Lessons learned for education and training from the first Massive Open Online Course on Carbon Capture and Storage

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Abstract

Present

This paper present the lessons learned from the world's first Massive Open Online Course (MOOC) on Carbon Capture and Storage run by the University of Edinburgh [1]. It introduces findings in terms of public perception of CCS presented in the context of global energy and climate change, and the response of a global, non-specialist audience to education and training in CCS.

MOOCs are freely accessible and open-licensed short courses delivered fully online to large cohorts, ranging from hundreds to tens of thousands at a time, of learners. They form part of the commitment of many educational institutions, including the University of Edinburgh, to knowledge exchange and community outreach. MOOCs do not have any entry requirements so that all courses can be taken by anyone from anywhere online. They require independent study and they are of comparable standard to a University course in terms of content, and study level.

The very first session of the course will run for a period of five weeks from 15th March to 23rd April, on the specialist MOOC platform EdX. The course is entitled 'Climate Change: Carbon Capture and Storage'. The promotional campaign targets a global, non-specialist audience and proposes to 'explore the technology to provide a long-term solution to protect our atmosphere from an excess of carbon dioxide, in the context of global energy, our use of fossil fuels, and climate change'

The learning objectives consist of:

- Understand the critical role of Carbon Capture and Storage in low-carbon futures
- Understand the most important technologies for Carbon Capture and their applications in key industries
- Understand the key elements of geological storage necessary to be confident of the safe disposal of carbon dioxide underground
- Understand the importance of removing carbon dioxide from the atmosphere with Carbon Capture and Storage

- Understand the international state of play and future developments for Carbon Capture and Storage

The material is designed to be at an introductory level – in academic terms it is one or two levels below that of a first-year undergraduate course. It consists of short videos, readings, interactive tutorials, quizzes, and interactive user forums to support interactions between the community of 'learners', lecturers and teaching assistants. It requires 10 to 15 hrs overall of personal study, over the fice weeks

The majority of the 'learners' taking the course will be relatively unfamiliar with what CCS is and what it is for. They represent a self-selected segment of the public, typically aged 25 to 45, educated and comfortable with the internet and social media. They usually take MOOCs to learn in a context of 'lifelong career development' to adapt to a constantly changing job market and develop cutting-edge knowledge and new skills.

We propose to use interactive user forums and the course quizzes to evaluate how 'our audience' respond to being exposed to the key concepts of CCS. Drawing on previous public surveys, we will seek to establish a baseline that will allow us to calibrate knowledge, attitudes and beliefs of participants against those of the wider public. Of particular interest will be how views and understanding change between the baseline assessment and after having taken the course. In particular, we will assess key concepts and controversies associated with CCS, such as

- Basic knowledge of earth science of relevant technologies
- The effects of climate change and available options to address climate change
- The future role of fossil fuels in the global energy system
- The depletion of fossil fuel reserves, and its relevance to the atmospheric carbon budget
- Perception of the development of CCS as an environmental technology
- The perceived safety of geological CO2 disposal
- Utilisation of CO2
- Negative emission technologies
- The acceptability of different climate change mitigation technologies
- The perceived risks and benefits of CCS

Finally, we will provide recommendations for education, training and communication strategies about the technology.

References

[1] https://www.edx.org/course/mitigating-climate-change