

DEVELOPING A PEDAGOGICAL APPROACH TO PUT INTERDISCIPLINARITY INTO PRACTICE FOR THE LOW CARBON TRANSITION

The School of the Built Environment at Oxford Brookes University has developed and tested a pedagogical approach to put interdisciplinary education into practice for the low-carbon transition¹. The work was carried out as part of an EU-funded Marie Curie Fellowship, and disseminated as an Open Educational Resource.

Transitioning to low or zero-carbon practices is a complex real-world problem that necessitates the insights of multiple disciplines and requires graduates who can transcend disciplinary boundaries, work collaboratively and handle complexity². However, future practitioners in critical sectors, such as the built environment, are still being trained in disciplinary silos using traditional learning approaches. Three important problems emerge as a result:

- The lack of appropriate learning materials;
- The lack of a suitable learning environments;
- The lack of scalable approaches to interdisciplinary teaching and learning.

The School of the Built Environment developed a pedagogical approach, which was offered as a unitary solution to solving these problems in the context of retrofitting existing buildings to improve their energy performance, i.e. energy retrofit. Energy retrofit can make a huge contribution to reducing carbon emissions from existing buildings. This complex problem was explored from a socio-technical perspective, against a background where possible solutions have mainly been confined to technical silos.

The School of the Built Environment developed an innovative pedagogical approach to fostering interdisciplinary learning and hosted a set of workshops. The workshops were delivered by a Marie Curie Fellow (first author) and attended by students studying at different levels, i.e. undergraduate, postgraduate and PhD students, and in different subjects, e.g. Architecture, Planning, Engineering, and Economics. The key challenge was to engage the students in an extra-curricular activity, which was perceived not to have immediate benefits.

During the workshops, participants individually defined the components of energy retrofit as a list of concepts based on their prior knowledge of the subject. They were then presented with a comprehensive cognitive map of existing academic knowledge on energy retrofit, which was drawn from a systematic literature review. During the next phase, the participants worked in pairs to reformulate the problem, i.e. energy retrofit, by prioritising the concepts on their lists and integrating these concepts into the cognitive map. The participants were then placed in small, inter-disciplinary groups, and were tasked with establishing and drawing meaningful inter-disciplinary connections between their disciplinary concepts.

KEY HIGHLIGHTS

- **HEIs should focus on interdisciplinary approaches** as common practice rather than extra-curricular events to promote knowledge exchange and integration in order to facilitate the low-carbon transition.
- **It is important to establish** a set of interdisciplinary learning objectives for students at different levels of study.
- **The pedagogical approach developed** by Oxford-Brookes has been disseminated as an **Open Educational Resource**, providing opportunities for other educators to adapt and implement it in different contexts.

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Sibilla, M. and Camerata, F. (2018). Cognitive Mapping League. www.energyretrofitlearningplatform.org/

Our approach facilitated the integration of disciplinary perspectives and engaged participants in interdisciplinary discussions at different levels. A grid of observations was used to monitor the participants' interactions during the different phases of the workshops, and an anonymous questionnaire was used to assess the level of participant's satisfaction. This allowed us to identify areas of future work by comparing the participants' prior knowledge and the reliability of the approach.

These considerations paved the way to establishing a set of specific interdisciplinary learning objectives (e.g. a common vocabulary, trans-domains of knowledge, unexplored research paths) for different levels of study, i.e. undergraduate, postgraduate and PhD. It was also concluded that the next generation of learning experiments should focus on interdisciplinary approaches as common practice rather than extra-curricular events.

KEY FACTS ABOUT THE INSTITUTION

Institution name	School of the Built Environment, Oxford Brookes University
Location	Oxford, UK
Number of students (total for institution)	18,000
Number of staff (total for institution)	2,900
Campus type	Headington campus

KEY FACTS ABOUT THE CASE STUDY

University or department led:	Department led – School of the Built Environment.
Number of staff engaged:	2
Number of students engaged:	60
Credit-bearing:	Not credit-bearing.
Mandatory or optional:	Optional.
External partners:	None.
Engagement approach used:	Group-work initiative.

Project team: Dr Maurizio Sibilla; Dr Esra Kurul

HOW TO CITE THIS PAPER

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REFERENCES

- Maurizio Sibilla & Esra Kurul (2021) Exploring transformative pedagogies for built environment disciplines: the case of interdisciplinarity in low carbon transition, *BuildingResearch & Information*, 49:2, 234-247, DOI:10.1080/09613218.2020.1811076
- Siedlok, F. and Hibbert, P. (2014) 'The Organization of Interdisciplinary Research: Modes, Drivers and Barriers' in *International Journal of Management Reviews*, 16, 194-210. <https://doi.org/10.1111/ijmr.12016>