

Introduction

Our objective was to modify an existing 1st-year student design project into an entrepreneurial project, based on a sustainability-driven business opportunity, culminating in participation in a KEEN Innovation Challenge. Judges ranked team presentations based on the three Cs of an entrepreneurial mindset, illustrated in Figure 1.

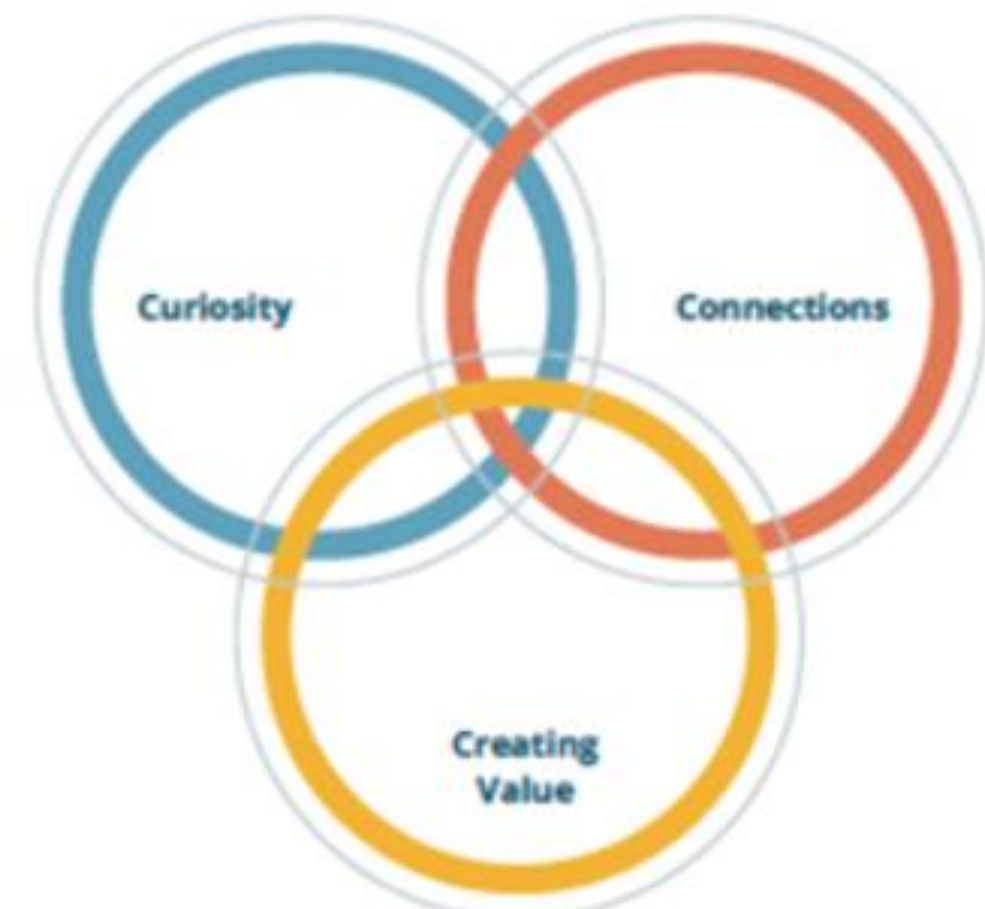


Figure 1. The three Cs of the KEEN Entrepreneurial Mindset¹

The project integrated concepts from the EOP framework to enhance student awareness of the sustainability challenges that society faces and prepare them to develop viable solutions. This project supports College of Engineering efforts to promote entrepreneurship and address UN Sustainable Development Goals.

Methods

Instructional materials were developed to address key skills required for working as effective entrepreneurs, as shown in Figure 2, and the project was developed by integrating the EOP framework with the KEEN 3Cs.

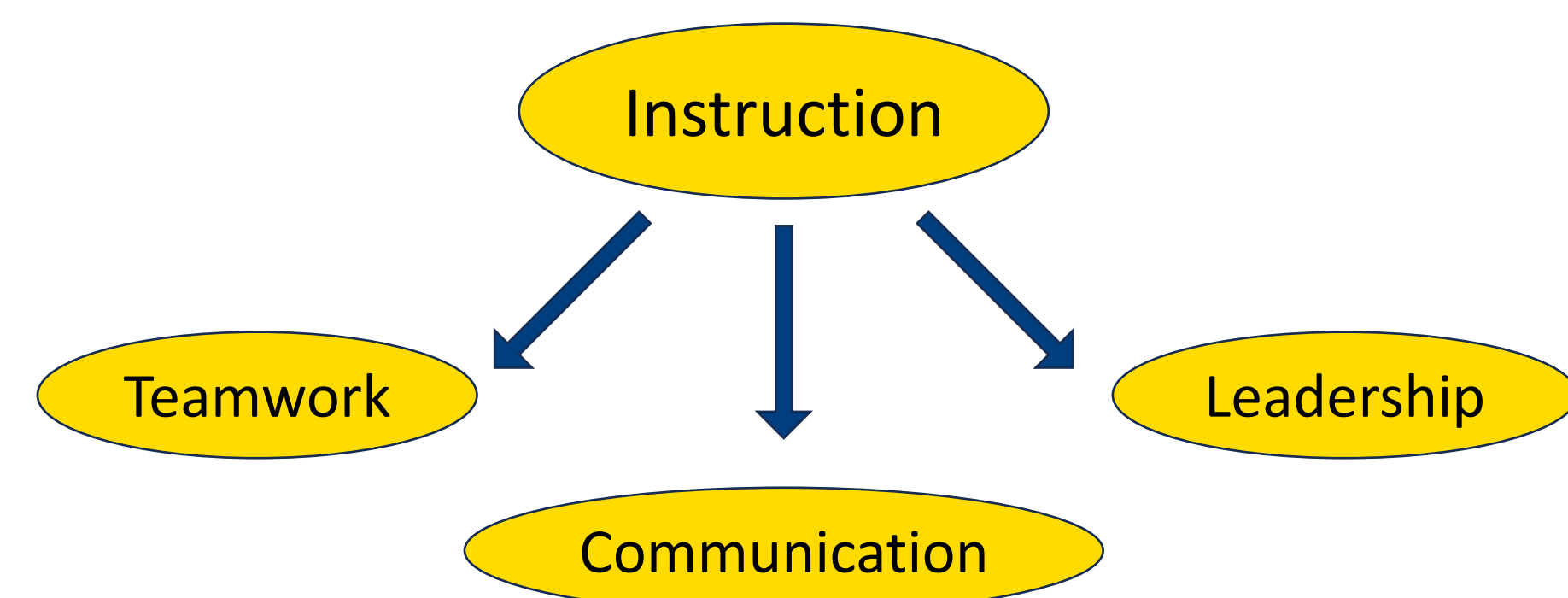


Figure 2. Instructional modules developed to support the entrepreneurial project.

Project teams were required to explore the elements of sustainability, develop an engineering design or solution that addresses one or more aspects of sustainability, and develop an investment pitch to implement their ideas.

Teams created an initial list of three or more ideas and ranked them according to sustainability criteria, including energy, water, and material consumption; impact on people and the environment; social acceptance and ethical concerns; and implementation costs. This analysis was used to select their project.

Teams reported their work in a written report and a seven-minute narrated or filmed presentation. The presentations were provided to a panel of four judges for evaluation.

Progress

The project's impact is illustrated in Figure 3.

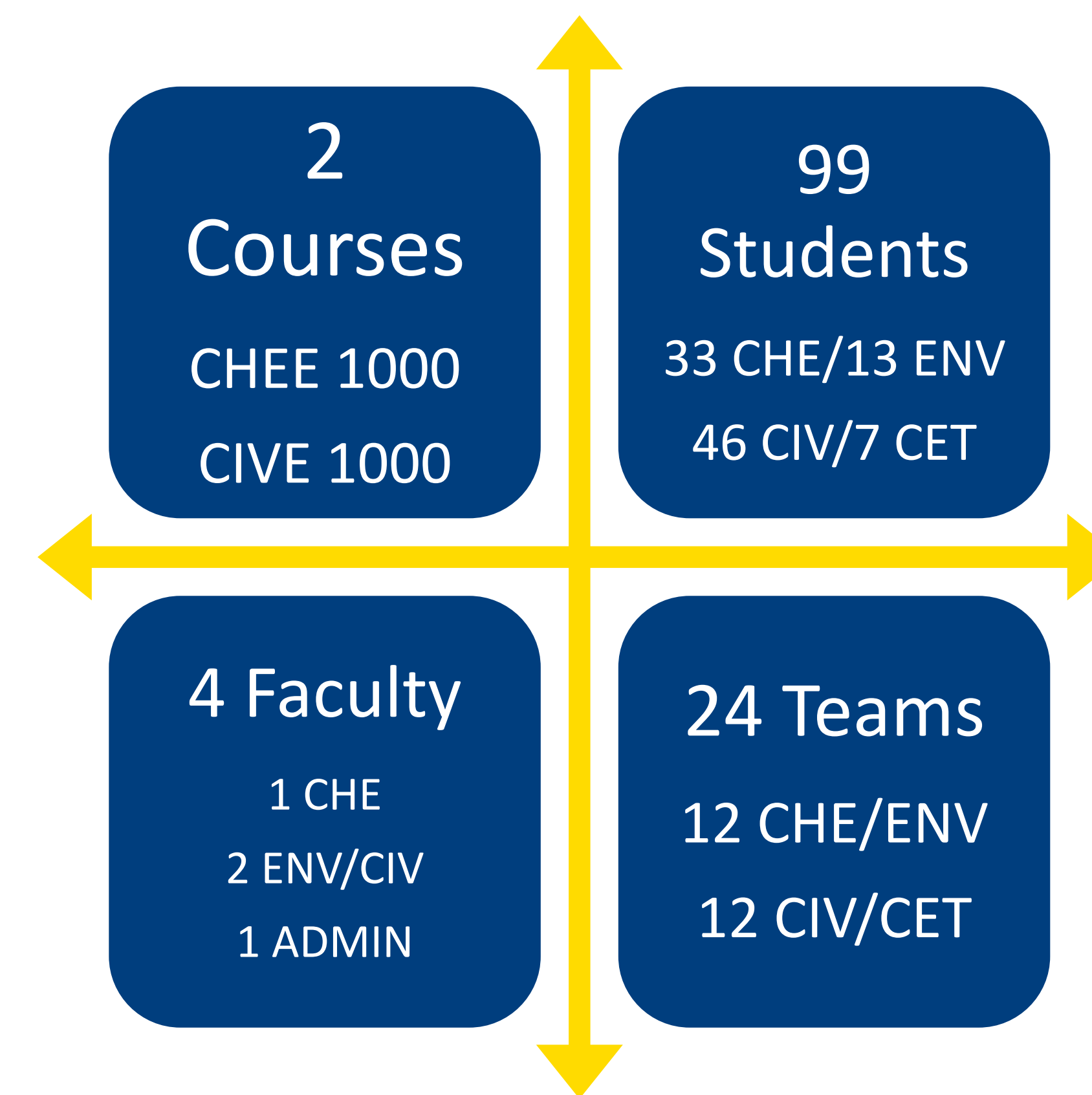


Figure 3. Project impact in terms of the number of students, faculty, courses, and teams involved.

The entrepreneurial project was implemented in the Fall 2025 orientation classes for students in the Chemical (CHE) and Environmental Engineering (ENV) programs (CHEE 1000), and for the Civil (CIV) and Civil Engineering Technology (CET) programs (CIVE 1000).

EOP Connections

The overlap between specific learning outcomes of the EOP framework and the entrepreneurial project is illustrated in Figure 4.

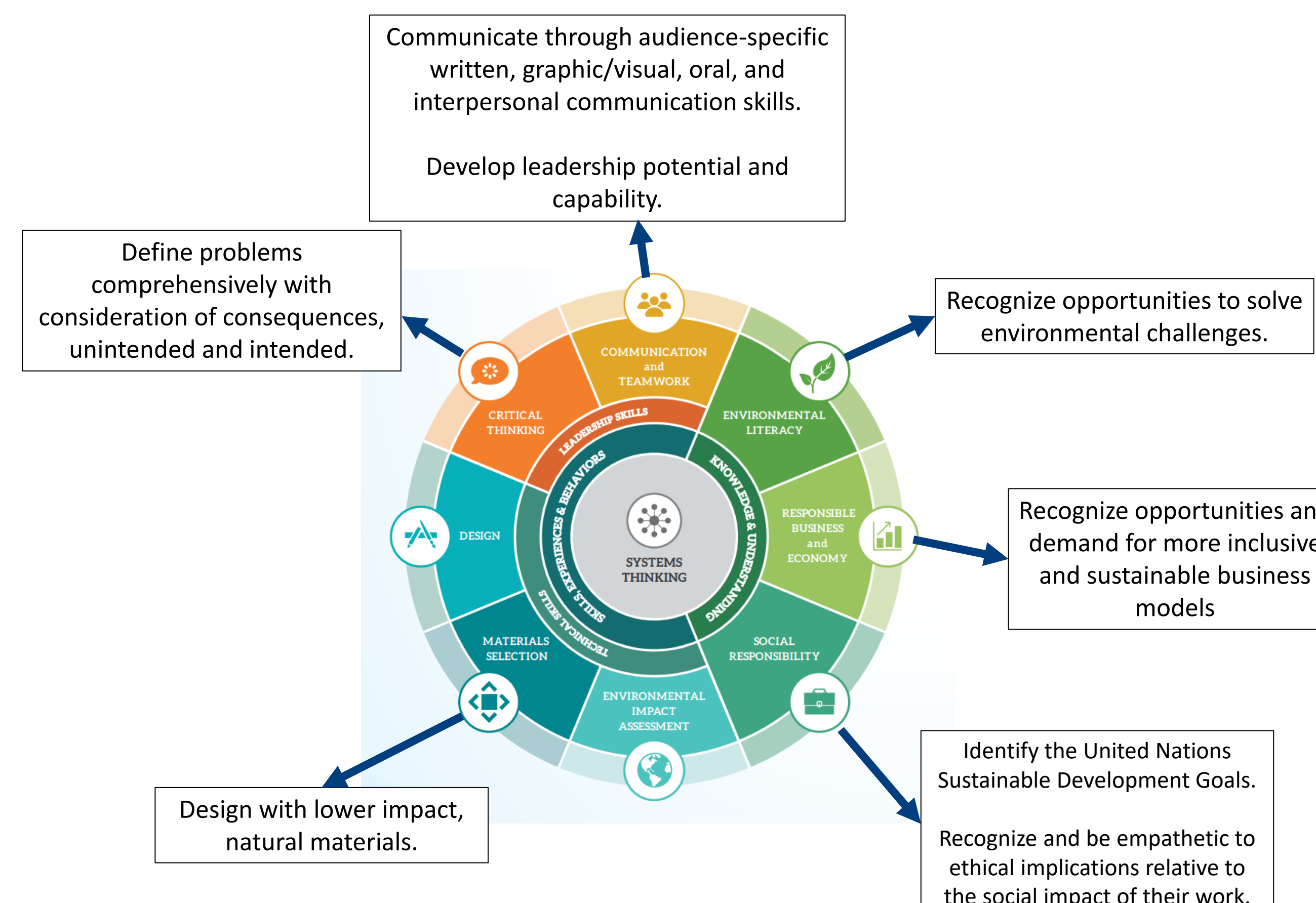


Figure 4. Connections between EOP elements² and the entrepreneurial project.

Evaluation

Students were asked to reflect on how their leadership, teamwork, and presentation skills had changed since the beginning of the semester. Figure 5 indicates 83% thought they had improved in all three areas.

Students were also asked about their ability to evaluate sustainability and identify positive and negative environmental/social impacts. Figure 6 indicates 83% thought they had improved in all three areas.

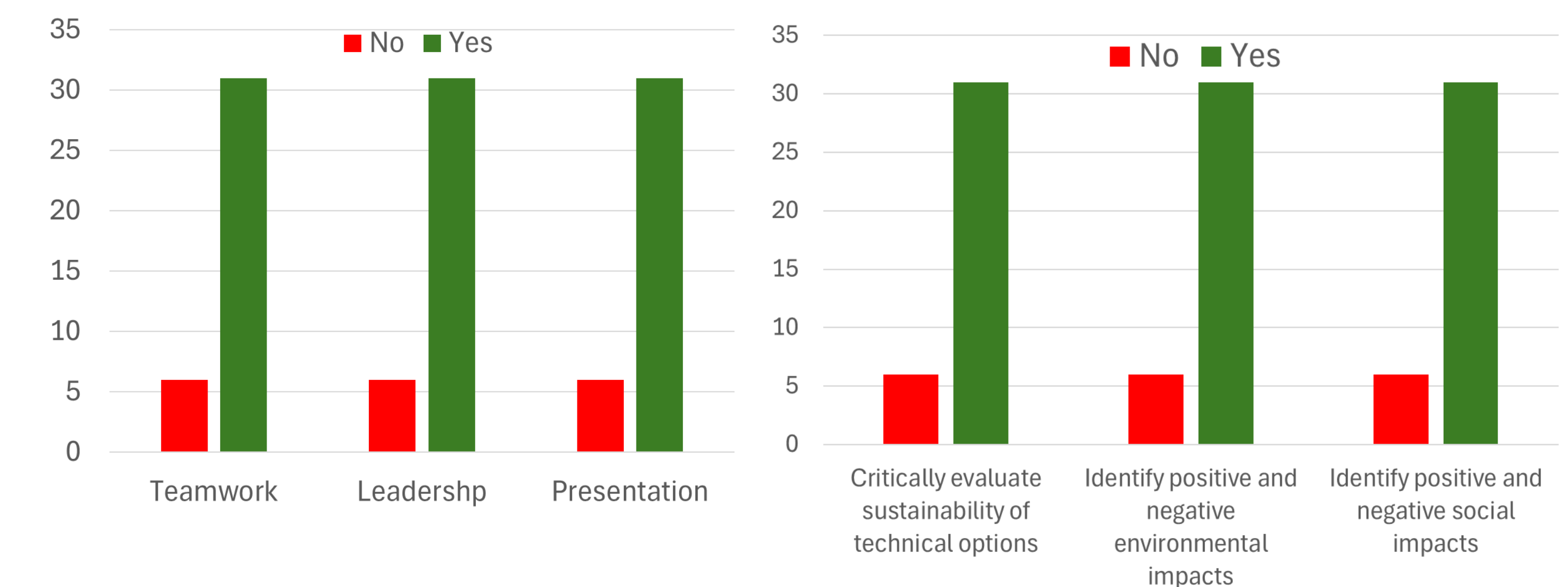


Figure 5. Relative to the beginning of the semester, do you believe your (...) skills have improved

Figure 6. Relative to the beginning of the semester, do you believe your ability to (...) has improved

Students were prompted to share the project's impact on themselves and on their understanding of sustainability. Table 1 highlights some of the responses.

Table 1. Responses to reflection prompts.

Prompt	Selected Responses
What part of the project had the greatest impact on you	"Learning to work as a team ..." "Learning team management skills ..." "The ability to identify social impacts ..." "Learning to work as a team"
How did the project affect your understanding of sustainability	"... taught me to search for a way to quantify effects on sustainability" "it made me think critically about how sustainable everyday things are" "... found ways to connect and identify sustainability in the real world" "Gaining a better understanding of what sustainability is ..." "I now better understand sustainability in terms of the environment."

Next Steps

The results of the project will be presented to the Engineering and Businesses College and opportunities sought to obtain additional funding for a recurring KEEN Innovation Challenge for 1st-year students across the University.

References

- The Kern Family Foundation (2025). Entrepreneurial Mindset. Retrieved 12/15/26 (<https://engineeringunleashed.com/mindset>).
- The Lemelson Foundation (2022). The Engineering for One Planet Framework: Essential Sustainability-focused Learning Outcomes for Engineering Education (2022). Retrieved 12/15/25 from EOP_Framework.pdf (https://engineeringforoneplanet.org/wp-content/uploads/2025/04/EOP_Framework.pdf)