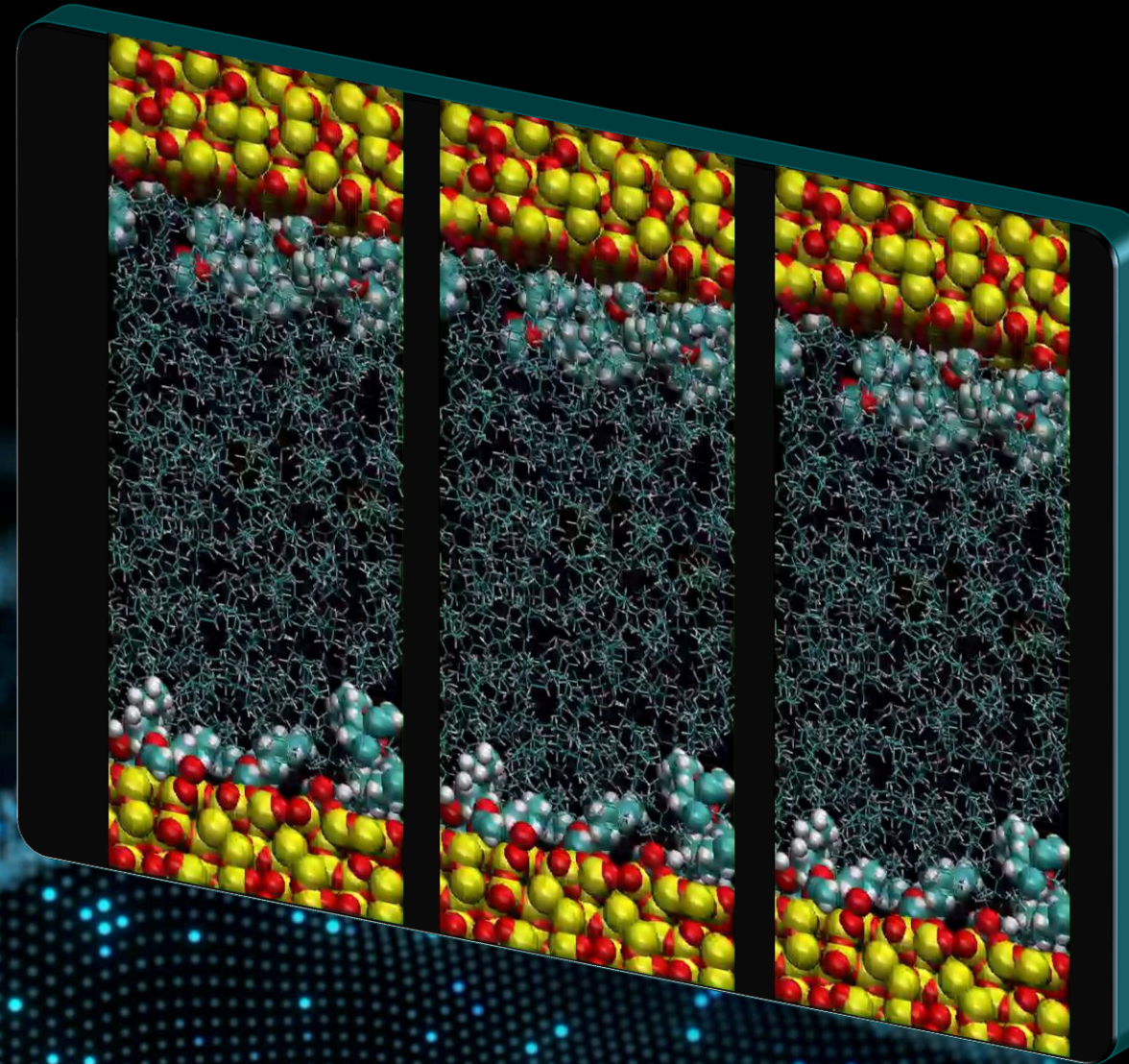


SCI310/SCI510 - Artificial Intelligence
and Computing for Science

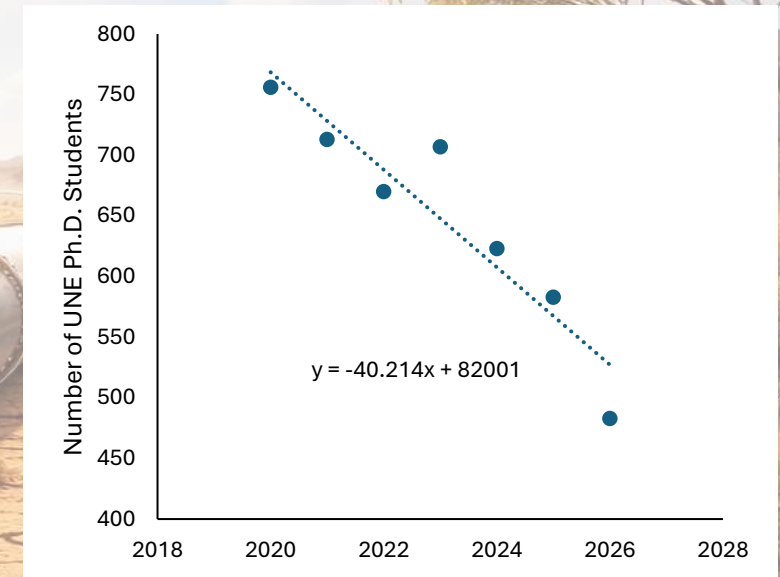
From Proposal to PhD: Building a HDR Pipeline Through AI- Integrated Assessment



Drying pipeline for HDR students

Image generated by
ChatGPT

- PhD enrolments have dropped ~8% Australia-wide since 2018.¹
- UNE Ph.D. Students numbers falling ~40 per year since 2020 (data from BI) →
 - The current trend has no Ph.D. students by 2040 (though of course extrapolation not inherently valid).
- Why?
 - Cost of living, inadequate stipends.
 - The average PhD candidate is **37 years old** — juggling cost of living, families, and financial pressure.¹
 - Simply not knowing what a research career looks like! Never “taste-tested” the inside of the HDR process.



[1] <https://universitiesaustralia.edu.au/wp-content/uploads/2024/12/Investing-in-PHD-Candidates-in-Australia.pdf>

The Regional Challenge

Image generated by a
drone probably

Competing
with metro

Relocation
hesitancy

Smaller
student pool

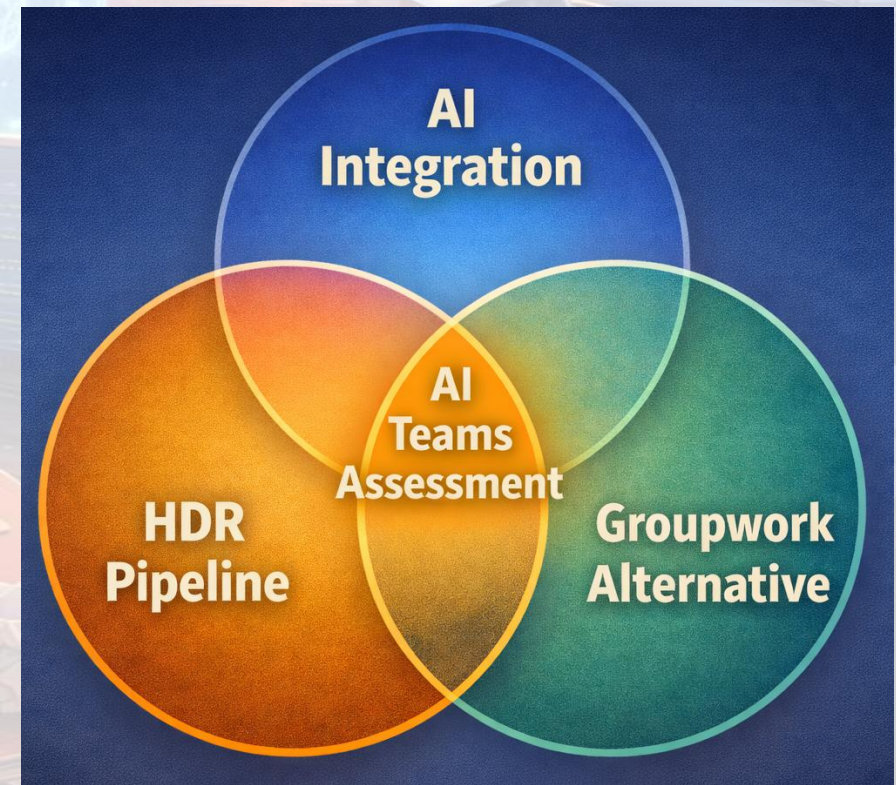
Limited HDR
exposure

Two More Design Constraints – Groupwork & AI

- Groupwork Pros:
 - Community
 - Interpersonal skills
 - Knowledge sharing across domains
- Groupwork Cons:
 - Free-riding
 - Scheduling conflicts
 - Low engagement

Groupwork can become a source of stress, not learning

- Simultaneously, generative AI integration, not prohibition, should aid students train for the future workforce



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The Solution — "AI Teams"

Images generated by Madgwick

Assistant Builder

Data Analysis
& Visualisation
Wizard



Chem-I-(s)-Try

SCI310/510
Assessment
Guide



Biochemistry &
Medicine
Collaborator



Student

Pre-peer
review & editor
comments



Science
Communications
Specialist



Assessment Design – Mirroring the HDR Pipeline

- Assessment deliberately scaffolded to mirror early HDR candidature:
 1. Identify a research gap addressing a real-world grand challenge (within the students field of study, BUT making use of a cross-disciplinary team)
 2. Write a formal research proposal (50% of Project assessment)
 - a) Include a transcript (“minutes”) of their AI-interactions with their team, showing evidence of using the “VERIFY protocol” such as RAG testing and iterative prompting and context building.
 3. Develop a budget and timeline
 4. Defend the proposal via viva voce (50% of Project assessment)
- Functions as an "HDR pipeline" – demystifying Honours and PhD pathways

Image generated by
ChatGPT

The Viva Voce – Ensuring Academic Integrity

- AI use is unrestricted during the creative process
- Authentic understanding verified through mandatory oral defence (as well as continual discussions throughout trimester)
- Students must:
 - Explain and justify their research decisions
 - Demonstrate understanding of AI-generated content they included
 - Respond to probing questions in real time
- Integrity without restriction – trust the process, verify the person

Images generated by
ChatGPT

Scaffolding Critical AI Engagement

- Students document their prompt refinement process – not just final outputs
- Required to validate AI claims against primary literature
- Critically evaluate AI outputs: What's useful? What's hallucinated? What needs reworking?
- Develops transferable AI literacy skills, not just task completion

PROMPT REFINEMENT:

Explore quality research...

Explore with research...



VALIDATE PRIMARY LITERATURE



EVALUATE AI OUTPUTS:

Detailed specs, diversity

Evaluation Data – What students said:



“Assessment 3, the project-oriented task... the freedom to develop a project that could become a thesis or a business.”



“**Kas supported...** in a similar fashion to a PhD supervisor “lite” – this gave us insight into how you might go about continuing in academic life.”



The lecturer was responsive to feedback and created an adaptive learning process to keep students motivated.”

Honest Reflections – Limitations

- Small cohort in the first offering. Yet to see how scalable the format is, or what steps need to be taken to make it so.
- Advanced students loved the freedom to attack a problem of their choice. Other students seemed to get overwhelmed by choice (i.e., completed all quizzes, but not the essay or project)
 - Three students became unresponsive after the Christmas break.
 - One made a sprint finish
- Marking Rubric and guidelines need workshopping to ensure academic integrity, learning and involvement. Close, but imperfect.

Image generated by
ChatGPT

Implications and Transferability



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ChatGPT

Summary & Questions

- Traditional groupwork has genuine value – but isn't always feasible
- AI teams offer a pragmatic middle ground: collaborative rigour without logistical burden
- Scaffolded HDR-pipeline assessment + viva voce = authentic AI integration with academic integrity
- First-offering data is promising (4.7/5.0, but n=3 (50%)) – iteration continues

Happy to share assignment instructions, course materials, etc, just swing me an email.