

Developing and supporting the curriculum

Collaboration across HWU campuses to enhance research-teaching Linkages

1	Your higher education institution: Heriot-Watt University
2	Name author(s), and contact details: Dr Tadhg S. O'Donovan & Dr Mehdi Nazarinia
3	How does your project contribute to a research-informed and professionally relevant curriculum? The main focus of the project was to enhance communication across campuses; as a case-study this was done to support Collaborative Undergraduate Mechanical Engineering Research Projects. All 4 th Year Mechanical Engineering UGs must conduct an individual research project; this normally compliments the research area of the student's supervisor. Dr O'Donovan and Dr Nazarinia share an interest in solar power and renewable energy systems and so devised project descriptions to make best use of the resources on both campuses. The Edinburgh campus developed theoretical models of solar power devices and systems. These were tested in solar simulators and under ideal and controlled laboratory conditions. The students on the Dubai campus built on the progress made in Edinburgh to investigate the practical performance of the solar technology under real environmental conditions. This reflects best practice research and development projects and in particular the practice of the renewable energy technology industry.
4	How does your project support an international and multi-disciplinary curriculum? The project sought to break down barriers between the campuses; students collaborated equally well irrespective of the geographical proximity. Documents such as engineering design drawings, supplier quotations, numerical models, computer code, research literature, progress reports and presentations were stored online and therefore were at the disposal of the whole group (including academic supervisors) efficiently. Practice presentations were webcast (UStream) and all students could watch live and give feedback and/or ask questions in real-time. An added benefit to this practice was the ability to record and watch at a later date; this was particularly useful for the presenter to improve their own presentation techniques. Further to this My Endnote Web was used to share research journals and group Skype for regular and informal conference calls.
5	How does your project support student-centred approaches that promote student engagement and leadership? The key to this promoting a student-centred approach was in the design of the individual project proposal. By determining synergistic project proposals and arming the students with the ability to communicate with ease across campuses, it was apparent that the projects quickly became student led. Students on very different projects, but still needed similar tools/skills (computer coding for example) formed working groups to further their individual research projects. Fundamental background literature was also effectively shared or "pushed" to the group which enhanced all projects in related areas. Although each student involved had an individual project, regular collaborative group meetings enhanced engagement overall and effectively replicated the approach in "real" research groups and international collaborations.

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6 **How does your project help to reshape the learning environment? Please refer (where relevant to):**

- **Technological mediation**

A fundamental objective of the project was to develop a simple, relatively cheap and reliable system to broadcast presentations and lectures etc. The system is not simply uni-directional but can be used to get feedback/questions or start an online conversation in real-time via Twitter or other social media streams. The system can also be used for video conferencing when the size of the group is “small”. Because of these attributes it is hoped that the system will be replicated by colleagues throughout the University in Edinburgh, Dubai and soon in Malaysia. This approach to teaching has also gathered interest from HWU Student Union for the impact it could have students with disabilities.

- **The distribution of learning across global locations**

The ability to communicate with ease is fundamental to the distribution of learning internationally. This technology has been developed and tested for that purpose and had proven to be very effective.