

IMPROVING STUDENT EXPERIENCE AND ENGAGEMENT IN FIRST-YEAR PHYSICS

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BACKGROUND AND AIMS

Engaging large cohorts of first-year students in STEM presents persistent challenges, especially in fostering a sense of belonging and sustained participation. In 2024, the PHYS1A team at UNSW redesigned its Problem-Solving Workshops (PSWs) in response to student feedback seeking more structure, challenge, and interaction. The redesigned PSWs aim to improve students' academic engagement, foster a greater sense of belonging within the course and university, and better prepare students for assessments. Additionally, we aim to gauge student preferences for collaborative, interactive formats compared to traditional tutorials.

DESCRIPTION OF THE INNOVATION

In the new format, the revised PSWs maintain their collaborative structure and incorporate whiteboard-based tutorials conducted in active learning spaces. While whiteboard tutorials have been adopted in other institutions, the PHYS1A model introduces a structured and carefully integrated approach. Each session begins with a brief recap of key content, followed by scaffolded worksheets that guide students through progressively challenging physics problems. Students work in small groups using large whiteboards to visualize and discuss shared solutions (Wood & Kutcher, 2019; Macrie & Shuck, 2020; PhysPort recommendations). A key innovation is the inclusion of an interactive quiz game, "Space Race", delivered via Socrative. This friendly, competitive group activity reinforces conceptual understanding and brings motivation to the final part of the workshop. Together, these elements support students with varying levels of prior knowledge and keep sessions active and student-centered.

METHODS AND RESULTS

Student perceptions were gathered informally in 2024 via end-of-term surveys and reflection prompts. A formal ethics-approved study (iRECS7939) commenced in 2025, incorporating validated engagement and belonging surveys (Slaten et al., 2017; Maroco et al., 2016) and focus groups. Preliminary responses indicate increased satisfaction with workshop structure, usefulness, and enjoyment. The Space Race was frequently highlighted as a motivating and engaging element. While attendance varied, students who participated reported stronger engagement and connection with peers.

CONCLUSIONS

The whiteboard tutorial format offers a promising, inclusive approach for enhancing student experience in large first-year STEM courses. While formal data collection is ongoing in 2025, the initial results from 2024 suggest this model can improve engagement, belonging, and perceived preparedness, supporting its further development and wider adoption.

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