Implementing research-based experiences for students

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Questions for today

- What is research?
- How are academics engaging undergraduates in research?
- What decisions need to be taken?
Research is

- An intellectual pursuit –
  \[ \approx \text{Research is a systematic process of coming to understand aspects of the world} \]
- A form of social engagement
- Bound in tradition
- A political process
Forms of research

- Everyday research
- Strategic research
- Applied research
- Industrial research
- Disciplinary research
- Funded and unfunded research
- Blue skies research
Blue skies research is basic, fundamental research. It goes from the known into the unknown. It is creative. More often than not it's collaborative. It's a basis for (researcher) learning. It generates innovative new knowledge. It changes perceptions.
The blue skies curriculum

Curriculum decision-making is based on research processes

A blue-skies curriculum is where students become co-creators of the curriculum, and partners in designing and pursuing it

Students learn with each other and with relevant others e.g. academics

Students are producers of knowledge, agents of change and researchers of curriculum content and processes
### Academics’ definitions of undergraduate research

<table>
<thead>
<tr>
<th>Guided research</th>
<th>vs</th>
<th>Independent research</th>
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<tbody>
<tr>
<td>-semi guided</td>
<td></td>
<td>-semi independent</td>
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<tr>
<td>-supervisors, mentors</td>
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<td>-groups or individual</td>
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<table>
<thead>
<tr>
<th>Involvement in stages of research</th>
<th>vs</th>
<th>Involvement in complete research process</th>
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<tr>
<td>-ie. data collection</td>
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<td>-from question to write up/presentation</td>
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<td>-trajectory, continuity</td>
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<tr>
<th>Doing in UGR</th>
<th>vs</th>
<th>Being in UGR</th>
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<td>-focus on skills</td>
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<td>-focus on developing the student</td>
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<th>UGR is secondary, lower quality research – not publishable</th>
<th>vs</th>
<th>UGR is original research generating new knowledge</th>
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<tr>
<th>UGR is for the student cohort and for the degree only</th>
<th>vs</th>
<th>Student treated as part of the research community and knows they have a wider role as a future researcher</th>
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<tbody>
<tr>
<td>Form of Engagement</td>
<td>Atomistic Undergraduate Research Development</td>
<td>Wholistic Undergraduate Research</td>
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<tr>
<td>Undergraduate Learning</td>
<td>Units of Study</td>
<td>Units of Study</td>
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<td>Units of Study</td>
<td>Individual uncoordinated skills development</td>
<td>Individual &amp; group coordinated Skills development</td>
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<td>Individual Work</td>
<td>Students: • develop basic student competency • largely unaware of research and research opportunities</td>
<td>Students: • develop skills of academic writing and critical analysis • develop knowledge of some techniques • research in the university unconnected • unaware of research and opportunities.</td>
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<td>Students: • essays and reports framed as research • Bibliographical exercises/ critical literature reviews • practicing individual research techniques, e.g. laboratory techniques, field work, etc.</td>
<td>Students: • combined and scaffolded research techniques through the curriculum. • disciplinary techniques, e.g. setting hypotheses, collecting data, practiced on unconnected topics</td>
<td>Students: • Program based approach to design of units of study • coordinated set of research skills and experiences • Engaged as research assistants and/or as part of a wider scheme e.g. merit scholars • may be voluntary</td>
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<td>Students: • individually tailored research projects • working alongside academics • Engaging in whole process from question setting to publishing</td>
<td>Students: • develop disciplinary professional tool kit • gain a clear sense of the process of research • practice skills in coordinated manner • know how research relates to profession</td>
<td>Students: • fully integrated into the scholarly community • treated as equal with academics • ownership of a particular project • know how their research furthers the discipline. • Gain a stipend or academic credit</td>
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**Red:** Insufficient Undergraduate Research Development

**Amber:** Some recognition of need to develop undergraduate research skills but practice is patchy and coordination across programs requires more work

**Green:** Some good recognition of the need for coordinated development and integration of students into the scholarly community.
Forms of engagement in undergraduate research

- **RED:** Undergraduate learning – insufficient undergraduate research development

- **AMBER:** Atomistic undergraduate research development – some recognition of the need to develop undergraduate research skills but practice is patchy and coordination across programs requires more work

- **GREEN:** Wholistic undergraduate research – good recognition of the need for coordinated development and integration of students into the scholarly community
“For the vast majority of students the research they get in their undergraduate degree is how to write an essay (1, p.15)

“there’s a built in assumption if we get you to write an essay on this topic ... that the student is doing research. I mean we haven’t been expected to spell that out.” (6, p.9)

“every time they read a book and they are thinking about a question they are actually researching. So research is an activity that happens every hour of every day ... So it’s a way of thinking.” (10, p.4)

Examples:
Psychology
English
RED: Undergraduate learning

- insufficient undergraduate research development
- students may be an audience for academics to tell them about their own and others research.
- There may be lectures on research methodology.
- Assessment is through Essays and/or reports

Outcomes
- students develop basic student competency
- They are largely unaware of research and research opportunities
Forms of engagement in undergraduate research

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Interviewer: So the students doing an essay – do you call that research?

Respondent: Yeah I would call that research. If ... I want them to do research on debates about legalisation or decriminalisation of cannabis, .. then I expect them to do a lot of research looking at the history of cannabis legalisation or decriminalisation in other contexts and the history of the legal prohibition of cannabis and so on. ... That is going to involve figuring out what to read and how to construct an argument. So in that sense it is research. ... We call it a research essay” (17, p.5)
“I think it is any learning activity or content that has some focus or element of research to it. So ..., students could .. interview each other to learn about interviewing. Students could engage with primary research. ... I've had them go out and interview or survey in the community and bring those results together. ...I used to like to get guest speakers in: people who have published their research ... And had the students quiz the author on how ... they did their research. So there’s endless possibilities “ (13, p. 5)
some recognition of the need to develop undergraduate research skills but practice is patchy and coordination across programs requires more work

Within courses there is uncoordinated skills development
- essays and reports are framed as research
- Bibliographical exercises/ critical literature reviews
- Individual research techniques practiced, e.g. laboratory techniques, field work, etc. These are uncoordinated

Outcomes
- Students develop skills of academic writing and critical analysis
- They develop knowledge of some techniques
- Academic research in the university is unconnected
- Students are unaware of research and opportunities.
AMBER 2: Coordinated skills development through individual and group work

“it is that skills development in the scientific research method that’s important ... So they’re constantly developing research skills, analytical thinking, being able to think about what data mean and interpreting it, being able to drill into papers and what not. So I guess for me undergraduate research is developing that critical analysis skill set that they need ... for outside science later on in their life.” (14, p.6)

Examples:
Linguistics
Geoscience
AMBER 2: Coordinated skills development through individual and group work

some recognition of the need to develop undergraduate research skills but practice is patchy and coordination across programs requires more work

- Within courses individual & group coordinated skills development
- research techniques combined and scaffolded through the curriculum.
- disciplinary techniques, e.g. setting hypotheses, collecting data, practiced on unconnected topics

Outcomes:
- Students develop particular research techniques
- They lack understanding of relationship to chosen profession
“some labs are more accessible for undergraduate stuff than others. ... My research group have had two undergraduate interns this year. ... These two students carried out field work with me and a PhD student of mine and spent considerable periods of time actually in the field learning how to capture, in this case lizards and how to mark them and measure them and carry out population surveys ... ... It wasn’t necessarily designed to integrate in with any particular knowledge base they might have developed as part of the undergraduate [course]... [It’s] completely independent of that. (9, p.5-6)
AMBER 3: Research-based scholarly tasters

Some recognition of the need to develop undergraduate research skills but practice is patchy and coordination across programs requires more work.

- Co-curricular engagement
- Research-based scholarly experience/tasters
- Students work alongside staff, PhDs, Post Docs etc on existing research projects.
- Engaged as research assistants and/or as part of a wider internship scheme
- May be voluntary

Outcomes:
- Students are introduced to research life and practices
- They are typically paid a stipend or salary or may gain academic credit
Forms of engagement in undergraduate research

**RED:** Undergraduate learning – insufficient undergraduate research development

**AMBER:** Atomistic undergraduate research development – some recognition of the need to develop undergraduate research skills but practice is patchy and coordination across programs requires more work

**GREEN:** Wholistic undergraduate research – good recognition of the need for coordinated development and integration of students into the scholarly community
“undergraduate research in order for it to be defined as research has to have [a] trajectory that takes them on the path of what for an anthropologist or a qualitative researcher, what that involves. So formulation of the question, figuring out how to answer it, going out and interviewing people or doing whatever ...... and then analysing it and then ... presenting it in a digestible form. So that trajectory I think that’s what research is for me is. You can do parts of research you can teach methodology, but you’re not teaching research if you just do methodology so you need the beginning to the end.” (18, p. 5-6)
GREEN 1: Scholarly practice within courses

Good recognition of the need for coordinated development and integration of students into the scholarly community

- Scholarly practice within courses and curricula
- Program based approach to design of courses
- Coordinated set of research skills and experiences
- Engagement within units of study in whole process from question setting to publishing

Outcomes
- Students develop disciplinary professional tool kit
- They gain a clear sense of the process of research
- They practice skills in coordinated manner
- They know how research relates to professional practice
GREEN 2: Integration into the scholarly community

“I would characterise it as students **actually doing genuine research** which in some cases could be publishable in a Journal. Having a student be able to get a scholarship to do this is helpful. ... So **there needs to be some sort of framework to fit them in**. ... And having post docs and PhD students who can in their lab mentor the more junior people... that sort of extra help from the broader group of researchers at the university I think is an important part. So the undergraduate feels they’re fitting in to a broader team or group so I think that’s an important part of it.” (15 p. 6-7)
GREEN 2: Integration into the scholarly community

good recognition of the need for coordinated development and integration of students into the scholarly community

- Co-curricular engagement
- Individually tailored research projects working alongside academics
- Engaging in whole process from question setting to publishing
- Summer/winter vacation scholarships, or internships.

Outcomes:
- Students are fully integrated into the scholarly community
- They are treated as equal with academics
- They have ownership of a particular project
- They know how their research furthers the discipline.
- They gain a stipend or academic credit
The higher education curriculum

Learning environments with their discourses, practices, interactions, tasks, patterns of power and resources, contribute to learning in many more ways than are contained within formal, rationally defined curricula with stated learning outcomes and related forms of assessment (Knight, 2001, p.377).
curriculum
contexts
students
student events
clubs and societies
living arrangements
finances
number in class
backgrounds
abilities
prior experiences

Learning outcomes

what skills?
Pedagogical
Disciplinary
Curriculum
Institutional
Research

what attributes?

what content?
Learning outcomes
contexts
what skills?
what content?
what attributes?
students
disciplinary
research
institutional
curriculum
pedagogical
learning outcomes

contexts

students

what skills?

pedagogical
disciplinary
curriculum

what attributes,

institutional

research

what content?
The process of research

- Choose topic
- Decide questions or problems to be addressed
- Decide on how the research is to proceed (methods and structure)
- Decide what theory will underpin the research. This will determine:
  ≈ how open-ended the investigation is to be
  ≈ The kind of knowledge to be generated
- Decide how the findings or results will be disseminated
- How will they be assessed?
Curriculum decision-making

Knowledge is known, stable and fixed. Topics to be studied are chosen by teacher/course leader.

Tasks are closed-ended, well-defined. Learning is structured by teacher/course leader.

Learning outcomes are controlled by teacher. Assessment is controlled by teacher.

Students' disciplinary curricula are researched and contextualized.

What skills? What content? What attributes?

Audience and output are fixed.
knowledge is known, stable and fixed

teacher chooses tasks/activities
tasks are closed-ended, well-defined
assessment controlled by teacher
student chooses topics to study

knowledge is new to student

knowledge unknown and negotiable
topics to be studied are chosen by teacher/course leader

Student decides tasks

Student controls assessment

audience & output negotiated

audience fixed
tasks are open-ended

tasks negotiated

negotiated structure

learning unstructured

negotiated structure

learning is structured by teacher/course leader

pedagogical, institutional, disciplinary, curricular, research

what attributes?

what content?

what skills?

learning outcomes

contexts

students
Questions for today

What is research?

How are academics engaging undergraduates in research?

What decisions need to be taken?
What are the lessons we take from all this?

1. Establish what you and your colleagues believe research-based learning to be
2. Start with the students’ experiences and outcomes (not disciplinary content)
3. Be clear about what you can change and what you cannot
4. Be open to new ideas when they come along but be prepared to start small
5. Use your own research skills to design the curriculum
6. Trust the students
Thank you for your attention
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