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Navigating the Terrain:

Emerging Frontiers in Learning Spaces, Pedagogies, and Technologies

Data-Driven Teamwork: Navigating the Barriers to Effective Student Collaborations in Large Cohorts

Helen McGuire, Angela Sun
The University of Sydney

Group assignments are a staple in higher education, providing opportunities to enhance collaboration and communication skills. However, we frequently encounter grievances related to group work as coordinators of large STEM units (800 students). Our student survey identifies work ethic and communication discrepancies between group members as barriers, often leading to uneven workloads, dissatisfaction, and diminished collaborative learning (Bacon et al., 1999). Common mitigation strategies to address work ethic discrepancies, like group charters and peer evaluations, often prove ineffective, since they could be ignored if not properly followed up or enforced (Chang & Brickman, 2018).

Another barrier to group productivity lies in the team formation process itself. Traditional team formation methods – self-selection, random assignment, or instructor-led grouping – each present inherent limitation. Self-selection often results in homogenous groups susceptible to "groupthink" (Janis, 1982), limiting the diversity of thought essential for creative problem-solving. Random assignment, while seemingly impartial, can lead to imbalanced skillsets and an uneven distribution of workload (Bacon et al., 1999). While instructor-led grouping might seem ideal, it is logistically impractical within large cohorts (Decker, 1995).

Computer-aided team selection offers a promising alternative. Its automated process streamlines team formation, generates diverse teams, and allows instructors to focus on teaching, despite concerns about increased workload (Cavanaugh et al., 2004).

To address these group work challenges, we have developed a multi-pronged strategy integrating computer-aided team selection with a comprehensive follow-up and feedback framework. Our goal is to transform group work from a source of anxiety to a rewarding learning experience.

Our approach combines technology with strategic interventions:

1. **Computer-aided Team Formation:** We utilise Gruepr, an open-source team selection software (Hertz, 2021), to generate groups based on student preferences including work styles and meeting preferences (Cavanaugh et al., 2004). Gruepr integrates seamlessly with our learning management system, Canvas.
2. **Structured Communication, Collaboration, and Proactive Monitoring:** Regular temperature-check surveys deployed through Canvas allow students to rate their group's progress and workload distribution. This data enables early identification of potential issues. To encourage group dialogue, the aggregated and anonymised outcome is shared with team members
3. **Facilitating Peer Feedback and Communication through SRES:** The Student Relationship Engagement System (SRES), a learning analytics tool (Liu et al., 2017), was used to communicate aggregated peer feedback to individual group members, encouraging constructive dialogues regarding group progress.

Our evaluation compared student performance, feedback, and complaints from the current year to previous years, alongside an estimation of staff workload. Preliminary findings demonstrate a reduction in staff time spent on group formation using Gruepr's automated grouping, highly contingent upon accurate survey design. Complaints, though still reported, were less severe, suggesting that regular temperature checks promoted proactive communication. Importantly, student feedback provided valuable insight, with many groups identifying the need for increased in-person interaction and

improved scheduling strategies to accommodate diverse commitments. Our poster will elaborate on these results, showcasing both successes and challenges, and propose a refined workflow to further enhance collaborative learning experiences.

Keywords: Teamwork, Learning Analytics, Learning Management System (LMS), Gruepr

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