The Bigger the Team, the Bigger the Dream: Navigating the Madness of Leading Large-Scale Interdisciplinary Projects

Fiona Truscott
Centre for Engineering Education, University College London, UK, *f.truscott@ucl.ac.uk*

Lelanie Smith
Faculty of Engineering, Built Environment and IT, University of Pretoria, South Africa, *lelanie.smith@up.ac.za*

Abstract

As engineering education responds to increasingly complex global challenges, the demand for interdisciplinary competencies continues to grow. Interdisciplinary team projects have become a key pedagogical strategy for developing these skills, but scaling such projects to accommodate cohorts of 900+ students presents significant challenges. This paper investigates the practical realities of running extremely large-scale interdisciplinary modules through a comparative narrative inquiry. Building on earlier studies that examined theoretical and pedagogical dimensions of large-scale teaching, this third paper in the series shifts focus to the day-to-day implementation strategies that make such teaching possible. Drawing on the experiences of two practitioners working in research-intensive institutions in the global north and south, the study explores how intentional activity design and assessment practices are adapted at scale. The findings highlight the importance of calculated decision-making, inventive resource use, and structured communication in managing complexity. Rather than offering a definitive model, the paper surfaces practical strategies and tensions that others may encounter when scaling interdisciplinary education. In doing so, it contributes to a growing body of work aimed at supporting educators and institutions navigating the realities of mega-class interdisciplinary project delivery.

Keywords: Keyword 1, Keyword 2, keyword 3, keyword 4, keyword 5

1 Introduction

As global challenges become increasingly complex, engineering graduates must develop interdisciplinary competencies that enable them to navigate diverse perspectives and integrate knowledge across fields. In 2017, UNESCO published eight sustainability competencies as part of a skill set for sustainable development, complementing the content outlined in the Sustainable Development Goals (UNESCO, 2017). These competencies align with broader efforts to transform engineering education, aiming to prepare students for the complex, socially embedded challenges they will face in their careers (Graham, 2018;

Gómez Puente et al., 2013). Engineers today must address open-ended and ill-defined problems spanning technical, social, environmental, and economic domains, which requires integrating knowledge from multiple disciplines (Barut et al., 2006; Lattuca et al., 2013). As such, interdisciplinary engineering education (IEE) is increasingly implemented in curricula to prepare students for this reality (Lattuca et al., 2004).

To foster interdisciplinary competencies, many institutions have adopted interdisciplinary team projects as a pedagogical tool. These projects engage students in experiential learning (Kolb, 2014), encouraging collaboration, communication, and ethical decision-making across disciplinary lines (Kolmos et al., 2024). While such team projects are well-suited to developing critical 21st-century skills, their implementation is far from straightforward. De Ruiter et al. (2024) point out the lack of clear rules and guidelines for interdisciplinary collaboration, noting that aligning norms, concepts, and practices across disciplines involves significant conceptual labour. These challenges are magnified in extremely large-scale teaching contexts.

Engineering education is also under pressure from government and industry to deliver more graduates without compromising quality. This tension is particularly acute in interdisciplinary and general engineering project modules, which are often taken by students across multiple programmes and can easily exceed several hundred students in a single offering. Although team projects are commonly studied in cohorts of 80–100 students, modules with 500 to 900+ students present significantly different challenges (Hernández-de-Menéndez et al., 2019). Van den Beemt et al. (2020) stress the value of authentic interdisciplinary experiences but highlight the limited understanding of how to scale these effectively. As the size of cohorts increases, educators must shift from traditional teaching approaches to become facilitators, curators, and project managers. This transformation introduces new pedagogical, logistical, and structural complexities.

This paper is the third in a series on large-scale interdisciplinary teaching (Smith & Truscott, 2025; Truscott & Smith, 2024). It builds on earlier work that applied Kimpton and Maynard's (2023) framework for successful team projects to the realities of teaching cohorts of 900+ students. Drawing on the experiences of two internationally recognized practitioners from the global north and south, this study focuses on the practicalities of assessment and activity design in mega-class environments.

2 Literature

Interdisciplinary Team Projects and Their Role in Engineering Education
Interdisciplinary collaboration has become essential in addressing complex, real-world engineering challenges (Kamp, 2016). Research highlights that interdisciplinary teamwork fosters improved communication, problem-solving, and adaptability, equipping students with essential professional competencies (Sahin, 2019). The shift toward interdisciplinary education aligns with the broader trend of authentic, project-based learning environments that prepare students for multi-stakeholder engineering challenges (Graham, 2018). However, existing research primarily focuses on small-scale implementations, where coordination, assessment, and disciplinary depth are more manageable. Scaling Project-Based Learning (PjBL) in Large Cohorts

Scaling project-based learning (PjBL) introduces complex pedagogical and logistical challenges, particularly in interdisciplinary modules. Once class sizes exceed 300 students, direct student-teacher engagement becomes difficult, requiring intentional design and structural adaptations to maintain quality. The definition of "large-scale" varies across institutions, depending on available staff, room capacity, and administrative infrastructure. At UCL, a standard module involves 50–100 students managed by one or two academics with full pedagogical control (Truscott et al., 2023). Beyond this, instructional complexity and resource needs increase substantially.

Interdisciplinary PjBL adds further complexity, requiring scaffolded activities, clear role definitions, and structured milestones to ensure productive teamwork. Joyner et al. (2023) emphasize that intentional course design helps mitigate confusion and disorganization, while Pauli et al. (2008) identify poor task structuring as a major contributor to negative group experiences. Multi-channel communication and flipped or asynchronous formats can support scale, but automation must be balanced with meaningful engagement through mentorship and guided peer interaction.

We define four categories of large-scale teaching:

- Large Classes (100–300): Can still be split for interactive group activities.
- Massive Classes (300–500): Less flexible, but manageable with TAs and structure.
- Mega Classes (500–1,000+): Require multiple lecturers and coordinated planning.
- MOOCs (10,000+): Depend on automation and asynchronous tools.

These categories reflect the practical constraints and pedagogical adaptations needed at each level. While research often explores the shift from small to large teaching, the realities of mega-class education remain under examined. This paper builds on our prior work (Truscott & Smith, 2024; Smith & Truscott, 2025) by exploring the structural, instructional, and design choices that support effective interdisciplinary teaching at this scale.

The Changing Role of the Educator in Large-Scale Interdisciplinary Teaching

Large-scale interdisciplinary teaching shifts educators from content delivery to facilitation, coordination, and project management. This transition demands adaptability, mentorship skills, and comfort with uncertainty—often without formal training (Truscott & Smith, 2024). Educators must balance structured guidance with student autonomy while managing institutional pressures and logistical complexity. Diverse backgrounds can enrich facilitation, but sustained support is essential to prevent burnout. Faculty development, peer mentorship, and recognition of these evolving roles are critical. Technology can streamline logistics and feedback (Joyner et al., 2023), but ongoing course maintenance and alignment with learning goals remain significant challenges.

Project-Based Learning (PBL) and Vertically Integrated Projects (VIP) as Pedagogical Frameworks

Problem-Based Learning (PBL) is widely recognized for its real-world application, self-directed learning, and interdisciplinary integration (Kolmos, 1996; Mills & Treagust, 2003; Perrenet, Bouhuijs, & Smits, 2000). Savage, Chen, and Vanasup (2007) highlight how self-directed PBL enhances adaptability and fosters an appreciation for complex, interconnected problems. Research indicates that PBL improves conceptual understanding, problem-solving skills, and self-efficacy, making it an effective model for interdisciplinary learning (Dunlap, 2005; Mills, 2009; Prince, 2004; Gavin, 2011). However, Heitmann (1996) notes a persistent tension between product-oriented and process-oriented learning, as institutions often prioritize measurable outcomes over deeper competency development.

To address this and support scaling, many institutions have adopted Vertically Integrated Projects (VIP), which integrate students at different levels, enabling peer mentoring, research alignment, and multi-semester continuity (Pai et al., 1998). This shifts students from passive learners to active participants, aligning with interdisciplinary PjBL (Fung, 2017). VIP models enhance social support, conceptual understanding, and professional development beyond traditional PBL (Feldman, 2006; Strachan et al., 2019)

Another essential dimension for supporting Project-Based Learning (PBL) and Vertically Integrated Projects (VIP) at scale is team teaching. As Van Hattum-Janssen et al., (2022) argue, successful team teaching is not only crucial to the success of PBL in engineering education but also serves as a live model of collaboration for students themselves. In large interdisciplinary modules, teacher collaboration is essential for planning project themes, defining learning outcomes, and providing consistent support across disciplinary lines

(Powell, 2007; Guerra et al., 2017). Team teaching challenges traditional notions of teacher autonomy and disciplinary silos, requiring co-planning, shared responsibility, and active reflection grounded in constructivist learning theory (Vesikivi et al., 2019; Hannafin et al., 1997).

3 Context and Purpose

The scale and complexity of interdisciplinary education in engineering programs present unique organizational challenges that remain underexplored in the literature—particularly for in-person cohorts exceeding 900 students. While project-based learning (PjBL) is well-documented in small to moderately large settings, limited research exists on how to structure and sustain interdisciplinary teamwork at extreme scale.

This paper draws on two case studies from research-intensive institutions in the global north and south, each implementing interdisciplinary, team-based modules at a scale rarely documented. At UCL, the Engineering Challenges module involves 900–1,000 first-year engineering students across seven departments, integrating discipline-specific problem-solving within a structured, faculty-wide framework. At the University of Pretoria, the Joint Community Project (JCP) requires 1,650 second-year students across 18 programs to collaborate on community-based engineering projects in interdisciplinary teams. Despite contextual differences, both modules rely on extensive coordination, logistical planning, and intentional learning design to support student engagement and pedagogical integrity (Truscott & Smith, 2024; Smith & Truscott, 2025).

Rather than proposing a finalized model, this study continues our investigation into the evolving dynamics of facilitating interdisciplinarity at scale. We examine practical aspects of resource allocation, intentional activity design, and assessment strategies in Mega classes. As these modules grow, educators must shift from traditional lecturers to facilitators and project managers, constantly adjusting to balance oversight with student autonomy. Emerging challenges in assessment, particularly around feedback mechanisms, and the emotional demands on educators further complicate implementation. Within this paper, we discuss the overall picture of Mega class delivery however, we did not have enough space to fully unpack all aspects and so we link to two other papers (Smith et al., 2025; Truscott & Smith, 2025) where we have gone into more detail about certain aspects of delivery. By articulating these aspects through practical examples, this paper shares emerging strategies for sustaining depth, engagement, and educator well-being in large in-person interdisciplinary modules. While we do not yet offer a definitive framework, our aim is to contribute meaningfully to ongoing discussions on what it takes to teach interdisciplinary teamwork at scale.

4 Method

This study builds on prior research examining the facilitation of large-scale interdisciplinary teamwork modules in engineering education at research-intensive institutions in the global north and global south. While previous work explored teamwork development and interdisciplinary collaboration using autoethnographic writing (Ellis & Bochner, 1999; Choi, 2012) and shared narrative inquiry (Chase, 2005), it did not explicitly address the intentional design of learning activities and assessment strategies. This study extends that work by focusing on the assessment frameworks and activity design choices that underpin teamwork development in these courses. To reflect the pedagogical and logistical complexities of courses with 900+ students, we introduce the term Mega Classes, moving beyond a description of scale alone to explore the intentional structuring of student learning, assessment, and teamwork in these environments.

The facilitators engaged in structured shared narrative inquiry, continuing their collaborative discussions while incorporating first-hand observations from institutional visits. These visits provided direct exposure to each other’s teaching practices, assessment structures, and student interactions, enriching their reflections with new contextual insights. Each facilitator documented and exchanged reflections, revising their narratives through an iterative feedback process. This was complemented by a comparative instructional analysis, in which the facilitators systematically reviewed study manuals, assessment rubrics, and instructional materials to examine the alignment between assessment strategies and learning outcomes. Key themes emerging from this analysis were synthesized into practical recommendations for structuring teamwork assessment and activity design in Mega classes.

5 Findings

Teaching teamwork in a Mega class environment (900+ students) requires a structured approach that minimizes direct lecturer-student interaction while sustaining clarity, engagement, and pedagogical quality. The focus shifts to clear communication, automated guidance, and structured peer engagement. Without these systems, misunderstandings, disengagement, and administrative overload quickly escalate. The challenge lies in helping students understand what to do, how to do it, and why it matters—without constant oversight.

5.1 Observations from JCP

Success in the Joint Community Project (JCP) module hinges on automated support systems, structured peer interaction, and a layered mentorship model. A vertically integrated mentorship system mirrors professional hierarchies: students manage their projects as "junior staff," mentors offer strategic guidance, and faculty provide high-level oversight. This structure reduces dependency on faculty, promotes student independence, and models workplace dynamics. The JCP Online Platform supports this system with automated FAQs and logistical information, minimizing unnecessary communication and freeing faculty for critical learning interactions.

5.1.1 Structuring Teamwork Development: Processes and Tools

Effective teamwork at Mega scale requires more than simply grouping students—it demands structured scaffolding to build essential collaboration skills. JCP Week serves as a critical onboarding phase, introducing foundational concepts of teamwork, leadership, and professional engagement. Before the week begins, students are placed into diverse teams of four to five using an automated system, simulating real-world project conditions where teams are rarely self-selected. They then participate in mentor-led introductions, exploring backgrounds, motivations, and expectations to establish early cohesion and identify potential conflict areas.

To formalize collaboration, each team creates a group contract that outlines shared values, meeting routines, and conflict resolution strategies. This proactive step fosters accountability and helps address challenges—like uneven participation—before they escalate. Simultaneously, students develop their project proposals, considering feasibility, resource needs, and ethical dimensions. These are structured through prompts that guide students in applying systems thinking from the outset, nudging them from passive learners toward independent problem-solvers.

Students also receive targeted professional development. Enneagram-based exercises help them understand their communication styles, while scenario-driven leadership and conflict management training prepares them for real-time interpersonal challenges. These preparatory activities offer not only a framework for collaboration, but also mirror the skills expected in professional environments.

This structured setup—explored further in (Truscott and Smith, 2025)—allows students to begin their interdisciplinary projects with confidence and clarity, building autonomy while reducing the demand on teaching staff at scale.

5.1.2. Assessment at Scale: Managing Feedback and Engagement

Assessment in a Mega class must be both meaningful and scalable. With such a large number of students, traditional feedback models become unsustainable, requiring an approach that is structured, automated where possible, and designed to guide learning rather than merely evaluate performance. The assessment process in JCP is built around layered evaluation methods that integrate self-assessment, peer feedback, mentor input, and community partner evaluations.

One of the most crucial assessments occurs early in the course, with the submission of the project proposal. This one-page document forces students to think critically about their project's objectives, feasibility, and anticipated challenges. The structured nature of the proposal ensures that students engage in focused, strategic planning without being overwhelmed by unnecessary complexity. Faculty review is streamlined using a highly standardized rubric, allowing for fast, consistent feedback that enables students to refine their approach before moving forward.

Throughout the semester, students complete bi-monthly reflective check-ins, connecting their experiences to concepts introduced during JCP Week. These short reflections prioritize the process of thinking rather than content depth. Faculty and mentors scan them for relevance and completion, offering marks for engagement rather than detailed critique. At this scale, the act of structured reflection is more valuable than the individual insights themselves. The final assessment consists of a dual-component video submission, requiring students to showcase both the outcome of their project and their personal growth throughout the process. The first component, a project execution video, provides a professional-style summary of the team's work, while the second, a structured team reflection video, captures individual insights and learning experiences. This format not only makes assessment more engaging but also ensures that students develop essential communication and storytelling skills.

5.1.3. Communication, Logistics, and Automation (see Smith *et al.*, 2025)

Managing a course of this size effectively requires a meticulously structured communication system. Without clear guidelines, administrative burden can spiral out of control. To prevent this, a strict hierarchy of information access has been put in place. Students are first directed to the JCP Online Platform, where they can find detailed explanations of assignments, structured FAQs, and automated responses to common queries. If their concerns are not addressed there, they are expected to consult their team members or their assigned mentor before escalating their query.

The vertically integrated mentorship model plays a crucial role in ensuring that students receive the support they need without overwhelming faculty resources. Within this system, mentors are trained extensively in facilitation techniques, allowing them to guide students rather than simply provide answers. This approach not only fosters student independence but also strengthens the mentorship experience itself, as mentors gain valuable leadership and coaching skills.

By structuring communication through multiple layers of support, JCP has managed to maintain high student engagement while keeping the administrative workload under control. The use of automated query responses, structured announcements, and clear escalation protocols has been essential in making this model work effectively at scale.

5.2. Observations from Engineering Challenges

Engineering Challenges spans seven departments at UCL, requiring careful coordination of a large, distributed teaching team. Each department contributes 1–3 academic staff (departmental leads) who tailor aspects of the module to align with their curricula. While this ensures disciplinary relevance, it limits oversight of the module as a whole. The module lead—uniquely focused on the full cohort—must maintain coherence across departmental adaptations. Around 45 postgraduate teaching assistants (PGTAs) support delivery, though their work is often siloed, adding complexity to communication and consistency across the module.

5.2.1 Structure (see Truscott & Smith, 2025)
The structure of Engineering Challenges is central to managing both student learning and teaching team coordination across seven departments. It functions as a roadmap, aligning with communication strategies to signal each stage of the project and reduce the need for continual reminders. While the structure is simplified to support clarity, the module’s complexity and distributed teaching team limit how much streamlining is possible. Departmental leads focus on their own segments of the course and may not always see or understand the broader rationale behind specific constraints. The module lead must maintain coherence by balancing local flexibility with module-wide consistency.

Importantly, the structure is not only logistical but pedagogical. It models real-world project workflows, helping students understand how to plan, communicate, and collaborate effectively. Project milestones are intentionally aligned with common professional decision points—for example, students must present their experimental plans before accessing lab time, mimicking client or manager approvals. This intentional structure reduces reliance on staff for routine clarifications, allowing them to concentrate on higher-level interventions like team mediation or supporting students with additional needs. By encouraging students to manage tasks independently, the structure fosters resilience and problem-solving—skills critical for engineering practice.

5.2.2 Communication (see Smith *et al*., 2025)
Effective communication is crucial, as no message will reach 100% of your cohort (or staff!). On Engineering Challenges, we use multiple channels such as workshops, Moodle, and forums to increase coverage as much as possible. This is particularly clear when you need to communicate a change in what's happening. Some students will miss any update and work with old information. Thus it’s essential to get communications as clear and accurate as possible the first time. This avoids the need to issue constant clarifications, which may cause more confusion, and avoid receiving a lot of emails asking further questions or if something is true. Regular reminders are also essential—frequent updates for students during term and annual reminders for staff help reinforce key information.

Avoid overwhelming students with too much information at once, especially at the start of a project. This is a particular challenge in Engineering Challenges because of the timing of the module - first year, first term. During this period, they are navigating the shift from school to university —managing their own schedules, living independently, and, in UCL Engineering’s case, adapting to active learning environments. With so much to take in, students often disengage quickly and may be reluctant to revisit information later due to feeling overwhelmed.

5.2.3 Assessment (see Truscott & Smith, 2025)
Providing timely, consistent feedback at scale is a persistent challenge. In Mega classes, instructors must choose between fast or thorough feedback—rarely both. Mid-module assessments amplify this tension, especially when juggling hundreds of submissions alongside teaching and communication duties.

Using multiple markers can help distribute the workload, but it introduces variation in marking interpretations, particularly in open-ended assessments such as ethics or sustainability reports. Extensive moderation is often required, but can delay feedback and feel disconnected from original comments. Without it, inconsistencies raise fairness concerns. In a 1,000-student class, even a 10% error rate could generate 100 student queries—creating a heavy communication burden. To mitigate this, live assessments are used during the project to provide timely, formative feedback when students can still act on it. Written submissions are scheduled for the end of the module, when feedback urgency is lower and harmonisation time is available. Live assessments bring their own logistical challenges—scheduling in a packed timetable and ensuring fairness across presentation slots. Engineering Challenges addresses this by running parallel assessment panels in a single workshop, drawing on faculty, departmental leads, and PGTAs. These sessions also build shared understanding of the module among staff.

Complex assessments enhance authenticity but require meticulous communication. Students must know what is expected and when. Multi-step assessments demand consistent messaging and robust follow-up mechanisms. In large cohorts, even small miscommunications scale quickly, so clarity and consistency across all teaching staff are essential to manage expectations and maintain engagement.

5.2.4 Logistics
As mentioned earlier, logistics becomes a major concern when working at this scale. Booking classroom space, for example, requires detailed strategies and contingency plans rather than a simple request through the timetabling system. When your cohort can't fit into a single room, you quickly become familiar with all the university's large spaces, who else might need them, and how to secure those slots. Managing this requires plans for splitting the cohort across multiple rooms and ensuring clear communication with staff and students.

Key considerations include:

- How close can you get to room capacity—can you risk being slightly over the limit, knowing not all students may attend every class?
- Do you have enough staff to split a class if needed?
- Can the session be moved, or must it happen at a specific time?
- Which activities require flat space, and which can work in a lecture theatre?
- How far apart are available rooms, and can staff move quickly enough between them to manage back-to-back sessions or swap mid-class?
- Will departmental leads be open to these adjustments, and what teaching adaptations are required as a result?

These just aren't issues when you have 30 students on your module. The module lead must balance the demands of central timetabling services, the module's requirements, and the preferences of departmental leads—who may not always understand the broader university constraints. Ultimately, managing these logistics becomes a form of large-scale project management, with contingency planning built into every decision.

6 Discussion and Implications (see Smith *et al.*, 2025; Truscott & Smith, 2025)

The findings from this study highlight the complexities of facilitating interdisciplinary teamwork at Mega scale and the evolving strategies needed to maintain engagement, structure, and assessment integrity. While multiple factors contribute to successful large-scale implementation, this discussion focuses on two key themes: Intentional Activity Design and Assessment at Scale. These elements are fundamental to sustaining meaningful student experiences in large cohorts while ensuring the feasibility of instruction at this scale.

6.1 Intentional Activity Design: Structuring Teamwork for Scale
Interdisciplinary teamwork requires carefully designed scaffolding to ensure students can collaborate effectively without direct faculty intervention. Both case studies—JCP at UP and Engineering Challenges at UCL—demonstrate how structured mentorship, strategic communication, and phased onboarding support large-scale teamwork.

At UP, the vertically integrated mentorship model reduces the burden on faculty by establishing clear communication hierarchies. Students first consult teammates, then escalate issues to their assigned mentor, ensuring faculty time is reserved for higher-level interventions rather than routine clarifications. This mirrors a professional organizational model, reinforcing autonomy while providing structured support. Importantly, the mentorship structure serves multiple purposes—it not only provides social connections for students within the class but also allows senior students to develop leadership, management, and mentorship skills. At the same time, it alleviates some of the workload pressures on faculty by distributing support more equitably across different layers of mentorship. At UCL, teamwork structures focus on aligning departmental autonomy with a shared module framework and framing for teaching teamwork. While departmental leads adapt content for their specific disciplines, the overarching module design ensures consistency, preventing fragmentation. Structured milestones, such as team-based presentations and progress check-ins, mimic real-world project workflows, guiding students through key decision points.

A shared challenge in both models is ensuring that students are equipped with the skills needed to navigate interdisciplinary work before they begin project tasks. UP addresses this through JCP Week, an intensive onboarding program covering teamwork dynamics, conflict resolution, and leadership. Another critical consideration in structuring large-scale teamwork is the role of in-person engagement in building relationships and enhancing collaboration. Both case studies emphasize that while online platforms and automation are essential for managing scale, there is no substitute for in-person interactions, particularly at the start of a project. At UP, JCP Week was introduced as a dedicated period where students engage with their teams, mentors, and faculty in structured, intensive sessions. Given the logistical challenge of scheduling across 18 programs, this required rethinking the traditional academic timetable—exploring whether activities could take place outside standard term time, weighing the trade-offs, and implementing contingency plans for students unable to attend. While such structural changes introduce complexity, they are crucial for establishing early team cohesion and ensuring smoother collaboration throughout the module. UCL integrates early-stage structured teamwork assessments, ensuring students engage meaningfully from the outset. A skills module runs alongside Engineering Challenges providing just-in-time teaching for skills as they are used by students within the project, allowing for a highly practical approach to teaching and giving students space to put their learning into practice straight away. These structured interventions build a foundation for independent problem-solving, an essential skill at this scale.

Effective resource use is another fundamental aspect of successful large-scale teaching. Given the constraints of faculty time, physical space, and administrative resources, both modules rely on innovative decision-making to optimize their teaching approaches. The ability to make calculated, strategic decisions ensures that resource allocation is not only efficient but also serves multiple functions simultaneously. For example, structured peer mentorship in JCP simultaneously builds student leadership skills, reduces faculty workload, and fosters a sense of community—demonstrating how decisions at scale must be multi-purposeful rather than merely reactive. In UCL the use of live assessments reduces staff load and makes the module more authentic.

6.2 Assessment at Scale: Balancing Structure and Flexibility

Scaling assessment presents unique logistical challenges, requiring efficient evaluation processes that provide meaningful feedback without overwhelming faculty resources.

At UP, the JCP module prioritizes process-oriented assessment, emphasizing the act of reflection over detailed faculty review. Given the impossibility of reviewing 1,600 individual reflections every two weeks over a 6 month period, the focus shifts to ensuring that students complete reflections meaningfully rather than scrutinizing content at a granular level. Short response prompts guide student thinking, and assessments are graded for completion rather than depth. This approach reinforces learning without creating unsustainable faculty workloads. At UCL, balancing timeliness and depth in feedback is a critical concern. Live assessments are used strategically, offering immediate formative feedback during project milestones, while written assessments are reserved for the end of the project. A carefully structured moderation process ensures consistency across multiple assessors, reducing discrepancies in grading and preventing excessive student queries.

One of the greatest challenges in Mega scale assessments is maintaining transparency and fairness while managing high student expectations. Both institutions emphasize clear, structured communication around assessment criteria and expectations. By using multiple communication platforms, structured feedback loops, and transparent assessment frameworks, students are better able to navigate assessment requirements independently, reducing unnecessary escalations.

6.3 Emerging Insights and Future Considerations

This study offers a framework for scaling interdisciplinary team projects by integrating:

- Teaching methodologies that support large cohorts without sacrificing depth.
- Assessment strategies that ensure equitable and constructive evaluation.
- Coordination approaches that account for institutional and cultural differences.

While no single model applies to all contexts, these findings provide a roadmap for institutions looking to implement large-scale interdisciplinary projects while maintaining quality and engagement. Additionally, this study identifies commonalities and variances in integration approaches, examining context-specific adaptations required for implementation in South Africa and the factors influencing successful scaling in different institutional settings.

While this study highlights promising practices in teamwork structuring and scalable assessment, key challenges remain. The need for adaptive mentorship models, sustainable feedback mechanisms, and institutional support is evident. Moving forward, further research should explore how technology can enhance real-time student support, how interdisciplinary coordination can be further streamlined, and how faculty can be better prepared for the evolving role of large-scale facilitation. By sharing these insights, this study contributes to the broader conversation on scaling interdisciplinary education while maintaining depth, engagement, and sustainability. While we continue to refine best practices, these findings provide practical considerations for institutions seeking to implement large-scale interdisciplinary team projects effectively.

7 Conclusion

Successfully scaling interdisciplinary teamwork in Mega classes requires a structured yet flexible approach. A key lesson from both JCP and Engineering Challenges is that students thrive when given a clear framework combined with the autonomy to navigate their learning journey. Moving from faculty-driven instruction to peer-led facilitation has proven essential in fostering student ownership, reducing faculty workload, and enhancing teamwork dynamics.

As these modules continue to evolve, innovative solutions such as AI-supported assessment, structured peer engagement, and automation tools are being explored to enhance learning at scale. Despite these structured approaches, assessment remains a challenge, particularly in providing meaningful individualized feedback. Peer and mentor evaluations help distribute the workload, but efforts are ongoing to integrate AI-driven assessment tools that offer automated yet personalized feedback on student reflections.

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