An ALURE (Authentic Large-Scale Undergraduate Research Experience) for Your Students: Designing for Success Using Learnings from a Multi-Institutional, Multi-Disciplinary Project

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Structure for today

• Identification of attendees who are thinking of designing a large-scale URE (and a room reshuffle?)
• Introduction to ALURE
• Workshop design time interspersed with short presentations and feedback from critical friends and supporters
While we move around (or not)....

• Identify a large group of your students who might benefit from a URE

• What could they research?

• Why would it interest them?

• Who else cares about the results? (who can they tell?)

Team ALURE
Authentic Large-Scale Undergraduate Research Experiences

Team ALURE
From left Dr Susan Rowland - Primary Project Leader (s.rowland1@uq.edu.au), Co-leaders Dr Gwen Lawrie and Dr Kirsten Zimbardi, Team members Dr Jack Wang and Dr Paula Myatt, and Project manager Mr Peter Worthy Research officer Rhianna Pedwell

Take a tour of the ALURE project here:
www.alure-project.net/

Take a virtual tour of SCMB here:
What is an ALURE?

- Hands-on research in the **undergraduate-course** laboratory, clinic, or workshop
- Projects are part of **authentic** research initiatives and results are communicated to “someone who cares”
- Allows **many students** to participate in research
- **Varies** by year level, desired learning outcomes, and discipline – no single model
The ALURE Model

Why is ALURE “Authentic”?

<table>
<thead>
<tr>
<th>Aspect or Definition of Authenticity</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experience of what scientists “do” (practices), how science is done, and what science “is”</td>
<td>15</td>
</tr>
<tr>
<td>Ownership/personal relevance to student</td>
<td>7</td>
</tr>
<tr>
<td>Experimental design; question/hypothesis, including by students</td>
<td>6</td>
</tr>
<tr>
<td>Results are novel/publishable/contribute to existing research; communication of results</td>
<td>4 each</td>
</tr>
<tr>
<td>Critical thinking</td>
<td>3</td>
</tr>
<tr>
<td>Data analysis; peer teamwork; interested audience</td>
<td>2 each</td>
</tr>
<tr>
<td>One project for the course duration; “Emerges” from constituent parts of experience; extended participation time; “open investigations”; “ill-structured and complex goals”; appropriate for the learner education level</td>
<td>1 each</td>
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</tbody>
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CRICOS Provider No 00025B
Microbiology - 500 students examine the human microbiome

16S rRNA sequencing

VS

Gram-Staining
Microscopy
Selective & differential culturing
Metabolic tests
Antibiotic Sensitivity testing

Microbiology - 500 students examine the human microbiome

Roche 454 Sequencer
GS FLX titanium
“Pyrosequencer”
Physiology – 200 students examine the effects of eating dark chocolate on their mental acuity.
What about student learning gains?

- Students perceive multiple learning gains and changes in professionalism
- Students see this activity as authentic to the practice of science
- Some students volunteer to help the lab staff prepare; others bring protocols and ideas from their part-time jobs for the project
- Academics note a change in the types of questions that students ask
- Students use this activity as a way of differentiating themselves when applying for positions in labs, for international study, and for higher degree programs
- Students who complete optional 4th year Honours degree in SCMB BSc are predominantly ALURE participants

References:
- Do we need to design course-based undergraduate research experiences for authenticity? Rowland, Pedwell, Lawrie, Lovie-Toon, Hung. CBE-LSE (in press)
- A unique large-scale undergraduate research experience in Molecular Systems Biology for non-mathematics majors. Kappler, Rowland, Pedwell. BAMBED (in press)
- Developing and resourceing academics to help students conduct and communicate undergraduate research on a large scale. Rowland, Pedwell, Lawrie, Worthy (2016) Sydney: Office for Learning & Teaching
Let's work on a design for you and your students

1) What students will you design for?
   - Why these students?
   - Learning Objectives?

2) What research question will they address? (Report out)

3) Why is this research question important? Who cares?

All resources are available at allure-project.net

What supports and challenges do you anticipate?
The balancing act for ALURE implementers

The recipe for success
1) Anticipate and mitigate challenges
2) Maximise the supports and ask for help and time allocation before you think you need it
Thank you!

Please let me know if you need help with your ALURE: s.rowland1@uq.edu.au