



Responsible Innovation as a vehicle for teaching ethical and social dimensions of technology

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This session is designed for anyone with an interest in teaching ethics, Responsible Innovation (RI) or both. We aim for a lively session in which participants leave with new ideas on how they might embed RI in their modules or curricula. The session will be of interest both to those who are involved in teaching modules and to those who are responsible for higher level curriculum design.

Workshop leads are also interested in understanding more about how members of the engineering education community are using RI in their programmes and we hope that this will be a forum for the exchange of ideas all round. Is RI (or elements of it) part of an already existing curriculum or module that you run? From our experience, RI is used most often in areas of the curriculum where sustainability is considered and the two endeavours do have synergies, which will be discussed in the workshop.

Background and relevance?

Over the past two decades there has been a growing emphasis on incorporating social and ethical perspectives in engineering education, and at the same time the concept of Responsible Innovation (RI) has emerged in the UK and Europe as a way of ensuring new technologies align with societal needs. The outcome is that RI frameworks are growing in popularity as a vehicle for teaching ethical and societal dimensions of technical innovation.

At its most fundamental, RI holds that moral values are embedded in technologies and that normative deliberation should be part of all stages of technological innovation [1]. RI is an ethical construct. Indeed, many educators treat it as a special case of ethics [2] but here we present our own on-going experience of using RI and its practice as a tool for teaching and addressing curriculum development. Using a framework (AREA) that is widely employed in the UK we will demonstrate how we can map curricula and modules in search of opportunities to embed RI within our engineering modules and student projects.

One advantage of using RI frameworks over teaching classical ethics is that RI is explicitly future oriented. Where ethics classes often focus on retrospective case studies, RI can be used in real-time in design projects. The AREA framework prompts practitioners to ask questions that will help to anticipate the impacts of research and innovation before they occur [3]. It encourages the engineer to understand how it is possible to innovate *with* and *for* society and it creates opportunities both for two-way dialogue and for co-creation. RI is especially helpful in the upstream phases of project development but in iteration it can also aid in assessing and responding to downstream technological impacts. In the broadest sense RI is a set of tools and techniques that enable engineers to probe the social world.

What is RI? And what is RI for you?

RI is often criticised for its vagueness, but this mistakes its purpose. RI is not a theory or a discipline and as such it does not have long held or rigid epistemic boundaries. RI is a process designed for use in knowledge production and technical innovation that can aid producers and innovators to embrace ethical, contextual and sustainability issues upstream and downstream of innovation. Key to this process is the opportunity it affords for making changes in designs in response to engagement with stakeholders.



Participants who join this workshop will take away -

- An understanding of the RI AREA framework and how to use it as a means of identifying normative material in the curriculum
- Ideas on how they might embed RI into modules and programmes.
- Ideas on the competencies that educators may need to teach RI effectively
- Going forward, an opportunity to build a network of educators who are interested in developing RI in engineering curricula

Workshop Format

Presentation on using RI and the AREA framework.

The aim is for participants to learn about the four steps of the RI framework – anticipation, reflection, engagement, action – and the ways they can be used for teaching.

(15 mins)

Activity 1: Mapping your module or your programme using AREA.

The aim for this group activity is for participants to identify where ethics, social context, value and impact are taught in their own modules and curricula – is your provision mostly about, through or for RI?

Sum up and introduction –

(30 mins)

Activity 2: Ways to teach RI using AREA

Using the output of the previous activity participants will explore opportunities to embed and extend ethics provision perhaps by including elements of RI in active-learning or PBL activities.

Sum up and introduction –

(45 mins)

Activity 3: Brainstorming the competencies that educators need to have within themselves to include this material in curricula

This is a chance to think through how we as teachers need to develop in order to teach this kind of material and a chance for discussion and reflection on the learning and how we would like to take it forward.

Sum up.

(60 mins).

The results of this workshop will be outlined in the final workshop report.



References

1. von Schomberg, R., (2013), A Vision of Responsible Research and Innovation, *Responsible Innovation: Managing the Responsible Emergence of Science and Innovation in Society*, R. Owen, J. Bessant, M. Heintz (Eds.), John Wiley & Sons, Ltd., West Sussex, pp. 51-74.
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3. Stilgoe, J., Owen, R., Macnaghten, P. (2013), Developing a framework for responsible innovation, *Research Policy*, Vol.42, pp. 1568-1580.