

# How do we enable curriculum change that integrates sustainability, inclusion and ethics into engineering degrees in a shorter timescale?

Change makers participating in the Systems Change Lab, co-delivered with the Royal Academy of Engineering, shared their insights on navigating the complex landscape of educational reform in the UK.

We asked the change makers why change was slow and what barriers to change - both real and perceived - exist? These questions unearthed many, wide-ranging issues relating to multiple actors within universities and externally.

Challenges included:

## **Slow procedures, underpinned by...**

- The 18-month notice period required for curriculum change (according to the Competition and Markets Authority);
- The current five-year cycle for degree accreditation;
- Slow university change procedures due to the long cycles of decision-making committee meetings;
- Small but significant changes being delayed as they are bundled into larger change programmes that are repeatedly postponed.

## **Lack of support for innovation**

- There is a lack of support from university senior managers and changes get lost in layers of management.
- There is a lack of incentives for busy educators to innovate.
- The Office for Students' has an apparent preference for "tried and tested" approaches over innovation.

## **Lack of knowledge or capacity for educators to deliver effective change**

- Educators lack confidence about changes needed due to:
  - Uncertainty about how to achieve fair and rigorous assessment;
  - Time pressures, resulting in a tick-box approach and too little time to drive changes or develop the skills and connections needed.

- Research has driven academics into increasingly niche specialisms, with a consequent loss of cross-disciplinary interaction and learning. Engineers of one discipline lacked the same language as those of another discipline, making it difficult to deliver interdisciplinary learning.
- Many educators have not been exposed to sustainability issues, and this limits their ability to engage in these discussions with students. Educators are also being challenged to address issues that require systems thinking, which is outside of their experience. It was suggested that this might be addressed by bringing in more industry representatives to the classroom.
- Overall, there is a need for a change in culture, hearts and minds, not just process-change: a shift from the educator as the “sage on the stage”.

### **Uncertainty about the change required**

- It's felt that many students arriving at university are not ready for different ways of learning, or issues such as ethics, suggesting a need for more engagement at secondary level.
- Change makers also warned that there is too much pressure on already heavily-loaded students, both in terms of new learning and content, and in terms of moral pressure to “be the hope” for the future.
- It was also noted that there are growing student demands for a greater focus on global responsibility in university courses, however, that there is no unified student voice and not all students want the same. Students who may want change are unable to ask for it because they don't know what “good looks like” – they only see the course that they have enrolled on.
- Finally, change makers noted that engineering courses are focused on developing a disciplined mindset of “remember, understand, apply” thinking rather than the inquisitive mindset of “analyse, evaluate, create” needed to tackle complex and chaotic problems. As a result, courses are attracting students who are more comfortable with the disciplined mindset and had limited interest in the inquisitive mindset.

Change makers did, however, also point to some positives, including:

### **Potential for fast-paced change**

- Scope to make minor modifications relatively easily and quickly.
- Experience in Scotland showed that some changes could be implemented more quickly than elsewhere in the UK.

### **Significant impact of changes**

- Changes to the way courses are taught can be impactful, without amending learning objectives.
- Research funding requirements (for sustainability) could have a long term trickle-down impact on undergraduate teaching, which might suggest that UKRI policies could be a potential enabler.

## **New levers for change**

- Student satisfaction levels can be a lever for change.
- The presence of some good practices that can be used to encourage others.
- Bringing more industry voices into the teaching environment.
- There is a growing awareness of the need to see the learning process as a partnership between educators and students.
- Examples of teaching that promote collaborative interdisciplinary mentalities.

## **Moving towards solutions**

Change makers explored steps that might be taken to overcome the barriers to change.

They identified:

- Creating ways to help educators lead and make change, and feel safe doing so, as they are often not used to doing this. This was important to avoid “fragmented faculties” in which some educators embed sustainability while others don’t, resulting in a disjointed student experience.
- New ideas, such as creating a space for motivated students to influence their peers, educators and first-year students, for example in the form of people’s assemblies.
- The power of the professional engineering institutes to require curriculum change through course accreditation (as RIBA and IMechE had demonstrated), alongside provisions within university guidelines for curriculum change, which include a clause “unless required by the professional bodies”. However, it was noted that this power is offset when the PEIs fail to speak with one voice.

Examples of positive change were also highlighted, including:

- The General Medical Council’s approach to required changes in teaching.
- Singapore, where university funding is driven by graduate outcomes rather than seats filled.
- The increase in the use of sustainability language in universities and beyond.

## **Background**

*Engineers Without Borders UK is running a Systems Change Lab on behalf of the Royal Academy of Engineering’s wider project, [Engineer 2030](#). Engineer 2030 aims to determine the foundational knowledge, skills and behaviours needed by engineers and technicians to meet 21st century global challenges and to understand the systems, cultures, and policies currently in place in the UK to deliver this.*