



Interdisciplinary modules and the Edinburgh Living Lab

Interdisciplinary research and teaching and the associated challenges
and opportunities for implementation



THE UNIVERSITY
of EDINBURGH



INSTITUTE FOR
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Background

Learning and Teaching Vision

The University is in the process of implementing a Vision for Learning and Teaching, following a period of extensive consultation with staff and students across the University. A key driver of the Vision is the increasingly high expectations of students, amidst increasing competition for students both in the UK and internationally. Students expect a more diverse and rich teaching experience, equipping them with relevant skills and preparation for their careers. The aim of the Vision is to deliver excellence in education alongside an outstanding student experience.

Delivering the Vision for Learning and Teaching will require creative approaches and resources for teaching. Learning by Developing (LbD) is an approach to learning that focuses on skills and application of knowledge through projects aimed at innovative change. Although it is well established in some areas of University teaching, LbD rarely engages with the outside world. By extending LbD to a much wider range of vocational and non-vocational disciplines, educational goals can be supported and informed by links to everyday working life and regional development¹.



Application in the Curriculum

Piloting an Interdisciplinary Module

Using the principles of LbD, an MSc course 'Design for Informatics' was piloted in 2014. A key element of the course is an interdisciplinary approach, where students from different disciplines were placed in project teams, each bringing their own expertise, knowledge and skills whilst learning to work together in a collaborative and respectful manner. This was achieved by using a Living Lab approach (see overleaf).

The course attracted students from both Design and Informatics, giving the students experience of working across disciplinary boundaries by providing them with an applied 'real-world' challenge set by one of the city's Neighbourhood Partnerships (the challenge being to improve active travel). Students tackled this by engaging with the community to clarify the challenge, before gathering data and testing their relevant design interventions.

Following the success of Design for Informatics, an undergraduate module (Data, Design and Society) is currently being piloted. The development of this module (and subsequent assessment) has been supported by a grant from the Principal's Teaching Award Scheme². This course is aimed at undergraduates across the University, focusing on externally set challenges (e.g. transport, sustainability and energy), making it possible to develop relevant data, tools, resources as well as a network of external speakers and advisors that students can engage with.

"We had the idea we wanted to get them to learn to engage with real-world problems and see how they were interdisciplinary in nature.

We wanted to use a design approach, and work with novel data and evidence, where the students learn that these always emerge from and respond to real-world socio-political processes"

Dr James Stewart - Course Organiser



Living Labs

Living Labs are a relatively new concept focused on removing research from the sometimes strict confines of the laboratory, into more applied 'real world' settings including specific buildings, institutions or geographic areas (e.g. cities).

While the concept and application of Living Labs is broad and somewhat loosely defined, it can be typically described as an environment in which challenges are explored in the 'messy' context of real life, incorporating both design approaches and formal evaluation³. Co-creation and integration of research and innovation principles into the exploration, experimentation and evaluation of new ideas, scenarios and solutions is one of the underlying principles of a Living Lab.

Living Labs offer the ideal context for students to engage with relevant issues and problems, by giving them hands-on experience whilst challenging them to utilise relevant academic expertise and skills to deliver meaningful interventions. This is all done in an environment that encourages creative thinking.

The emphasis is not on finding a solution to relevant challenges, but rather on how to engage with the real world and propose new ways of seeing and approaching difficult issues by making appropriate interventions.

The **Edinburgh Living Lab⁴** is an evolving partnership between a range of local stakeholders. the "Lab" provides support for a range of experiments and observations, using shared tools, often based on new digital research techniques. The main partners are The City of Edinburgh Council and The University of Edinburgh (The School of Informatics, Design Informatics and Science Technology and Innovation Studies).

Learning and Teaching in 2020

Courses such as Design for Informatics and Data, Design & Society can also deliver key aspects of the Emerging Vision for Learning and Teaching:

Giving students agency to create their own learning:

Methods for delivering LbD are defined by student choice, in a Living Lab context students define the problem and subsequent intervention.

Extend learning beyond the traditional knowledge centred course:

Through LbD students gain experience and develop and apply their knowledge in real-world environments.

Course design for 21st century learners:

Students make use of the most appropriate and relevant technology and data to deliver and communicate their interventions.

Focus on multiple learning styles and learning for life:

Students are given the opportunity to develop interdisciplinary skills in an applied context, while learning to value their own knowledge and that of others. In the process they gain useful experience of teamworking and managing relationships with multiple stakeholders.

“Living Labs in the University context foster applied research and education by using their campuses to test real-time sustainability solutions, offering opportunities to all university stakeholders to turn theory into practice, to achieve greater engagement with the study material, and a more well-rounded educational experience”⁵

Living Lab - process⁶ and implementation (Design for Informatics)

Co-creation

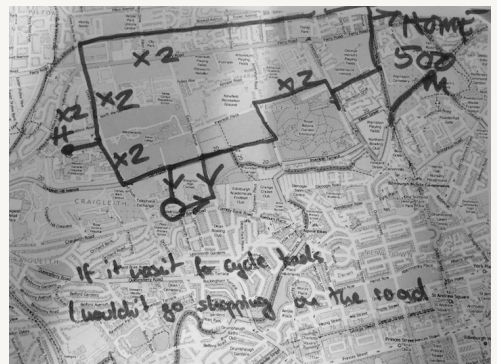
Match the relevant technology push and application pull (e.g. crowdsourcing) into a diversity of views and constraints, to encourage the ideation of new scenarios and concepts.



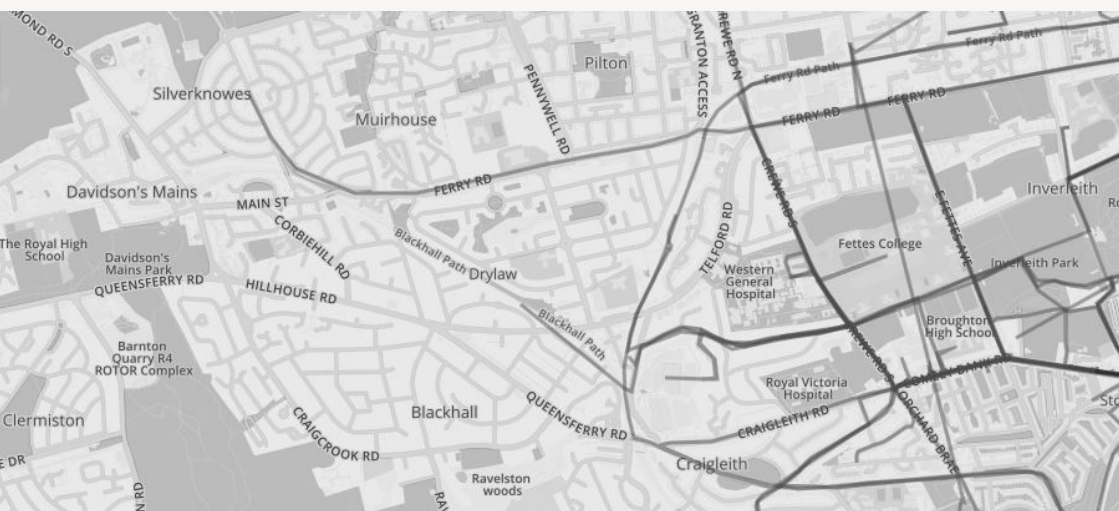
Students met with local community group to discuss issues and start dialogue, with an aim to reduce the barriers to walking and cycling in Inverleith.

Exploration

Engage all stakeholders (particularly end-users) at the early stage of the co-creation process to discover emerging scenarios and ideas in applied environments.



Research with different members of the community through focus groups and meetings, capturing the regular journeys that people take alongside common barriers to cycling and walking.



Experimentation

Implement the tools to experience live scenarios with appropriate users, and collect contextual data to be used for evaluation.



Development of prototype website allowing users to draw their route or upload gps routes to track journeys like bike routes.

Evaluation

Assess the efficacy of the new ideas through a range of dimensions (e.g. socio-economic), and to communicate with appropriate evidence, examples and narratives.



Creation of the Paths tool⁷, allowing local authority to capture insightful data about travel in Edinburgh, whilst giving residents options for multiple bike and walking routes



Lessons Learned - Implementation

The pilot, although successful, highlighted various challenges associated with running an interdisciplinary course **(with solutions and potential enablers)**.

Timetabling:

Teaching is usually organised by department rather than centrally, meaning there are organisational challenges associated with timetabling and creating sufficient space in the curriculum to run cross-school courses.

Creating a space in the curriculum across the University for interdisciplinary modules (e.g. Wednesday mornings) would free up space for this, and other modules available across schools.

Staffing:

There are no incentives for staff to work and collaborate across schools, and no mechanisms to facilitate transfer of money and time associated with delivery of teaching across schools.

Take advantage of ad-hoc networks and 'barter exchange' of teaching time between interdisciplinary modules. Utilise funding (e.g. Innovative Learning Week, Academic Networking Fund) to initiate cross-disciplinary projects, and standardise work load models across schools.

Resource:

The pilot was relatively time intensive involving a large degree of personal mentoring and interactive classes. Development of relevant teaching resources and time taken to set up a pilot/module is also a challenge.

PhD students and Post-Docs could be used for mentoring and delivering relevant parts of the course. Funding from relevant sources (e.g. Principal's Teaching Award Scheme) can be used to support implementation.

Space and Tools:

The availability of appropriate studio-style space, where students can work together within and outside timetabled hours. Collaboration tools, shared data storage and novel IT solutions are required.

Development of flexible learning spaces with input from different University Schools and stakeholders (e.g. Information Services).

Lessons Learned - Teaching

Assessment:

Appropriate methods of assessment are needed for different students and their home departments.

Adopt different methods for assessment, e.g. reflective and peer-assessment.

Communication:

Interdisciplinary courses are sometimes hindered by discipline specific language, technical terminology and lack of foundation technical skills.

Development of, and direction to relevant training and resources (e.g. Interdisciplinary events in Innovative Learning Week), and appropriate prior briefing from mentors will allow students to be more prepared with a clearer level of expectation.

Staffing:

Identifying staff members with the requisite skills and commitment to run and deliver aspects of the course could be problematic.

Draw on academics with experience and appreciation of the benefits of interdisciplinary research, highlighting the potential that Living Labs can offer to their own research.

Workload:

Large sets of projects can be difficult to manage – particularly if student numbers are going to increase.

Utilise the expertise and involvement of external Living Lab partners as mentors for relevant projects.

Benefits and Opportunities

Students

Students acquire a range of pragmatic competencies, by engaging with issues and problems outside of academia. They gain new and differing insights and perspectives from students in other programmes, whilst accessing resource and expertise that would usually not be available. This gives them key employability skills, by developing experience in working on challenges in areas of potential employment and through developing skills in interdisciplinary teamwork, design approaches and creation.

“Living Labs would not only be beneficial but are essential for what universities stand for. That’s what we should be calling education”

Researchers and Academics

Involvement in Living Lab style projects gives staff a unique interdisciplinary perspective, allowing them to utilise skills from other disciplines which will be of real benefit to their own research. It is also a useful opportunity for academics to generate primary research and develop new pathways to impact for their own research.

External partners

External partners (including local communities) appreciate the reciprocal benefits of the co-created design approach – they often have very little resource for R&D or creative thinking, so they are keen to work with the University – at the same time giving staff and students a space with freedom to experiment. Living Labs can also be used by policy makers and users for designing, piloting and refining new policies in real life scenarios – allowing for effective evaluation before implementation at a larger scale.

University

A Living Lab (and research and teaching aligned to it) is an effective way for the University to make stronger links to the local community (including business, NGOs and public organisations), as well as mainstreaming community engagement and embedding it within the curriculum (aligning with key points of the University’s strategic vision). Interdisciplinary courses also provide the opportunity to promote collaboration between Schools, whilst allowing for a safe space to trial new teaching methods.

Living Labs - Scalability and Transferability

Living Labs present a range of opportunities beyond learning and teaching, and are potentially a very useful resource for researchers, particularly those with applied research interests.

They can be used to both co-create and explore emerging research ideas in conjunction with end-users. Involving these stakeholders from the start of the process will help researchers develop more applied outcomes, ensuring a greater chance of delivering impactful innovation and research.

Living Labs are well established in the International research community, and have been used in projects ranging from building developments, social and community work and communications technology, and are frequently being used to tackle issues around sustainability⁸.

The flexible and broad definition of a Living Lab makes it a resource for learning and teaching that is available to any school or discipline with an interest in interdisciplinary research. There are various opportunities within the University of Edinburgh to test and embed a Living Lab approach into both teaching and research:

Innovative Learning Week

A week without conventional teaching where a variety of activities, workshops and projects are coordinated around innovation in the academic community. Provides a space for collaboration and multidisciplinary engagement of stakeholders to work on specific projects.

www.ilwevents.ed.ac.uk

R&Dialogue

A research organisation aimed at establishing dialogue between science and civil society actors around the theme of low-carbon transitions, run around a series of stakeholder engagement workshops.

www.rndialogue.eu

Virtual Edinburgh

An initiative aimed to turn the city and its environs into a learning environment through mobile devices, enabling people to gather information about the relevant local architecture, geology and art, whilst recording events and specific topics of interest along the way.

www.wiki.ed.ac.uk/display/VE/Virtual+Edinburgh

Edinburgh 2020

A partnership and community of practice where students and staff come together to develop a community of practice for people interested in innovative approaches to learning and teaching.

www.ed2020.org.uk

References

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Links to this and other relevant case studies:
www.wiki.ed.ac.uk/display/casestudies/IAD+Case+Studies

Other opportunities for students to get involved with community engagement at Edinburgh:
www.edinburghconnected.ed.ac.uk



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