Sketching and Modelling: reflections after (almost) two cohorts

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COWI, define engineers

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Engineering design process | one version...

Problem → Process → Solution
Engineering design process | another version...
‘T’ shaped people

Design space

Breadth
diverse interests and influences

Depth
specific knowledge and understanding

Open

Closed
Becoming an Engineer
Four domains

• Knowledge and understanding
  • Threshold concepts
  • Informed innovation

• Attitudes
  • Curious
  • Committed
  • Respectful
  • Reflective

  • ‘Steal like an artist’
  • ‘Show your work’

• Skills
  • Communicate
  • Collaborate
  • Challenge
  • Critique
  • Convince
  • Create
  • Connect

• Experience
  • Design it, make it, break it
  • Do it again?
Sketching and Modelling (analogue and digital)

Learning outcomes:

• Feel confident in using sketching and modelling to think, collaborate and communicate.

• Feel confident in using computational tools as part of the engineering design process.

• Develop and iterate design details and processes using sketching and modelling.

Constraints/challenges:

• Class of 100 first year students (35 groups of 3 / 25 groups of 4)

• Limited time (18 hours / 30 hours)

• Limited space (no design studio)

• Curriculum inertia

• Fear of failure / wasted work

• Can play be work / work be play?
Sketching and modelling

We wanted:

• One artefact type that could be used throughout
• Something that could be easily made, thrown away and remade
• Something that had rules that could be translated from the physical analogue to the virtual digital domain without requiring (too much) specialist knowledge

We had lots of discussions over coffee (and beer)

We decided on...
Pop-Ups
2 Cuts
7 Folds
Changes from cohort one to cohort two

- Little less conversation, little more action, please
- More hours, less lecturing
- Analogue and digital design introduced in parallel
- Groups taught in subgroups and encouraged to reflect in groups
- Week 1 structured reflection to improve learning and teaching
- Deliverables consolidated into an Assignment and a Design Challenge (1:4)
- Student peer feedback anonymised and allocated marks
- Assessment criteria allow for failure with reflection
- Design critiques booked by students
Conclusions

• Civil engineers are creative!
• People are creative
• The module challenged the students
• Students are really good at reflecting and giving (anonymised) feedback

• Work with alumni
• We learnt at the same time as the students
• It is OK to remove things from the curriculum to add in new things

• We want to extend the approach from sketching and modelling to analysis
Replication Alteration

Exhibition on second floor of Skempton Building
Friday 22 March to Friday 29 March 2019
Thank you for your attention

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