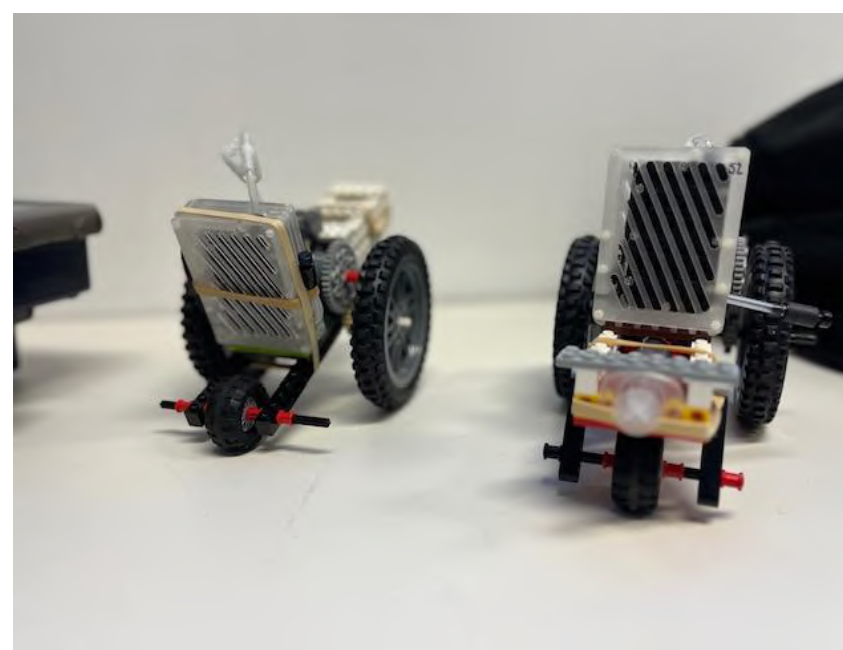


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Using hydrogen powered LEGO vehicles to improve the communication skills of engineering students.



INTRODUCTION & AIMS

Within the **College of Science and Engineering (CoSE)**, concerns had been raised regarding some students' ability to communicate effectively in English with both peers and academic staff, particularly during presentations and team-based projects. In response, we recognised the value of teamwork and problem-solving in a competitive setting as a powerful mechanism for supporting both learning and the wider student experience. The initiative aimed to enhance students' confidence in communication while fostering collaboration, engagement, and academic development.

METHODOLOGY

To address these aims, we adapted the **Hydrogen Challenge Ltd**—originally designed for high school pupils—for a postgraduate cohort. Students worked collaboratively to design and build LEGO vehicles powered by hydrogen fuel cells, competing to travel the greatest distance. This introduced a highly engaging, hands-on dimension to the learning experience, encouraging active communication and collaboration throughout.

In parallel, undergraduate engineering students were trained to deliver the workshops, creating a valuable development opportunity. This enabled them to enhance their presentation skills while gaining experience in effectively engaging with international students. Overall, the approach created a dynamic and collaborative learning environment that supported both academic development and improved confidence in communication across multiple levels.

IMPACT

1. Improved Communication Skills.

Students should demonstrate better clarity, coherence, and confidence in speaking. Improved ability to listen actively and respond appropriately in conversations with peers and staff.

2. Increased Self-Confidence.

Increased confidence in speaking in front of groups. More active participation in team discussions and activities.

3. Enhanced English Skills.

Broader vocabulary and better usage of English words and phrases. With a particular focus on STEM/Eng terminology.

4. Improved Team Dynamics and Collaboration.

Stronger sense of unity and collaboration within teams and the class. Improved ability to handle and resolve conflicts and challenges constructively. Agreeing on common goals and strategy.

5. Practical Application.

Working as a team to complete the task. Taking onboard constructive feedback and implementing suggested changes

6. Quantitative outcomes.

Improvement in scores from pre- and post-project assessments on communication, answering project centred questions. But with only one data point we will need to repeat the activity.

STUDENT FEEDBACK

I think this event was very interesting because using hydrogen as a power source was something new for us. The atmosphere at the venue was great, filled with the tension of competition, and everyone was fully engaged when we calculated the distance our car travelled together. In the end, it was really unexpected and made us very happy—and proud—that our team's car achieved such a good result. 62meters the furthest in the UK ! - Xin Zhao

References

Ferreira, C., Robertson, J., Pitt, L., & Lord Ferguson, S. (2024). Unlocking Student Creativity with LEGO® Serious Play (LSP): A Case Study from the Graduate Marketing Classroom. *Marketing Education Review*, 34(2), 153–163. <https://doi.org/10.1080/10528008.2024.2337926>

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