Integrating Research into the Undergraduate Curriculum: A case study from Ireland

Presentation by:
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Outline of Presentation

1. Context
2. Benefits of research-led teaching
3. National Policy
4. Concepts underpinning the embedding of research into the undergraduate curriculum
5. Institutional approach
6. Challenges to implementation
1. Context

• The research-teaching dilemma:
  • High level research seen as driver of economic growth
    
    “Governments worldwide see Universities as vital sources of new knowledge and innovative thinking, as providers of skilled personnel and credible credentials... as attractors of international talent and business investment into a region...”

    (League of European Research Universities report Sept 2008)

• National policies, massification of higher education and increasing graduate numbers also seen as important for economic and social growth

• Balance to provide equity of access to higher education while simultaneously preserving the status of elite research institutions to compete in the global knowledge market

    (Brew 2006)
“Relationship between teaching and research is amongst the most intellectually tangled, managerially complex and politically contentious issues in mass higher education systems” (P. Scott 2006)

- Policy and political pressures mean research and teaching often resolved into separate domains competing for time, resources and space
- Pedagogical developments and drive to improve student experience stress benefits of research-led teaching and integration of research into undergraduate curriculum

- Institutional leadership is caught in the middle
  - Intellectual convergence vs political divergence
- Imaginative integration of research-led teaching may assist both agendas
2. **Rationale for and benefits of research-led teaching and learning**

- Evidence shows increased student engagement, deeper understanding through inquiry-led learning
- Provides students with additional skills (critical enquiry, evaluation of knowledge, direct research skills)
- Linkage of research and teaching in academic work makes university education distinctive
- Potential to generate additional research output/knowledge creation and strengthen pathways to postgraduate research
- Generally held most effective university teachers are those engaged in research and scholarship, transmitting the excitement to classroom
- Significant competitive advantage and reputational kudos, attracting higher quality students and staff
- Helps develop student as knowledge worker and engages them in concept of the provisionality of existing knowledge
3. National Policy

- National policies and strategies can play key roles in promoting the integration of research into teaching
- Healey and Jenkins (2009) list a number of such strategies:
  1. Funding learning resources to support student research and inquiry (e.g. Higher Education Academy UK; PRTLI and SIF programmes Ireland)
  2. Through national quality assurance and enhancement systems (e.g. New Zealand, UK)
  3. Ensure research funding supports undergraduate research and research dissemination (e.g. SFI UREKA programme in Ireland)
  4. Target research opportunities to students in particular disciplines and from underrepresented groups (e.g. national bursary schemes)
  5. Encourage disciplinary/professional associations to support undergraduate research and inquiry (to this one might add governmental agencies and industry)
• FASTNET Outreach programme funds undergraduates for 11 week summer research project with one of research groups in Tyndall

• The students are assigned a task related to the research of the group, and introduced to methods, equipment and software used by modern ICT scientists

• The students apply these to their own assignment, produce a written report of results and make presentation to the other students at the end of project

• A number of events are organised for the students throughout summer, including tours of ICT companies and social outings
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National policy in Ireland

Irish government has focused on developing skills for knowledge economy

• Government-sponsored reports: 2002 (Skilbeck); 2004 (OECD); Programme for Government June 2007 – Blueprint for Ireland’s Future 2007-2012

• The National Development Plan investment in higher education identified key development needed by 2013
  - Significant increase in PhD numbers and research activity under 4th Level Ireland strategy
  - Embedding of research into undergraduate curricula to create a seamless transition to postgraduate study

• National Qualifications Authority of Ireland (2003) stated that development of research skills is a critical learning outcome for all undergraduates
1. Higher education students of the future should have an excellent teaching and learning experience, informed by up-to-date research...

3. Every student should learn in an environment that is informed by research, scholarship and up-to-date practice and knowledge

6. Both undergraduate and taught postgraduate programmes should develop generic skills needed for effective engagement in society and in the workplace
4. Concepts underpinning the embedding of research into the undergraduate curriculum

- A number of conceptual models that propose ways of bringing teaching and research together in the learning environment

- 3 dimensions of curriculum design

  - Emphasis on research content
    - Students treated as audience
    - Teaching is teacher-focused

  - Emphasis on research processes and problems
    - Students treated as participants
    - Teaching and learning is student-focused
Wuetherick and Turner model (2006-modified)

Teacherr as researcher.

Research outcomes transmitted

Artefacts &/or Information integrated into courses

Presentation of methods and approaches

Class activity comes out of research and review of research article

Research projects

Inquiry-based problem based learning

Students engage with outcomes or problems to solve

Students as researchers

Research activities integrated into modules

Publication or Production of Research outcome

Building on previous student research

Modules integrated into teaching.
Curriculum design and the research-teaching nexus [Healey, 2005]

Student-focused
Students as participants

Emphasis on research content

RESEARCH -TUTORED
Learning focused on engaging students in research discussions
[emphasis on research content]

RESEARCH -LED
Curriculum structured around teaching current subject content
[using staff research interests – information transmission]

RESEARCH -BASED
Curriculum emphasises students undertaking inquiry-based research and learning
[division of roles between teacher and student minimised]

Emphasis on research processes & problems

RESEARCH -ORIENTATED
Curriculum emphasises teaching processes of knowledge construction in the subject
[staff try to engender research ethos through learning]

Teacher-focused
students as participants
**What does this mean in practice?**

### Research-led:
Learning about current research
- Lectures
- Staff-led seminars
- Labs and course work
- Evaluation of research papers
- Staff presenting current research

### Research-orientated:
Developing research skills and techniques
- Lectures
- Group work & collaborative projects
- Research skills built into formative exercises in modules
- Web resources to provide guidance
- Assessment centred on PBL

### Research-based:
Learning how to do research and be a researcher
- Final year/capstone dissertation
- Literature projects
- Building on research from previous students/classes work
- Presentations of research
- Student participation in staff research projects (in or outside of curriculum)

### Research-tutored:
Engaging in research discussions
- Staff led academic tutorials and discussions
- Course work
- Journal reading clubs
• Healey (2006) argues case for Universities to place greater emphasis on pedagogies which fill top half of the model
  Student-focused; Students as participants
  Research-tutored and Research-based

• Brew (2003) argues that research-led teaching is not just for high-flying students or just for elite institutions

“Putting greater emphasis on actively engaging students with research, suitably adapted to recognise variation and complexity of constructing knowledge in different disciplines, is one way of re-linking teaching and research in the 21st century” (Healey 2006)

“Research-enhanced teaching and learning is strategy to meet the needs of students in the 21st century” (Brew 2010)
5. **Institutional approach**

- Key to developing undergraduate research and inquiry
  - mainstream it
  - integrate it into the curriculum of all students

- Care to differentiate between:
  Research-led and Researcher-led teaching and learning
University of Sydney project to integrate research and teaching – 6yr+ (Brew 2010)

1. Established Academic Board Resolution on generic attributes of graduates
2. Changed course approval processes to include requirement for information on how academic unit involves research-led teaching experience
3. Increased opportunities for students to present research to staff and vice versa
   • Research showcases/seminars by staff, postgrads and higher level undergrads
4. Development/introduction of research-enhanced curriculum practices, e.g.:
   • Increase opportunities for presentation of relevant examples of current research in lectures
   • Visiting lectures; workshops; master classes
   • Units of study to develop research skills
   • Final year research thesis + presentation
   • Increase use enquiry-based activities, collecting and interpreting data
   • Wider use of exercises with unknown outcomes
   • Student-organised study groups outside of scheduled teaching
NAIRTL has done much valuable work in this area by promoting research-based teaching practices in academic professional development.”

(Hunt Report p.59)

NAIRTL has 38 Irish HEIs affiliated to the Academy:

NAIRTL established in UCC through Government Strategic Innovation Fund
Developing a research-led curriculum

RESEARCH-LED TEACHING AND LEARNING COMPETENCIES

Curriculum model being developed by D. Ryan/J. Cronin UCC to address:

Employability Agenda; Competencies; Programme Outcomes; Assessment Strategies; Learning Practices; Forms of Teaching Delivery (adapted from Sydney model of competences)
Developing targeted outcomes/competencies across the curriculum

<table>
<thead>
<tr>
<th>Outcomes Level</th>
<th>CORE Res. Led Teaching</th>
<th>CORE Res. Oriented Learning</th>
<th>Res. Based Learning</th>
<th>E-learning Blended</th>
<th>Placement/Practice</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level 3</td>
<td>Taught specialism</td>
<td>Attributes/Employability</td>
<td>Dissertation/Archive-based</td>
<td>Res. Based E-learning</td>
<td>Placement</td>
</tr>
<tr>
<td>Level 2</td>
<td>Taught specialism</td>
<td>Skills/Attributes</td>
<td>Independent studies</td>
<td>International Consortia; Discussion groups</td>
<td>Exchange; Intensive Summer schools</td>
</tr>
<tr>
<td>Level 1</td>
<td>Introductory survey</td>
<td>Skills/Attributes</td>
<td>PBL: Projects Group work</td>
<td>Blended module</td>
<td></td>
</tr>
</tbody>
</table>

- Traditional teaching
- Core specialist info
- Research methods teaching. Developing res skills from yr 1
- Student-based learning. Students practicing research
- Different forms of delivery of material and group work
- Wk experience
- Placement
- Putting into practice what learnt
6. **Challenges to implementation**

- Gap between institutional rhetoric re research-led teaching, accepted research findings, and reality that confronts academic staff seeking to make linkages between the research and teaching.

- Linking research and teaching been described as “perhaps the most intractable problem in American higher education” (Austin and Chang 1995).

- Confusion between research-led & researcher-led teaching.

- In drive to achieve higher rankings and world class research, separation of university career pathways between learning and teaching experts and research-only staff.
6. **Challenges to implementation cont.**

- Under mass education system, has been argued most students may not need to be taught by active researcher or learn how to research – i.e. diversity of student ability

- Difficulties in incorporating aspects of research-led teaching into large class sizes e.g. 1st yr foundation subjects

- Discipline cultures affect nature of research-led teaching; currently much less embedded in humanities

- Negative attitudes and objectives of research funding bodies who do not encourage students in research projects
Endnote

• Research indicating that engaging undergraduates in research and inquiry effective to help students begin to think like a chemist, engineer, historian...

• Studies in USA shown benefits of students engaging in research projects
  • Increased confidence and intellectual development
  • Increased ability to apply knowledge, and understanding of how scientific knowledge is built

• Brew (2010) suggests from experience in Australia
  • Once faculties begin to base design of curricula on research and scholarship,
  • and engage students in variety of research-based approaches
  • Student experiences are seen to improve
Principles to guide implementation of research-led teaching  (adapted from Schapper and Mayson, 2010)

1. Commitment to strengthen links between research and teaching across university
2. University resources development of exemplars of research-led teaching
3. University accepts relationships between research and teaching are complex and dependant on disciplinary approaches to knowledge creation and communication
4. Acknowledgement that there is no “one best way” to embed research-led teaching across all faculties, departments and disciplines
5. Linking of university reward systems and HR management practices to research-led teaching
6. Workload allocation that ensures all staff conduct both research and teaching
7. Ensure all students develop research skills during university education
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