

Title: SCALE-UP – an alternative way of engineering pedagogy

Presenter: Anne Nortcliffe
Sheffield Hallam University

Session Learning Outcomes

By the end of this session, delegates will be able to:

Reflect upon their own class-room teaching practice, and from their current practice identify what aspects could be modified/adapted and what aspects would need revisiting and re-designing for SCALE-UP.

Session Outline

Engineering classroom teaching is historically very traditional, the 'sage on the stage', Rugarcia et al (2000). However, this provides limited scope for students to develop graduate skills required by the Engineering Council (2014). A relatively new approach is SCALE-UP: Student-Centred Activities for Large Enrolment University Physics, developed by Beichner (2007). SCALE-UP involves a unique learning space and technology, promoting new pedagogical practices of directed student-centred, independent and peer learning, that requires students to research knowledge and critically evaluate their understanding and conclusions. This corresponds well to the engineering graduate skills identified by Rugarcia (2000), which include interdependent learning, problem solving, creative thinking, teamworking, communication and self-assessment.

Observations at SHU have highlighted that both academics and engineering students are hesitant about using SCALE-UP. Initial feedback from students on the learning experience has been mixed: "Whilst I did not really like SCALE-UP, I feel it is a good way to learn. However, there are some topics that do not benefit from this method and as such, the time is wasted." and "[I] found it pushed us to think more and teach ourselves." That some students still do not buy into the approach is consistent with previous research into directed student learning (Fedler and Brent, 1996).

Academics who have embraced SCALE-UP have seen it as an opportunity to have to enhance their teaching practice with the intentions of improving student learning, engagement and skills development.

SCALE-UP sessions pedagogically lend themselves to progressing student learning through Kolb (1984) learning cycle theory. The workshop session will:

- offer delegates an immersive example of an experience of "mini SCALE-UP" session and reflection of pedagogy practice to their institution, practice and subject, identify the challenges and opportunities.

- demonstrate the results and the analysis of engineering academics and student's reflections of the learning, skills development and experience of SCALE-UP.

Session Activities and Approximate Timings

The outline of the workshop is as follows;

Initial Perceptions (10 mins) - The delegates initial perceptions of SCALE-UP, their immediate reflections on the enabling and inhibiting factors to adopting this approach in their institution, own practice and their subject area.

Presentation of Engineers Experience (10 mins) - Analysis of the results of engineering academics experience of applying SCALE-UP the impact on their own practice, student learning and engagement.

Immersive Experience (25 mins) - Working in the room configured as close as possible to a SCALE-UP learning space, the audience will experience a mini simple level 4 engineering SCALE-UP learning session in tables of 6 delegates or 9 delegates per table.

Reflection (15 mins) - Each table will be encouraged to reflect upon the SCALE-UP learning experience, reflect upon SCALE-UP in relation to their own subject pedagogy practice and identify the challenges and opportunities of adapting/creating SCALE-UP pedagogy to their institution, practice and subject.

Share (10 mins) - Each table share their reflections of Challenges and Opportunities of SCALE-UP.

Summary (5 mins) - The key learning the engineers identified adapting to SCALE-UP and delegates have identified for their own institution, subject and practice.

Questions and Answers (5 mins)

References

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