Title: Employer Engagement in a Pandemic Environment for Connected Curriculum Design

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Learning Outcomes

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

1. Critique how emerging digital technology can be used to facilitate and maintain University-employer relationships.
2. Reflect on how curriculum, delivery and assessment can be optimised to address engineering graduate skills shortages in a post-pandemic era.
3. Identify the advantages of using educational technologist produced, lecturer-focused, webpage creation tools, to improve online student engagement through interactive, attractive, inclusive, and comprehensive blended resources.

Outline

The context for this initiative was the failure, since 2013, to grow our existing undergraduate engineering Scheme, comprising Electronics, Mechanical, Electrical and Energy engineering. With the pandemic, the attractions of cities had dulled, so I believed we could generate interest in our programmes by removing geographical barriers and by delivering education less bounded by space and time. Additionally, I wanted to embrace Engineering Education 2.0 (Pears 2020) to better prepare students for Industry 4.0 (SDS 2018), moving them up Bloom's Taxonomy (Anderson *et al*. 2001) and down the Learning Pyramid (IEEE 2020). Having delivered online engineering education since 2011, I felt we could harness new technologies and contemporary pedagogies to develop the meta-skills consistently reported lacking by engineering employers. Consequently, we conducted qualitative research with local employers, and quantitative secondary-source research to determine best curriculum design, delivery and assessment. The six employers' representatives, who contributed through focus groups, were selected based on geographical spread and on size, scope, and subjects of interest. Research was fully online, employing various synchronous and asynchronous, emerging digital technologies, to maintain focus and engagement. This resulted in UHI's adoption of a Professional work-related engineering degree, for first delivery in 2022, in any of UHI's 13 Academic Partner Colleges.

We are now producing hybrid modules for this course, using a new tool invented by UHI, which facilitates efficient creation of interactive, engaging and inclusive Reusable Learning Objects (RLOs). The Professional degree will be predominantly delivered online, using contextualised "chunks" of learning, with the support of remote and pocket laboratories (UNED 2021). Since the positive impact of project-based learning on development of engineering students' creativity, self-management, and innovation has been well proven

(Calvo *et al.* 2018), assessment will be through individual and group problem-solving activities, carried out at the student's workplace or in a college/online environment.

Activities and Approximate Timings

Time	Activity	Participants
5 minutes	Powerpoint presentation on employer engagement methods and research findings	Host
5 minutes	Powerpoint presentation on Education 2.0 and the use of digital technologies to enhance Industry 4.0 skills	Host
5 minutes	Question and Answer or Discussion session (Learning Outcomes 1 and 2)	Attendees
5 minutes	Powerpoint presentation on Forge for Reusable Learning Objects	Host
5 minutes	Question and Answer or Discussion session (Learning Outcome 3)	Attendees
5 minutes	Presentation of session results, e.g. by Word Cloud	Host

For the discussion element questions could include:
What do you think of our approach to facilitating University-employer engagement in a fully online environment? What does your University do? How could this be improved?

Do you agree that project-based learning is the best way of developing meta-skills, such as communication, creativity, innovation and self-management? What are the pitfalls? Are there better ways?

Have you used remote laboratories or online simulation tools? Did you find them to be valuable? What problems did you experience and how did you overcome these?

What do you think of our web-based resource creation tool and the RLOs created? How useful is this tool and the RLOs it produces, for work-based learning?

Preparation before the session

Attendees could watch the video produced by Dr. Arnold Pears, the IEEE's key proponent of Engineering Education 2.0: https://www.youtube.com/watch?v=9DY5ngTV0rM. This is one of the drivers of our educational change.

Attendees could also have a prior look at the Reusable Learning Object resource I created on using Excel, for year 1, undergraduate, 6 hours of study. This was created using UHI's new 'Forge' tool: https://showcase.uhi.ac.uk/previews/ESIF_Eng/assets/resources/Cross%20Module%20Materials/Excel%20for%20Analysis%20and%20Graphing/build/index.html However, please be aware this is fully UHI copyrighted and must not be copied at all.

Attendees could then reflect on some of the questions suggested for discussion.

References and sources

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