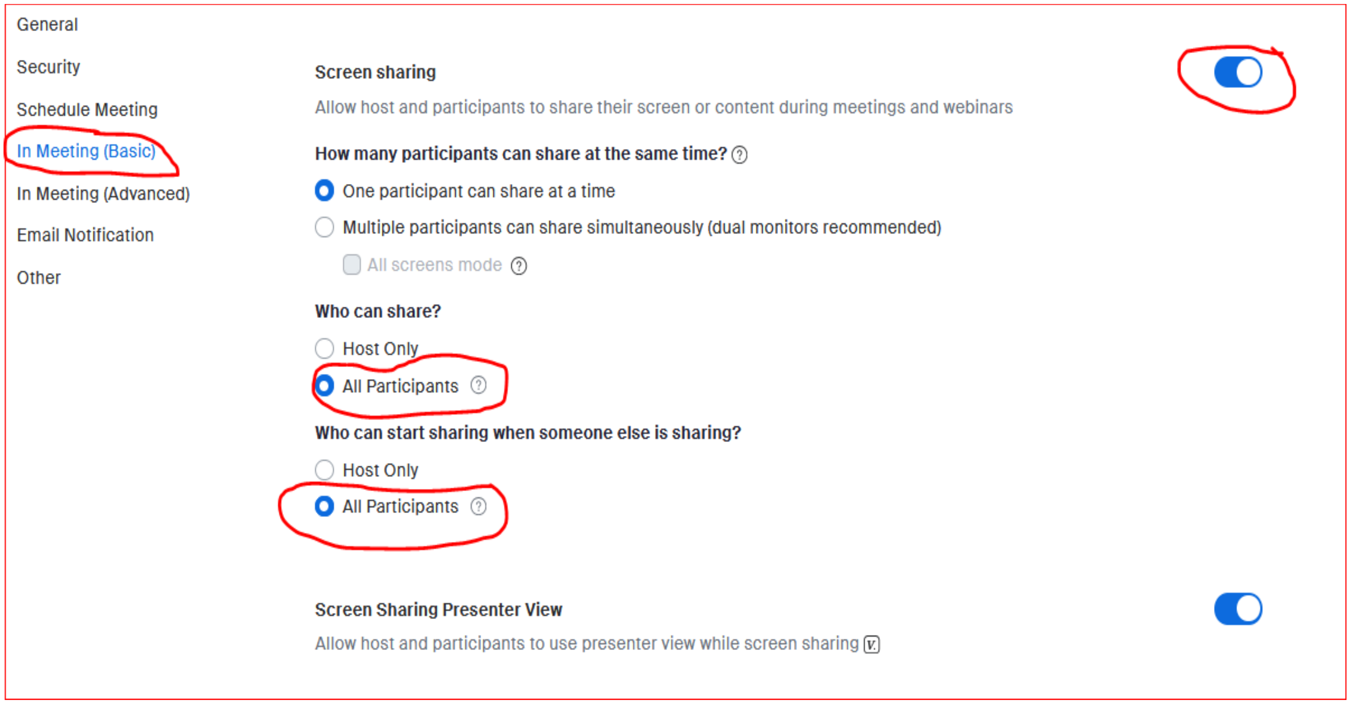

Figure 1: ZOOM setting

Students were informed in advance that a summary of the Zoom meeting would be generated once the meeting was concluded and that the summary may be analyzed for research purposes. The following were the instructions given to the students:

1. Start and manage your meeting independently.
2. Share your screens and relevant documents as needed.
3. Discuss the following points during the meeting:
   a) An overview of the project and its objectives.
   b) Progress made to date and completed tasks.
   c) The plan and next steps moving forward.
   d) The individual contributions of each group member.
4. Each meeting must be at least 45 minutes in duration. One hour has been scheduled to allow sufficient time, if needed.

After collecting the meeting summaries, referred to as 'Meeting Assets,' these assets were then analyzed using ChatGPT to assess individual participation based on predefined criteria.

6. Results and Analysis

We tested our concept for two undergraduate and one graduate level courses. Please note the criteria for grading (task distribution, individual contributions, collaboration, and support of teammates) for the ChatGPT. Below is an evidence-based grading assessment aligned with the stated criteria. The scores reflect only what is documented in the meeting summary, without assumptions beyond the record. We confirmed with the faculty teaching these courses that they agree with the grading awarded by ChatGPT.

Students were instructed to engage in an open and structured discussion of task distribution and individual contributions related to the completion of the project. During this discussion, each team member was required to clearly articulate their specific responsibilities and contributions, describe any challenges or obstacles encountered, and indicate whether they received assistance from or provided support to other members of the team. Emphasis was placed on transparency, accountability, and collaborative problem-solving. The discussion was expected to focus on both individual effort and overall team collaboration, highlighting how responsibilities were coordinated and how team members supported one another throughout the project. Based on the resulting meeting summary, students who participated in the meeting should be evaluated using a reasonable, evidence-based grading approach aligned with the stated assessment criteria: task distribution, individual contributions, collaboration, and support of teammates. Scores should be assigned on a scale from 0 to 10, where 0 represents minimal or undocumented contribution and 10 represents exemplary and well-documented contribution. Importantly, scores must be grounded solely in the evidence provided in the meeting summary and should not rely on assumptions or inferences beyond what is explicitly recorded. Tables 1-5 summarize the assessment reports generated by ChatGPT based on the assessment criteria given.

Student	**Primary Contributions**	**Collaboration & Support**	**Score (0–10)**
A	• Responsible for TX and RX Algorithms and data extrapolation/analysis. • Led RX/TX hardware–software integration and reliable electrical testing. • Developed an 8×8 matrix table for Bluetooth communication. • Contributed to LCD development, touchscreen programming, and applications. • Assisted with schematics and administrative tasks, indicating support beyond core duties.	High	**9**
B	• Assigned and actively working on Bluetooth (BLE) implementation across all modules. • Modified and integrated open-source GitHub code. • Contributed to overall system integration and debugging efforts.	High	**8**
C	• Served as lead for LCD module development. • Completed LCD hardware testing. • Assisted with administrative tasks and documentation. • Assigned responsibility for LCD integration with TX/RX modules.	Moderate–High	**7**

Table 1: Capstone Course for Electrical and Computer Engineering

Student	Primary Contributions	Collaboration & Support	Score (0–10)
A	• Demonstrated primary technical leadership in the project. • Clearly articulated design decisions and algorithms during the meeting. • Integrated multiple code components and implemented key features. • Actively collaborated with Band supported overall project integration.	High	**9**
B	• Actively collaborated with Jesse on core code integration. • Participated in discussions on project implementation details and next steps. • Committed to additional work (linear search and recursive helper functions). • Demonstrated consistent engagement and follow-through. • Slightly lower score reflects fewer individually highlighted technical deliverables compared to A.	High	**8**
C	• Contributed through coordination and planning. • Actively engaged in discussion and asked relevant questions. • Committed to collaborating with D to finalize and deliver code. • Some technical contribution is implied but not strongly detailed in the summary, resulting in a moderate score.	Moderate–High	**7**
D	• Responsible for a key remaining code component needed for full integration. • Participation was acknowledged, but contribution was largely pending at the time of the meeting. • Engagement appears collaborative, though limited evidence of completed deliverables was discussed. • Score reflects partial contribution with expectations for follow-through.	Moderate	**6**

Table 2: Programming Course for Computer Science

Student	Evidence-Based Rationale	Collaboration & Support	Score (0–10)
A	• Demonstrated the strongest and most clearly documented contribution. • Served as project manager and lead architect.	High	**9**
B	• QA Manager and Cloud Security Engineer. • Clearly articulated project vision and innovation, emphasized use-case scoping, contributed to research discussions, and took responsibility for presentation coordination. • I actively collaborated with teammates and supported project organization and communication.	High	**8**
C	• Contributed meaningfully as Systems Integration Engineer and client advocate. • Documented contributions include research on decentralized identity, creation of architectural diagrams, discussion of system requirements, participation in project planning, and responsibility for presentation sections on concepts and requirements. • Demonstrated collaboration and engagement in technical discussions and planning activities.	Moderate–High	**7**

Table 3: Capstone Course for Graduate Computer Science Group-1

Student	Evidence-Based Rationale	Collaboration & Support	Score (0–10)
A	• Took a lead role in structuring the presentation narrative and ensuring alignment with the rubric. • Developed and refined speaker notes across slides. • Emphasized cohesive storytelling, clarity, and preparedness for questions. • Proposed standards compliance (e.g., APA style) and visual coherence. • Actively coordinated next steps, mock runs, timing, and follow-up meetings	High	8

B	• Collaborated closely on presentation content and structure. • Proposed adding research-oriented slides to strengthen educational value. • Contributed ideas to align the project with Agile terminology and concepts. • Added content to slides and participated actively in formatting and organization decisions. • Engaged in collaborative planning, mock presentations, and checklist creation.	High	**8**

Table 4: Capstone Course for Graduate Computer Science Group-2

Student	**Evidence-Based Rationale**	**Collaboration & Support**	**Score (0–10)**
A	• Clearly identified as lead developer for the project. • Produced and presented the UI/UX design using Figma and Android Studio. • Demonstrated a working demo, including AI-based photo analysis features. • Took responsibility for starting application coding and publishing updated design artifacts. • Led discussion on scope prioritization and development feasibility. • Actively collaborated with Eddie and responded to feedback	High	**9**
B	• Served as project manager, defining scope, timeline, and priorities. • Led discussions on system functionality, requirements, and trade-offs. • Contributed to documentation, system diagrams, and workload estimation. • Reviewed demos, provided feedback, and guided scope decisions (e.g., deferring APIs and purchases). • Supported multiple team members as backup across tasks.	High	**8**
C	• Led user research, acceptance criteria, and UI/UX review. • Contributed feedback during demo reviews and discussions.	Moderate–High	**7**

	• Supported documentation, learning new technologies, and code/design reviews. • Assigned responsibilities in QA/testing support and client interaction preparation.		
D	• Responsible for database design and SQL implementation. • Assigned to quality assurance and testing, with backup arrangements in place. • Participated in workload estimation and planning discussions. • Engaged collaboratively with Eddie and Jennifer on overlapping tasks.	Moderate–High	**7**

Table 5: Capstone Course for Graduate Computer Science Group-3

The report demonstrated clear planning, role definition, and identification of next steps; however, it lacked sufficient evidence of completed technical work. Most discussion focused on design and future tasks rather than implemented, integrated, or tested functionality. Individual contributions were described at a high level, with limited reference to concrete deliverables such as code modules, commits, test results, or deployed components. In several cases, participation was inferred from assigned roles rather than supported by documented outcomes. Collaboration was discussed conceptually, but the report provided little evidence of how team members supported one another through activities such as code reviews, joint debugging, or collaborative decision-making. In addition, there was minimal documentation of testing, validation, or performance evaluation, and project progress was not consistently tied to measurable milestones. To improve their grades, students should clearly document completed technical contributions rather than planned work, reference artifacts such as Git commits, database schemas, UI screens, or tested features, and provide explicit evidence of collaboration and peer support. Students should also highlight challenges encountered, explain how issues were resolved through team interaction.

7. CONCLUSION

Drawing on many years of experience teaching capstone courses, we observe that successful capstone completion is inherently complex and demands sustained effort from all stakeholders, particularly faculty. Effective capstone outcomes rely on careful coordination, continuous guidance, and timely intervention throughout the project lifecycle. Within this context, the use of AI to analyze Zoom meeting summaries and assess individual student contributions proved both effective and informative for evaluating teamwork in online, project-based courses. This AI-supported approach provided meaningful insight into team dynamics, participation patterns, task ownership, and peer collaboration—elements that are often difficult for instructors to observe directly in virtual learning environments. At the same time, the analysis revealed several recurring shortcomings, including limited documentation of completed work, insufficient evidence of collaboration, and a lack of clearly articulated or measurable milestones. These gaps highlight challenges in how students report, reflect on, and demonstrate their individual contributions within team-based projects. Addressing these issues requires more refined and structured AI prompts that explicitly restrict evaluation to documented evidence, clearly distinguish completed work from planned activities, apply well-defined rubric criteria, and identify missing or insufficient information. When combined with such structured prompts, AI-driven analysis can enhance transparency, fairness, and consistency in grading while significantly reducing instructor workload. This integration offers a scalable and practical framework for assessing individual accountability and collaborative processes in online capstone and team-based computing courses.

We hope that the recommendations presented in this paper contribute to more positive and effective capstone experiences by mitigating common stressors and workload pressures associated with these courses. Ultimately, our goal is to preserve a strong focus on student learning, engagement, and project success while freeing faculty to devote more time to mentoring and high-impact instructional activities.

REFERENCE:

1. K. Sha, "*Lessons and Experiences from Teaching Computing Science Capstone Project Courses,*" 2021 International Conference on Computational Science and Computational Intelligence (CSCI), pp. 990-995, Las Vegas, NV, 2021.
2. A. J. Dutson, R. H. Todd, S. P. Magleby, and C. D. Sorensen, "*A review of literature on teaching engineering design through project-oriented capstone courses,*" Journal of Engineering Education, vol. 86, no. 1, pp. 17–28, 1997.
3. M. A. Halim, N. Buniyamin, A. Imazawa, N. Naoe, and M. Ito, "*The role of final year project and capstone project in undergraduate engineering education in Malaysia and Japan,*" in 2014 IEEE 6th Conference on Engineering Education (ICEED), pp. 1–6, 2014.
4. J.E. Burge and G.C. Gannod, "*Dimensions for categorizing capstone projects,*" 22nd IEEE Conf. Soft. Eng. Edu. Train., pp. 166–173, 2009.
5. J. Vanhanen, T.O.A. Lehtinen, and C. Lassenius, "*Software engineering problems and their relationship to perceived learning and customer satisfaction on a software capstone project,*" J. Sys. and Soft., vol. 137, pp. 50-66, 2018.
6. M. M. Sahl and M. Samarah, "*Building MVPs: An Experience Report of a Software Engineering Capstone Course,*" in 2025 IEEE/ACM International Workshop on Designing Software (Designing), Ottawa, ON, Canada, 2025, pp. 17-24, 2025.
7. Laye, M. J., Boswell, C., Gresham, M., Smith-Sherwood, D., & Anderson, O. S., "*Multi-Institutional Survey of Faculty Experiences Teaching Capstones*", Journal of College Teaching, Vol.*68*(4), pp. 201–213, 2020.
8. Schmidt, D., "*A Method to Provide Student Peer Mentorship within the Capstone Experience*", 2019 IEEE Frontiers in Education Conference (FIE), pp. 1-7, October 16-19, Covington, KY, 2019.
9. S. Howe, R. Lasser, K. Su and S. Pedicini, "*Content in Capstone Design Courses: Pilot Survey Results from Falcuty, Students & Industry,*" Proceedings of the 2009 ASEE Conference, 2009.
10. R. H. Todd and S. P. Magleby, "*Elements of a successful capstone course considering the needs of stakeholders*," European Journal of Engineering Education, vol. 30 (2), pp. 203–214, 2005.

11. S. Gorka, J. R. Miller, and B. J. Howe, "*Developing realistic capstone projects in conjunction with industry*," in Proceedings of the 8th ACM SIGITE conference on Information technology education, pp. 27–32, 2007.
12. C. Rober, Hauhart, and Jon E. Grahe, "*Designing and Teaching Undergraduate Capstone Courses*", San Francisco, CA: John Wiley & Sons, 2015.
13. S. Tenhunen, T. Männistö, M. Luukkainen, P. Ihantola, "*A systematic literature review of capstone courses in software engineering,*" Info. Soft. Tech., vol. 159, 2023.
14. B. Cimatti, "*Definition, development, assessment of soft skills and their role for the quality of organizations and enterprises*," Int. J. Qual. Res., vol. 10(1), pp. 97-130, 2016.
15. Taylor, D. G., & Frechette, M., "*The impact of workload, productivity, and social support on burnout among marketing faculty during the COVID-19 pandemic*", Journal of Marketing Education, 44(2), 134–148, 2022.
16. Vyletel, B., Voichoski, E., Lipson, S., & Heinze, J., "Exploring faculty burnout through the 2022-23 HMS faculty/staff survey", APA., 2023.
17. Perlman, B., & McCann, L. I., "*Undergraduate research experiences in psychology: A national study of courses and curricula*", Teaching of Psychology, Vol. 32(1), 5–14, 2005.
18. Devine, J.L., Bourgault, K.S. & Schwartz, R.N. "*Using the Online Capstone Experience to Support Authentic Learning*" The Journal of TechTrends, 64, pp. 606–615, 2020.