

Project outline (max 1-2 pages) (See guidelines for detail)**A brief description of the aims and rationale for the project**

Two key skills in science are effective communication and comprehension of the scientific literature (Bronwell et al. 2013). Being able to critically read and comprehend the scientific literature is fundamental for students to integrate knowledge from multiple sources into their inquiry-oriented science courses. Many students find reading the primary literature overwhelming and frustrating and may lose self-confidence as a result (Round and Campbell 2013). These feelings may persist to later years; science majors have been reported fearing having to read and interpret primary literature (Kozeracki et al. 2006). With the shift towards blended and flipped learning approaches, students' digital literacies increasingly involve searching and downloading resources from the internet, reading a variety of texts and incorporating them into their assignments (Lea and Jones 2011). A critical first step for these academic practices is successfully filtering relevant and reliable sources available through digital search engines. Incoming Science students are not necessarily skilled in this area, and may be unfamiliar with the expectations for university academic reading and writing, and the tools available.

Starting in 2015, all commencing Science students (n = 1100 in 2014) will enrol into the core subject 60001 Principles of Scientific Practice (PSP). The Faculty of Science has a large diversity of students. In addition, the subject "Communication for Science", designed for low language proficiency students which attracted approximately 10% of the incoming Science cohort in 2014, has been discontinued. Current research argues that academic literacy skill development should be integrated into the discipline to support student learning (Wingate, 2006). Clearly there is a need for embedding a program addressing reading of complex scientific texts (journal articles and other primary literature) early on in the science curriculum, onto which critical evaluation of scientific literature can be scaffolded.

Survey data from our (YD, NG) previous FYE grant on referencing and paraphrasing in a first year environmental sciences subject (91123 Biocomplexity) indicated that although most students used the online tutorials provided to improve their scientific writing, many still lacked confidence in reading and selecting appropriate texts. This is particularly the case for students who are unfamiliar with academic reading and writing conventions and expectations at university level (often LSES (Priest 2009) but also mature-aged and non-school leaver pathways).

Our goal is to embed a series of bespoke interactive online resources into the flagship Science subject, 60001 Principles of Scientific Practice (PSP), which demystify and unpack the scientific literature to make it accessible to the diverse first year science student cohort. The intention is to build students' confidence in choosing relevant, reliable and valid sources of information for their scientific reports and to apply these skills in a major assessment task within the subject. The online modules will complement collaborative face-to-face workshops designed to further develop academic literacies in a supportive environment.

First Year Curriculum principles for Transition Pedagogy addressed by the project (tick the appropriate box(es) Select the 1-2 strongest principles that you are addressing.

Kift (2009) First Year Curriculum principles for Transition Pedagogy - <http://fyhe.com.au/transition-pedagogy/fy-curriculum-principles/>

- Transition
- Diversity
- Engagement
- Assessment
- Design (broader focus)
- Evaluation and Monitoring (broader focus)

Provide detail of how the selected principle(s) is (are) addressed in your project.

Design

The first year curriculum is designed intentionally for commencing students, based on evidence from practice and research.

Our goal is to build student understanding and confidence in reading strategies required to navigate the scientific literature through:

- Scaffolded screencasts and interactive tutorials that introduce how to find, filter and choose appropriate scientific literature for scientific reports for a range of science disciplines
- Unpacking the components of a scientific article, using exemplars and benchmarking
- Interactive modules on planning and structure of a scientific report based on existing resources (e.g. HELPS report writing site)

The screencasts and interactive tutorials will be designed after careful consideration of the fundamental reading skills commencing students need to prepare them for the later years of their respective science degrees.

Diversity

The first year curriculum embraces and supports the diversity and reality of students' backgrounds, previous experiences and preparedness for university

Given the high diversity within the large incoming Science cohort and often limited experience of our students in reading and understanding complex scientific texts, these targeted modules will ensure greater accessibility to the reading strategies, the flexibility to use them at their convenience and to support their learning at their own pace.

Other University/Faculty/Course/Subject priorities addressed (optional)

Development of specific Faculty graduate attributes – professional skills and their application, communication skills.

The use of interactive tutorials and online materials in a blended mode is aligned with the UTS learning.futures project

Key project activities and timeline, including appropriate activities that engage the overall teaching team (if applicable)Pre-Autumn semester

1. Curating existing materials (e.g. from discontinued Communication for Science subject) and designing new material for inclusion in online resources
2. Storyboarding content and formative assessment to be included in workshops
3. Creation of Adobe Captivate interactive online resources, testing, uploading to UTSONline

Autumn semester

4. Week 1 - upload online resources to UTSONline; promote online tutorials/screencasts in lectures/workshops/announcements;
5. Week 2 - students complete interactive tutorials online and prepare for workshop 3; meeting with TAs to discuss activities in workshops
6. Week 3 - Workshop 3 - Researching the Problem
7. Week 4 - students complete interactive tutorials online and prepare for workshop 5
8. Week 5 - Workshop 5 - Scientific writing
9. Design evaluation tool and apply for ethics approval for evaluation (Teaching and Learning application)
10. Week 13 - Report due; evaluation of online resources (survey and focus group)

Mid-year break

11. Evaluation of tutorial use and survey results for improvements for Spring semester
12. Review and refine existing materials for implementation in Spring semester

Spring semester

13. Week 1 - upload refined online resources to UTSONline; promote online tutorials/screencasts in lectures/workshops/announcements;
14. Week 2 - students complete interactive tutorials online and prepare for workshop 3; meeting with TAs to discuss activities in workshops
15. Week 3 - Workshop 3 - Researching the Problem
16. Week 4 - students complete interactive tutorials online and prepare for workshop 5
17. Week 5 - Workshop 5 - Scientific writing
18. Design evaluation tool and apply for ethics approval for evaluation (Teaching and Learning application)
19. Week 13 - Report due; evaluation of online resources (survey and focus group)

Your evaluation strategy ie how you will know that the project has been successful, with particular focus on the transition pedagogies that you have chosen, and how will you collect information to improve the outcomes?

- Survey before and after workshops addressing student confidence (self-assessment) in reading and academic writing
- Successful completion of online tutorials and engagement in workshops
- End of workshop evaluation OR post-assessment evaluation to assess student engagement and perceived value in the online tutorials and in the development of their academic reading skills
- Focus groups

Project Budget (insert table or spreadsheet if appropriate) and budget justification (remember to add on-costs – approximately 17%) Salary rates:

<http://www.hru.uts.edu.au/conditions/pay/rates.html>

Funding is requested for a casual academic to: produce Science-specific online resources using Adobe Captivate; curate existing resources; and, for running evaluations and incentives for focus groups.

Activity	Hours	Rate	Total
Pre-semester item 1,2,3	35	Casual academic, other academic activity – PhD' rate projected at \$50.72 per hour (current Jan 2015 rate) including 17% on costs	\$2076.99
Pre-semester item 5	10	As above	\$593.42
Mid break item 10, 11	10	Casual academic, other academic activity – PhD' rate projected at \$51.48 per hour (May 2015 rate) including 17% on costs	\$602.32
Spring item 15	7	As above	\$421.62
Focus group incentives (light lunch, 2 groups)			\$300
		TOTAL	\$3994.35

References:

Bronwell SE, Price JV, Steinman L (2013) A writing-intensive course improves biology undergraduates' perception and confidence of their abilities to read scientific literature and communicate science. *Advances in Physiology Education* 37: 70-79.

Kozeracki CA, Carey MF, Colicelli J, Levis-Fitzgerald M (2006) An intensive primary-literature-based teaching program directly benefits undergraduate science majors and facilitates their transition to doctoral programs. *CBE- Life Sciences Education* 5: 340-347.

Lea MR, Jones S (2011) Digital literacies in higher education: exploring textual and technological practice. *Studies in Higher Education* 36: 377-393.

Priest A-M (2009) "I have understanding as well as you": Supporting the language and learning needs of students from low socio-economic status backgrounds. *Journal of Academic Language & Learning* 3: A70-A81.

Round JE, Campbell AM (2013) Figure facts: Encouraging undergraduates to take a data-centered approach to reading primary literature. *CBE - Life Sciences Education* 12: 39-46.