Interdisciplinary learning and teaching provision: findings from a UK study

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Acknowledgements

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A personal interdisciplinary research journey

‘An essential guide for researchers and research managers in how to do interdisciplinary projects’
Philip Lowe, Director of the UK Research Councils’ Rural Economy and Land-Use Programme

Interdisciplinary Research Journeys
Practical strategies for capturing creativity

Catherine Lyall, Ann Bruce, Joyce Tait, Laura Meagher

New paperback edition October 2015!
Strategic management of IDR

• Supporting and developing interdisciplinary research teams, especially early career researchers

• Enabling organisational infrastructures for IDR programmes

• Identifying obstacles and good practice in achieving effective interdisciplinarity
Other things we have learned about (and tried to share)

• What makes a good ID collaborator?
• Why do collaborations fail?
• Developing strategies for ID research groups
• IDR leadership
• Career challenges and mentoring
• Career tactics for IDR scholars

See ID short guides http://tinyurl.com/idwiki
Interdisciplinary provision in higher education: current & future challenges

Contract with Higher Education Academy to:

• provide a literature review of interdisciplinary provision (national and international perspective)
• map scale and type of current interdisciplinary provision; classify different forms; identify UK plans for future – expansion, steady state or reduction
HEA’s key research questions

1. What are the pedagogies that are likely to provide distinctive opportunities for interdisciplinarity?

2. What are the key elements of effective practice that are identified within the literature?

3. What are the principles supporting interdisciplinarity in undergraduate and postgraduate taught education?
Deliverables

• a **review of the literature** about the effectiveness of interdisciplinary provision and the pedagogies which provide distinctive opportunities for interdisciplinarity
• the **results of a survey** indicating the scale of interdisciplinary provision and a **typology** of different approaches to interdisciplinarity
• **case studies** of effective approaches to promoting, evaluating and sustaining interdisciplinarity
Methodology

- literature review
  pedagogy related to interdisciplinarity, including international good practice

- document analysis
  sample of ID (sustainability; international development; social dimensions of health; games design; and culture); UCAS search for related UG and PGT courses; sample of 150 contacts

- on-line surveys
  (1) directors of these ID programmes
  (2) Pro-VC overview
  (3) online JISC communities
  scale & type of current ID provision; future plans; opportunity for some ‘snowball’ sampling

- semi-structured interviews
  17 (two-thirds programme directors) from different types of institutions

- case studies
  selected purposively to illustrate a range of types of ID offerings at different sorts of institutions and the processes of programme development

- international dimension and ‘critical friend’
  University of Copenhagen study of pedagogical issues from ID ‘experiments’ at UC

- integrative analysis and reporting
Case studies

1. Extracurricular experience in interdisciplinary project teams
2. Piloting an interdisciplinary module
3. New interdisciplinary UG degree programme
4. Professional education PGT masters degree
5. Liberal arts UG bridging arts & sciences
6. Top-level, institutionalised support for interdisciplinary undergraduate education at a major US university
Themes identified in the literature

1. Case studies presenting implementation of interdisciplinary teaching projects
2. Teaching strategies aimed at specific fields/subject areas (e.g. medical sciences, law and engineering)
3. Outcomes and challenges of interdisciplinary education
4. Broader context of interdisciplinarity e.g. sociocultural and communication approaches, problems with epistemology and ontology of ID teaching
Arguments for ID teaching

1. Educational benefits – the ability to critically assess one’s stand by viewing it from another discipline’s point of view
2. The reality of modern workplace requiring multi-professional team work
3. The global challenges (global warming, pandemics, international crime, migration, etc.) requiring critical thinking and holistic approaches

Woods, 2006
Scale and locus of provision

- Interdisciplinary programmes and courses are most commonly (but not exclusively) carried out on graduate level of education or during senior years of undergraduate education
- Scale of ID provision quite broad – from single workshops and courses to certification programmes and Master’s and PhD programmes
Drivers of interdisciplinarity

1. Individual-level drivers – such as personal connections between academics
2. University-level drivers – such as university strategy, university regulation regarding specific courses
3. External drivers
   • availability of funding e.g. US NSF IGERT
   • international initiatives e.g. Education for Sustainable Development by UNESCO
   • requirements of professional bodies
4. Socio-cultural and economic drivers – trends in education and workforce
5. Nature or evolution of the discipline, for example neuroscience, synthetic biology, law, environmental studies
Strategies for ID teaching

1. Co-teaching
   - techniques: negotiating teaching approaches, assessment criteria to mitigate the differences between teachers from different disciplines

2. Interactive methods
   - outcome-based teaching
   - real-life setting and classroom-setting
   - project-based learning, case study methods, simulation, role-playing, peer-review, peer-assessment, conferences, group projects, etc.

3. Programme-level strategies
   - “bridging courses”
   - combing learning and practical experience
   - core courses covering knowledge from different disciplinary approaches, interdisciplinary electives and practical implementation of knowledge from the early stages of graduate education, e.g. lab research, research teams
Surveys

• Two on-line surveys
  – ‘ProVCs’, invited by HEA
  – directors of programmes identified from UCAS analysis in 5 cluster areas ID
    • sustainability; international development; social dimensions of health; games design; and culture
    • only 12% response rate

• Shorter surveys: HEA Conference attendees, SEDA, Interdisciplinary Curriculum Group
Over the past 5 years, do you think that ID courses or programmes have:

- Increase
  - ProVCs: 73%
  - Programme directors: 69%
  - Belfast group: 74%
  - Online survey: 54%
- Decrease
  - ProVCs: 0%
  - Programme directors: 3%
  - Belfast group: 4%
  - Online survey: 15%
- Stay about the same
  - ProVCs: 31%
  - Programme directors: 27%
  - Belfast group: 28%
  - Online survey: 22%

N=113, % of the respondents
In the next 5 years, do you think they will

N=113, % of the respondents
ID education is a ‘live’ topic in the UK:
• more ID undergraduate programmes
• more ID taught postgrad programmes

But different views on what is driving this:
• professional needs and employability (university leaders)
• alignment with complex societal issues the interests of individual academics (university teachers)
Degree of integration

Q: Is interdisciplinary provision actually an aggregate of different pre-existing modules from different courses, with only one or two new modules tailored to be integrative?

– University leaders more likely to agree
Opportunities of ID L&T

**For academics:** Intellectual excitement, stimulation of new thinking and influence on research – nearly all directors. Also creativity, new relationships, keen students

**For students:** ‘Reflection of reality’; employability; competencies (ability to synthesize, appreciation of diverse perspectives, flexible & critical thinking)

**For institutions:** New markets; new curriculum; research impact; ‘more interesting, better educated students’
Challenges

• **Cultural challenges** (e.g. comfort zones, ‘silo mentality’, institutional structures & incentives, understanding of interdisciplinarity)

• **Assessment** (e.g. just over half find it difficult to identify external examiners)

• **Administrative barriers** (e.g. teaching credit, finances, timetabling)

• Interdisciplinary integration of educational provision takes **effort** (e.g. bringing together fields, staff members)
  
  – Views of directors split (40% agreed; 47% disagreed) as to whether, ‘primarily, it is the student’s responsibility to integrate the various contributions of different teachers/modules in the programme’
Staff development

• Strong agreement to ‘helpful to have access to a body of good practice in ID provision’
• Yet, only a third of ProVCs and a quarter of directors say that current staff development includes ID teaching
• Only a fifth of directors have attended staff development in ID teaching elsewhere
Interdisciplinary pioneers

There is a sense from our interviews that individuals who develop interdisciplinary provision are pioneering champions often working against the status quo:

“There is a small group of (academics) who are the innovators, who think interdisciplinarity is exciting, ….really devoted to undergraduate students and think interdisciplinarity is a part of their education” (ProgDir interviewee)
Conservatism?

• Demand, or not?
  – parents?
  – employers?
  – university management?

‘I was thinking more, we’d like to be just behind the wave’

(Dean, quoted by ProgDir interviewee)
Typologies, pedagogies and principles

1. What are the pedagogies that are likely to provide distinctive opportunities for interdisciplinarity?

2. What are the key elements of effective practice that are identified within the literature?

3. What are the principles supporting interdisciplinarity in undergraduate and postgraduate taught education?
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<tr>
<th>Strategy</th>
<th>Pedagogical techniques</th>
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<td><strong>Co-teaching</strong></td>
<td>• Advanced planning and negotiation with co-teacher</td>
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<td>• Co-advising with industry representatives</td>
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<td>• Taking turns in teaching</td>
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<td>• Creating learning community</td>
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<td>• Co-creation of syllabus and case studies</td>
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<td><strong>Interactive methods</strong></td>
<td>• Project-based learning (PBL)</td>
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<td>• Case study methods</td>
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<td>• Role-playing</td>
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<td>• Virtual methods</td>
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<td>• Peer-assessment and review</td>
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<td>• Peer Assisted Learning (PAL)</td>
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<td>• Small-group teaching</td>
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<td><strong>Programme-level strategies</strong></td>
<td>• Interdisciplinary electives</td>
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<td>• Core courses covering material from different perspectives</td>
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<td>• Research work from the initial stages of graduate school</td>
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“There is no unique or single pedagogy for integrative interdisciplinary learning” (Klein, 2005; see also DeZure, 2010)
Rigour in ID learning

The rigor in interdisciplinarity can only come from knowing how, why, and what to integrate

(Szostak, 2007)

• learning broadly about multiple different topics will not be beneficial to the student, unless they learn how to integrate knowledge

• teaching students how to integrate different theories and methods (Szostak, 2007)
“Heightened interest in integrative learning and interdisciplinary studies has led many to wonder about the relationship between these concepts. ‘Integrative learning’ is the broader of the two. It is an umbrella term for structures, strategies, and activities that bridge numerous divides, such as high school and college, general education and the major, introductory and advanced levels, experiences inside and outside the classroom, theory and practice, and disciplines and fields. ‘Interdisciplinary’ studies is a subset of integrative learning that fosters connections among disciplines and interdisciplinary fields.”

Klein, 2005
Typology – or not?

• Different scales
  – one-off workshops
  – single course modules or units
  – sometimes full degree programmes
• Different aims (not always fully articulated)
  – general awareness of knowledge beyond the student’s immediate degree discipline
  – ability to go further and apply that knowledge
  – a more root-and-branch transformation of the student’s way of thinking and viewing the world
Conceptualising ID education

• ID as a ‘threshold concept’ (Meyer & Land 2005)?
• Or as a ‘commonplace’ (Myers & Mcnaughten 1998) [rhetorical tradition of frequently used arguments]?
• A powerful ‘trope’ [a word used figuratively; sometimes an overused theme or device]?
The word ‘interdisciplinary’ clearly denotes a spectrum of experience ....

“Well, which approach shall we try this year?”
Principles for Development of ID Education

1. A whole institution approach
2. Clarity of purpose
3. Adequately resourced
Some concluding thoughts

• Variation in ID provision unsurprising given early stage of evolution within UK HE
• Guard against ‘pluridisciplinarity’ where students are sole agents of integration
• Tension between institutionalisation and the ‘mission for insurgency’ inherent in ID
• Does theory lag behind practice?
  – where is the debate about underlying ‘curriculum ideologies’ (principles, ideas, beliefs and epistemologies) that underpin ID learning?
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http://tinyurl.com/idwiki