

EEES Project Proposal Form – 2022 entry

Project Title	OU14 - Evolving fieldwork teaching: the benefits and challenges of a mixed economy of virtual and 'in field' learning in the environmental sciences
Key words	Environmental Science; Fieldwork; Technology Enhanced Learning
Supervisory team (including email address)	Lead supervisor: Dr Sarah Davies, School of Environment, Earth and Ecosystem Sciences, The Open University (sarah.davies@open.ac.uk) Supervisor: Dr Trevor Collins, Knowledge Media Institute, The Open University (trevor.collins@open.ac.uk) Supervisor: Professor Eileen Scanlon, Institute of Educational Technology, The Open University (eileen.scanlon@open.ac.uk)
Is the PhD suitable for part time study?	Yes <input type="checkbox"/> No <input type="checkbox"/>

Project Highlights:

- Investigating how environmental scientists are blending virtual and in-field activity to support fieldwork.
- Assessing the role(s) that technology plays in supporting learning about environmental science.
- Exploring how environmental scientists perceive and value digital and in-field skills.

Overview:

Questions about the value of practical work in the sciences and the role of technologies in learning have generated lively debates over the years (Scanlon *et al.*, 2002). Recent developments in the use of technologies for fieldwork learning have added opportunities in environmental science learning; for example, through 'in-field' mobile technologies (Whitmeyer *et al.*, 2020), remote fieldwork (Collins *et al.*, 2016) and virtual fieldwork (e.g., Burden *et al.*, 2018). Furthermore, fieldwork is valuable for developing employability-related technical, transferable, and personal skills, with fieldwork design and student engagement being seen as critical in this process (Peasland *et al.*, 2019).

The benefits and challenges of different blends of 'in-field', remote and virtual fieldwork learning have been brought into sharp focus for a wider audience over the last two years as the Covid-19 pandemic required a rapid move to online and virtual fieldwork for many. This PhD will contribute to these wider debates by exploring the role a mixed economy of 'in-field', 'remote' and 'online/virtual' experiences plays in shaping and framing fieldwork education in the environmental sciences (e.g., Earth Sciences, Ecology and Physical Geography).



Figure 1: An example of the interactive web broadcasts used to introduce Open University Environmental Science students to practical field investigations – from introducing the field site, designing a study and collecting data (episodes 1 and 2, left) to analysing and interpreting the results (episode 3, right).

Alt-text: Two photographs of Open University live fieldwork broadcasts – one from a field site showing three OU lecturers introducing a field site and one from a laboratory showing the lecturers discussing the results.

Research questions key to this project are as follows:

- What are the benefits and challenges of a mixed economy of virtual, technology-enhanced, and ‘traditional’ fieldwork for teaching and learning in earth and environmental sciences?
- How do students experience and engage with a mixed economy of virtual and in-field fieldwork learning?
- How do employers view ‘in-field’ skills and digital field skills in providing the core competencies of an environmental scientist?

Methodology:

The PhD could take a number of forms. We are interested in research that investigates one or more case studies to explore the deployment of a mixed economy of technology-enhanced and ‘in-field’ teaching and learning in the environmental sciences (e.g., see Collins et al. 2016 and Burden et al. 2018).

The research is likely to be informed by triangulation through mixed methods (e.g., Jensen and Holliman, 2009), and could draw on methodological approaches, such as participatory design or action research. We are keen for this project to include engagement with students, which could involve students as partners.

The successful candidate will draw on a range of methods to collect data, which could include surveys, self-reporting, semi-structured interviews, focus groups, and methods of systematic observation (e.g., in laboratory conditions and/or on location in the field).

Training and skills:

You will join a vibrant international community of students studying our PhD programmes. The Open University (OU) provides excellent support for students and offers a full range of training in educational research methods, as well as computer, library and presentation skills.

Partners and collaboration:

The student will join a well-established team researching technology-enhanced learning at The Open University. The multi-disciplinary supervision team is drawn from researchers working in the School of Environment, Earth and Ecosystem Sciences; the Institute of Educational Technology; and the Knowledge Media Institute, with support from eSTEEem – the STEM Faculty’s scholarship and innovation centre. With assistance from the supervision team, you will explore opportunities for collaboration or engagement with relevant stakeholder groups (e.g., the Field Studies Council).

The [School of Environment, Earth and Ecosystem Sciences](#) has an international reputation for research and innovative distance teaching. We research the past and present for a sustainable future, whilst also supporting research into inclusive and quality environmental education for all, promoting lifelong learning and engagement with environmental science.

The [Knowledge Media Institute](#) (KMi) is home to internationally recognised researchers in, among other things, interactive media. KMi offers students an intellectually challenging environment with exceptional research and computing facilities. A common characteristic of KMi postgraduate study is that it involves the design, development and/or testing of technologies to address theoretical and practical concerns.

The [Institute of Educational Technology](#) (IET) is a leading centre for research in Technology Enhanced Learning supporting innovation and enhancing teaching and learning across the University. IET takes a leading role in research that includes mobile learning, open education and massive open online courses, accessibility, assessment and citizen science.

[eSTEEem](#) is the STEM Faculty’s scholarship and innovation centre, which promotes and supports colleagues’ engagement in the Scholarship of Teaching and Learning (SoTL). A series of recent projects have explored the challenges and affordances of online technologies for learning, including practical laboratories and fieldwork at a distance.

Possible timeline:

- Year 1: The main activities will include training, pilot study research and write up for assessment in a probation review.
- Year 2: You will spend your second year collecting and analysing data for your main study.
- Year 3: In your final year you will complete your analysis and produce a thesis for examination.

Further reading:

Burden, D.J.H.; Argles, T.; Minocha, S.; Rock, J.; Tilling, S. and Wheeler, P. (2017). Fieldscapes – Creating and Evaluating a 3D Virtual Field Trip System. In: *iLRN 2017 Coimbra: Workshop, Long and Short Paper, and Poster Proceedings from the Third Immersive Learning Research Network Conference* (Beck, D.; Allison, C.; Morgado, L.; Pirker, J.; Khosmood, F.; Richter, J. and Gütl, C. eds.), Immersive Learning Research Network, pp. 18–29. DOI: <https://doi.org/10.3217/978-3-85125-530-0-09>

Collins, T.; Davies, S. and Gaved, M. (2016). Enabling remote activity: widening participation in field study courses. In: Kennepohl, Dietmar ed. *Teaching Science Online: Practical Guidance for Effective*

Instruction and Lab Work. Sterling, VA, USA: Stylus Publishing, pp. 183–195. Available from: <http://oro.open.ac.uk/42474/>

Jensen, E. and Holliman, R. (2009). Investigating science communication to inform science outreach and public engagement. In: Holliman, R. *et al.* (eds.) *Investigating Science Communication in the Information Age*. Oxford: Oxford University Press, pp. 55–71. Available from: <http://tinyurl.com/gnkmfve>.

Peasland, E.L.; Henri, D.C.; Morrell, L.J. & Scott, G.W. (2019) The influence of fieldwork design on student perceptions of skills development during field courses, *International Journal of Science Education*, 41:17, 2369-2388, Available from: <https://doi.org/10.1080/09500693.2019.1679906>.

Scanlon, E., Morris, E., di Paolo, T. and Cooper, M. (2002). Contemporary approaches to learning science: technologically mediated practical work, *Studies in Science Education*, 38:1, pp. 73-114. Available from: <http://tinyurl.com/jyjad96>.

Whitmeyer, S.J.; Atchison, C. and Collins, T.D. (2020). Using Mobile Technologies to Enhance Accessibility and Inclusion in Field-Based Learning. *GSA Today*, 30, pp. 4-10. Available from: <https://doi.org/10.1130/GSATG462A.1>.

Further details:

Students should have a strong background in educational research or practice, and enthusiasm for environmental science and technology-enhanced learning. If you're not sure whether your academic background is suitable, please contact one of the supervision team or Olivia Acquah at STEM-EEES-PhD@open.ac.uk. We'd be happy to hear from you.

The successful student will join well-established teams researching fieldwork learning and technology-enhanced learning and inclusive approaches at The Open University.

Applications should include:

- An OU STEM application form, downloadable from: [OU STEM application](#)
- A CV with the names of at least two referees (preferably three and who can comment on your academic abilities)
- And an Open University application form, downloadable from: [Home OU application form](#) (if you are resident in the UK) or an [Overseas OU application form](#) (if you are an international applicant).

Applications should be sent to STEM-EEES-PhD@open.ac.uk by **12 noon on Friday, 7th January 2022**.