

# Longitudinal EOP Integration in a Chemical Engineering curriculum

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## Introduction

**Motivation:** Chemical engineers make decisions that affect energy use, emissions, water demand, safety, and community impacts. Students need structured practice connecting technical design to sustainability outcomes.

**Project idea:** Build a scaffolded pathway where students meet EOP [1] outcomes repeatedly with increasing depth the curriculum. Target courses are Introduction to Chemical Engineering Design (Freshman), Heat Transfer (Junior) & Process Design II (Senior)

**Goal:** Improve students' ability to justify engineering decisions using technical, economic, and sustainability reasoning.

## Scaling and Impact

Track EOP gains across courses for four years & improve course design.

## Methods

**Mapping:** We used a course-to-outcome mapping approach to align EOP learning outcomes with existing content in our courses.

**Changes:** Course materials (syllabus and assignments) were revised to address EOP clearly. An introduction to EOP is given as a presentation at the beginning of the semester.

**Evidence of learning:** Collected using student questionnaires (pre & post).

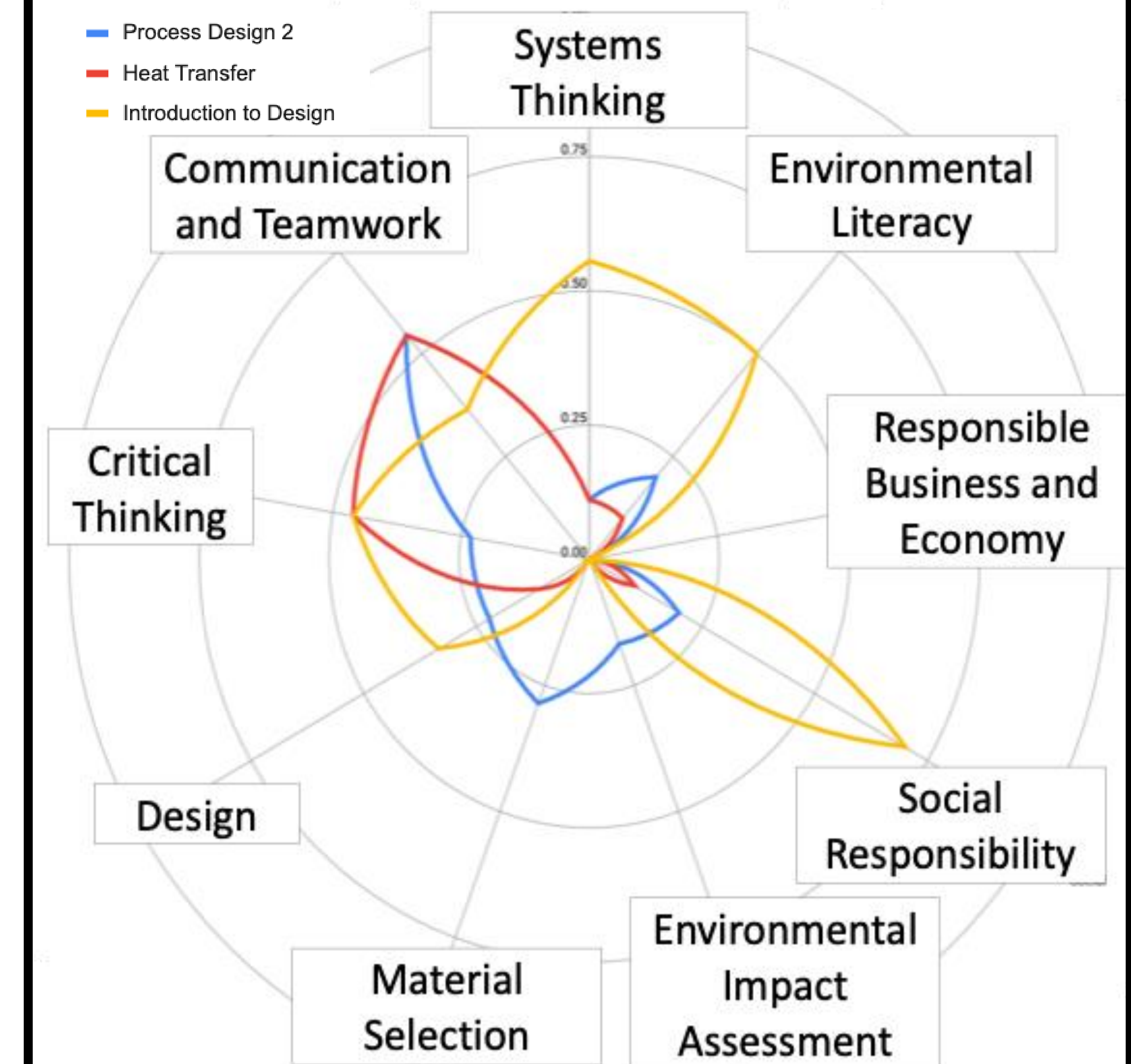
## Results: Questionnaire Setting

A DC burger plant must raise output while cutting utilities, lowering wastewater costs, and reducing odor/night trucks, without harming food safety, shelf life, quality, or unit cost. Students then rate 14 Likert items (0–5) that are mapped to EOP LO on how they would approach the problem. Instrument design was informed by longitudinal research on socially responsible engineering [2].

## References

1. The Lemelson Foundation. (2022). The EOP Framework. 2. Rulifson & Bielefeldt. (2019). doi:10.1007/s11948-018-0042-4.

## Results: Mapping



## Acknowledgments

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