

WORKSHOP

Intentional Integration of Reflection in Engineering Courses

Heidi Diefes-Dux, Grace Panther, and Logan Perry

University of Nebraska-Lincoln

Corresponding Facilitator's Email: grace.panther@unl.edu

OVERVIEW OF WORKSHOP

The intentional integration of reflection alongside traditional engineering learning activities has the potential to facilitate students' development as self-directed learners. Through careful consideration of the anchors for reflections and the use of metacognitive theory to guide prompting and feedback on reflection, students can become better able to select and use learning strategies.

ACTIVITIES

Attendees will participate in three activities. First, they will gain practice using terminology that is related in metacognition and reflection. Second, they will be exposed to the three dimensions of metacognitive regulation (e.g., Zimmerman, 2000) and asked to identify each dimension within sample student reflections. Lastly, in small groups, they will apply what they have learned and Aronson's (2011) tips for teaching with reflection when considering how they might integrate reflection into their own courses.

TARGET AUDIENCE

The target audience is researchers, engineering instructors, and faculty developers who are interested in integrating reflection in engineering. Students who are interested in engineering education research are also encouraged to participate and contribute their own perspectives. No prior knowledge required.

OUTCOMES

After this workshop, participants will be able to:

- Define pedagogy, andragogy, workplace learning, self-regulated, and self-directed learning
- Describe the metacognitive regulation dimensions and recognize them within students' reflections
- Apply concepts and best-practices when considering reflection integration in their own courses

REFERENCES

- Aronson, L. (2011). Twelve tips for teaching reflection at all levels of medical education. *Medical Teacher*, 33(3), 200-205. <https://doi.org/10.3109/0142159X.2010.507714>
- Zimmerman, B. J. (2000). Attaining self-regulation: A social cognitive perspective. In M. Boekaerts, P. R. Pintrich, & M. Zeidner (Eds.), *Handbook of self-regulation* (pp. 13–39). Academic Press. <https://doi.org/10.1016/B978-012109890-2/50031-7>

KEYWORDS

Metacognition, Reflection, Self-Regulated Learner

PRESENTERS' BACKGROUNDS

The presenters have a combined 15 years of experience integrating reflection into engineering courses and conducting research to understand the impact on student learning and development. They are working on a \$600K U.S. National Science Foundation funded project to integrate reflection across two undergraduate programs. To date, members of the research team have mentored a dozen engineering faculty on implementing reflection in their courses. Further, they have conducted previous workshops on reflection and published a combined 12 conference papers and a *Journal of Engineering Education* research article on reflection.