

WHY SHOULD CDIO-PROGRAMS AND EDUCATORS CARE ABOUT EMOTIONS?

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OVERVIEW OF THE WORKSHOP

The CDIO approach provides a structured framework for designing and implementing engineering education that aims to prepare students to develop expert knowledge in an engineering field, abilities to create and operate new products and systems, and a deep understanding of the impact of technological development on societies and natural environments. A large body of educational research has shown that emotions emerge in, and influence, learning in all these areas. Emotions play important roles in, for example, design and real-world projects, active and experiential learning, teamwork and communication, engineering ethics and sustainability, as well as classroom engagement and assessment. Despite this profound importance of emotions for engineering (and all other) education, emotions are not even mentioned in the CDIO Standards. The aim of this workshop is to initiate a conversation about the role of emotions in CDIO teaching and learning in general and more specifically focusing on some of the CDIO standards.

KEYWORDS

Emotions, engineering education, Standards: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12

DURATION

The duration for this workshop is 120 minutes.

ACTIVITIES

The workshop will employ a variety of activities aiming to provide conceptual grounding, inspiration, and immediate relevance for each participant in their own contexts.

Activity	Purpose	Estimated duration
1. Brief introduction to common ways of conceptualizing emotions and their roles in education	Establish a shared vocabulary to facilitate discussions during the remainder of the workshop	10 minutes

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2. In small groups, participants are invited to explore and share their own experiences of situations in which emotions influenced teaching and learning.	Contextualize the discussions in participants' own experiences and teaching contexts	10 minutes
3. Participants are invited to share some of their experiences in plenum. The facilitators will cluster these experiences into broader themes.	Generalize from individual experiences to broader themes that are relevant to the group	15 minutes
4. Responding to the themes developed in activity 3, the facilitators will provide a brief overview of relevant research findings and their implications for engineering education practice.	Offer research-based insights on the roles of emotions in engineering education and connect these insights to participants' own experiences	15 minutes
5. In small groups, participants are invited to choose one or two CDIO standards and discuss whether (and how) emotions are important for that/those standards. They are also invited to draft possible revisions for those standards that take the role of emotions into account.	Explore how emotions relate to the CDIO standards and whether/how they should/could be explicitly addressed in the CDIO framework	30 minutes
6. Participants are invited to share and discuss their insights and/or revision drafts in plenum. The facilitators will synthesize the outcomes.	Co-create new knowledge and understanding	30 minutes
7. Concluding the workshop, facilitators and participants together will discuss possible future activities.	Facilitate continued engagement and contribution to the CDIO framework and community	10 minutes

TARGET AUDIENCE

We invite participants from all backgrounds; no prior knowledge or experience is needed. Each participant will be invited to contribute with their unique perspectives, and a diversity of perspectives is expected to enrich the discussions and increase the relevance of the outcomes.

OUTCOMES AND FOLLOW-UP

Participants are expected to gain knowledge and understanding about the multifaceted roles emotions can play in engineering education. They are also expected to be able to make better sense of their own experiences of situations in which emotions may influence teaching and learning in engineering education.

All activities and outputs from the workshop will be documented, and a written summary will later be made available to roundtable participants and CDIO leaders. We hope that the discussion itself, together with the documented outcomes, will stimulate the CDIO community to discuss challenges and opportunities in explicitly relating to emotions – and their roles in engineering teaching and learning – in CDIO documents and processes.

BIOGRAPHICAL INFORMATION

Johanna Lönngren is an Assistant Professor at the Department of Science and Mathematics Education at Umeå University. Her research focuses on sustainability education for engineering students, wicked problems as a pedagogical approach, and the role of emotions in engineering education. She also works as a pedagogical developer, training faculty from all disciplines to integrate sustainability into their courses and programs.

Roland Tormey is a Senior Scientist in Learning Sciences and the Head of the Teaching Support Centre at EPFL in Switzerland. He researches diversity issues and emotions in teaching and learning. He has previously worked in teacher education and now focuses mostly on the teaching and learning of engineering.

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