
# Workshop

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# OPEN EDUCATIONAL RESOURCES (OER) IN ENGINEERING EDUCATION: FROM AWARENESS TO ACTION

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## ABSTRACT

There are considerable benefits to both Higher Education Institutions and the community in making education more openly accessible. As such, the awareness and appreciation of Open Educational Resources (OER) has grown considerably over recent years. In parallel, a noticeable shift is taking place in Engineering Education towards project-, problem- and challenge-based learning formats, which further aim to embed the attainment of transferable skills. OER has the potential to support the development of such new learning formats in a way that allows educators to leverage best practice without having to reinvent the wheel, yet it has yet to make an impact in this area.

This workshop will guide participants in understanding, creating, and sharing OER to promote their more widespread use. We will begin by exploring what qualifies as an OER and recognising that we all interact with OER in various ways. From there, we will focus on how educators can create and share their own OER, identifying key challenges and practical solutions. Finally, we will explore how collaboration and community can support OER adoption, empowering participants to take their first steps toward developing and using OER in engineering education. The session will provide a structured yet interactive environment, ensuring participants leave with concrete takeaways and a stronger understanding of how to engage with OER in a meaningful way.

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## 1 BACKGROUND AND RATIONALE

Open Educational Resources (OER) have gained significant attention in higher education as a means to improve access, reduce costs, and enhance teaching and learning experiences. UNESCO defines OER as "learning, teaching and research materials in any format and medium that reside in the public domain or are under copyright that have been released under an open licence that permits no-cost access, reuse, repurpose, adaptation, and redistribution by others" (UNESCO, 2024).

OERs present considerable benefits for both learners and higher education institutions, including enabling access to education regardless of background and aligning with the UN's Sustainable Development Goal 4 for inclusive and equitable quality education (United Nations, 2023). At a Higher Education (HE) institutional level, there are considerable economic benefits to both institutions and their students; pivoting to open-access online textbooks and journals can allow libraries to make huge cost savings, and students benefit from free and unrestricted access to required course materials (Anderson et al. 2017). However, the widespread adoption and development of OER face several challenges. Many higher education institutions have yet to fully embrace OER practices, with adoption slower in Europe and the UK than in the US (Tovar & Piedra, 2014). This can be attributed to factors such as a perceived lack of quality, difficulty in finding relevant content, concerns about adaptability, and a general lack of recognition as a viable teaching resource (Atenas and Havemann, 2014). Additionally, the creation of effective repositories of OER can demand considerable technical, social, cultural, and financial investment, and a common pitfall has been to overemphasise the digital infrastructure at the expense of the OER itself (Smith, 2009).

In addition, most open educational resources aimed at Higher Education often pertain only to classical lectures, although more recently, the promotion of the creation and publishing of open (interactive) textbooks through university libraries is taking flight (Idema, 2023). However, in Engineering Education, a noticeable shift is taking place towards project-based, problem-based and challenge-based learning. In addition, engineering curricula now also include the often embedded teaching of transferable skills as required by the various professional bodies such as IMechE. Sadly, few such resources are being shared as OER, which results in many engineering educators having to reinvent the wheel, as few resources are available. Given the vital challenges that lie ahead, assisting educators by encouraging the creation and (re)use of relevant OER would ease the burden of implementation and increase the quality of engineering education.

## 2 WORKSHOP OBJECTIVES

### 2.1 Target audience

This workshop is designed for educators in engineering and related disciplines who are interested in exploring OER, whether they are new to the concept or looking to expand their practice. Participants may include lecturers, curriculum developers, learning technologists, and educational researchers.

### 2.2 Expected learning outcomes

By the end of this workshop, participants will:

- Recognise and categorise OER within their own teaching context, and know where to find them.
- Identify opportunities to make their own materials more openly accessible.
- Understand common barriers to using and creating OER and explore potential solutions.
- Have gained a basic understanding of what makes an OER reusable
- Develop an action plan for engaging with OER in their teaching practice.
- Establish connections with other educators to foster collaboration and best practice sharing.

## 3 WORKSHOP DESIGN

The workshop will be structured to foster both awareness and action, using a mix of self-reflection, peer discussion, and interactive engagement in small groups. The session will be designed to ensure participants leave with tangible next steps for adopting OER in their own teaching environments.

*Table 1. Intended schedule for the workshop*

| Run time | Activity | Format |
|---|---|---|
| 10 min | Introduction | Presentation & discussion |
| 15 min | Activity 1<br>What Do Engineering OER Look Like? | Self-reflection & small group discussion |
| 15 min | Activity 2<br>Perceived challenges in using OER and how to overcome them | Small group discussion & presentation |
| 15 min | Activity 3<br>Creating your own OER | Small group discussion & self-reflection |
| 5 min | Summary of key takeaways and opportunities for Q&A | Presentation & discussion |

The workshop will begin with an introduction (10 min) to OER, establishing a shared understanding of what qualifies as an OER and exploring its benefits.

This will be followed by Activity 1, where participants will be asked to reflect on their own teaching and the teaching materials they rely on for this. Using post-it notes, participants will be able to independently write down examples to contribute to a collection in the centre of each table for the whole group to see. In groups (per table), participants will then be asked to identify which of the examples could already be considered OER and which aren't, leading to a further prompt to consider how the latter could be made more openly available. This will help participants to build up a picture of the range of materials that could be considered OER, potentially identify existing familiarity and highlight how OER might already be (or could be) integrated into teaching practices.
Next, Activity 2 will focus on the challenges participants might perceive in incorporating OER into their teaching practice. Participants will be provided with a large sheet of paper per table, and will aim to populate this (either by writing directly or sticking post-it notes on the sheet) with any potential challenges they foresee. In the final part of this section, participants (in groups) will then be asked to consider how the challenges that they have identified could be overcome. This will then be followed by a short (5-minute) presentation by the facilitators, aimed at summarising some of the common examples brought forward in the groups, supported by

presentation of some common challenges that are typically cited (discovery, quality, credibility, licensing), and some potential solutions.

Finally, Activity 3 will shift the focus specifically to *creating* OER, where participants will start by (independently) considering what resources they aspire to create, and the potential barriers that they might face in achieving this (commonly, aspects such as time constraints, technical skills, hosting, and institutional support). Group discussion will then aim to collate challenges and identify key training, support structures or collaborative approaches that could be employed to overcome such barriers and enable OER development. Before the end of this activity, participants will be asked to (individually) define some tangible next steps for achieving their goals and where they could go to seek the necessary support they might need. Paper templates will be provided for participants to write on and take away with them.

The session will conclude with closing statements and key takeaways (5 min), summarising the main insights from the discussions and reinforcing practical actions that participants can take forward in their teaching environments

## 4 WORKSHOP RESULTS

The final report was intended to reflect on the session's discussions, participant insights, and key outcomes. Unfortunately, no one attended the session, so there are no outcomes to report.

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