# Exploring alternate models for WIL in Science: Linking Work with Learning at the University of Queensland

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## Project summary

This project explored an alternative model of WIL in Science, linking students’ extant work to explicit learning about their skills as science undergraduates and their employability in science and non-science-focused jobs. We propose that students in any type of work (science or non-science) are gaining valuable skills for employment; what they lack is the ability to recognise and articulate these skills. We aimed to develop an academically rigorous curriculum that (i) enabled students to evidence and articulate their development and understanding of multiple transferable skills that are commonly gained during work and (ii) helped students explicitly link these learned skills to their future careers in science. Our pilot project used a small group of student volunteers and an abbreviated “course” to examine how our proposed curriculum would work for Science students.

## Context

This project was conducted in the Faculty of Science (FoS) at the University of Queensland (UQ). UQ is a large public university, and the FoS is a large Faculty, comprised of 7 schools. FoS courses serve over 10,000 enrolled students each year, and classes in first and second year Science programs regularly exceed enrolments of 500.

WIL in FoS is delivered in a fragmented and uncoordinated way, championed by individual academics. There is no central WIL office or staffing group. Despite staff keen to see students and industry engage, the FoS struggles to offer industry placements to large numbers of students, particularly those who are not “elite” academic performers. This paucity of WIL opportunities is consistent with a recent Australia-wide study that showed the proportion of science students who engage in WIL is very low [1]. This project aimed to address the issues of scale and varying student abilities and interests by providing a way for students to get course credit for paid work or volunteering that they are already doing.

The proportion of our students who can participate in this program is substantial. In 2011, about 50% of Australian students aged 15-24 worked part time, while 42% of students aged over 25 worked full time as they studied [2]. Students on international visas can work up to 40 hours per fortnight during semester [3]. UQ students have work patterns that echo these statistics. For many students, paid work is a financial necessity, which may limit their capacity to engage in WIL placements. For many others, it is a healthy social outlet that develops core life and employment skills.

We argue that any form of work is likely to develop non-technical, generic, transferable employability skills such as problem solving, interpersonal communication, professionalism and organisational skills. Clearly this is of value – STEM employers identify critical thinking and problem-solving capability as the most important graduate attributes for new hires [4]. Crucially however, work experience does not automatically result in students being able to explicitly articulate their learning [5]. This type of metacognition requires a reflective process that supports a transformation in understanding [6]. Conversely, teaching employability skills has little effect on employability unless a student is also placed in a workplace [7].

## Approach to implementation

In this project we (i) developed a transformational curriculum model; and (ii) tested and evaluated a prototype curriculum prior to implementation as a formal course in 2017.

This curriculum differs from conventional WIL experiences in that it revolves around work that a student is already doing (or may have done recently). Unlike WIL curricula commonly used to raise awareness of gains in generic employability skills, this project aimed to raise students’ metacognitive skills by facilitating a deeper understanding of learning gains and explicitly foregrounding science learning in workplace settings. As a foundation for the curriculum the project team engaged in much friendly and philosophical discussion to build the four Learning Objectives shown below; we also presented these Objectives to colleagues in the FoS for comment and discussion. We named the program SCIWILWORK as a placeholder, until a proper course name can be decided.

## Learning Objectives for SCIWILWORK

Upon completion of the proposed course a student will be able to

1. Critically reflect on experiences in the workplace and explicitly link those experiences to potential employment opportunities as a science-based professional.
2. Have awareness of strengths and capabilities cultivated in a BSc and be able to articulate how those attributes can be applied in a workplace
3. Critically read the literature related to science employability and apply this knowledge to a reflection on current work experience
4. Present a learning portfolio that charts their development through the course, reflects their skills and interests, and provides a plan for their career development

The prototype curriculum to address these Learning Objectives was built on a series of five fortnightly evening meetings, each two hours in length. We recruited a group of volunteer students as participants and offered compensation of $100 to students who completed all aspects of the program. Students were given a light dinner at each workshop and students who completed a “half-time” and a “post-pilot” interview with the research team were given an additional $20 for each completed interview. Our initial group of recruits consisted of 35 students; there was significant attrition after the first information session (probably because students realised the commitment required to be part of the pilot). Fifteen students attended the first program workshop, and 12 students finished the program.

During the workshops students drew on their extant experience of work and discussed set readings of scholarly literature about work-related learning, work-related behaviour, and self-management. Students engaged in scaffolded critical analyses of these papers, reflected on how the findings contributed to their understanding of their workplace, and conducted self-evaluations. In one workshop five recent BSc graduates came and spoke with the students for 90 minutes about their pathways to work. Academic staff members facilitated the workshops, and discussions in the classes were lively, insightful, and sometimes surprising.

Out of session, students completed a series of activities that included peer mentoring, reflective exercises, interviews with our research team, and interviews with science graduates. At the end of the program students submitted and presented a “Me in three” talk in which they explained what they had learned from the project. Evaluation data were collected from multiple source, including student and facilitator perceptions of curriculum effectiveness and student learning gains via surveys, interviews, and examination of learning artefacts (written responses and talks given by the students).

## Achievements and impact

This project provided a platform for discussion and discovery, with our academic colleagues expressing mixed opinions about whether it was an appropriate offering for Science students. Some colleagues were very supportive of the initiative – they expressed their concern about students and indicated that, in their opinion, our duty of care to students meant we should definitely be working to help students build their employability. Other colleagues saw the initiative as “soft”, lacking in rigour, and superfluous to a Science degree – they indicated that students should not do this activity in a for-credit course because it interfered with their deep content learning and disciplinary mastery.

In developing the curriculum for SCIWILWORK we are walking the line between helping students develop transactional employability skills and helping them develop a deep a set of transformational understandings about themselves and their identities as scientists. Although we sense that science academics at our university are willing to allow the transformational component to be part of the for-credit curriculum, we suggest they are less enthusiastic about the transactional learning. There is a feeling amongst our colleagues that transactional skills should be taught in co-curricular programs (e.g., by student services). What we found, however, is that many of the activities in the program helped develop both the students’ transactional skills and their understanding of the transformational value of a science education and of work. Additionally, although all the students had access to UQ student services, they had not used them to any great extent, suggesting that co-curricular implementation of the SCIWILWORK activities is likely to have minimal uptake and impact.

This work helped us understand that our students need help understanding and articulating their value as Science graduates and their places in the continuum of the science community. One student stated, “Scientists are not creative”, while others questioned the value of understanding the history of one’s discipline. When asked to write down their strengths, one student was unable to write anything other than “knows science”, and many were surprised to find that they had multiple skills and attributes they had not previously considered saleable.

Our students also need help with the basics of finding work. For example, none of the students understood that (i) job advertisements have explicitly articulated or implicit selection criteria, and (ii) these criteria should be addressed in an application. They also lacked basic awareness of how to articulate their skill sets to others in an interview situation. Clearly they need instruction and practice in these basic skills.

Very pleasingly, not everything we learned from the students was a cause for concern. The classroom discussions were lively and fun. Students were keen to meet each other and support each other as they learned and progressed. As they described their weaknesses to each other they offered to help by teaching skills, acting as critical friends, or taking other students into social situations that they found challenging. The students were also eloquent and articulate, once they learned that they were required to prepare for and speak in the classroom. They had interesting opinions, and they developed the capacity to argue with one another in a positive and respectful way. They asked that one of the rules of the classroom be “in the beginning of each workshop we take 5 minutes at our table to get to know each other”. They also quietly came to academics in the room, presented problems at work, and asked for help using their newly learned phrase: “I would value your advice”.

The feedback during the “Me in Three” sessions was extremely positive. Quotes from three students are shown below.

## Me in three quotes from three student participants

I learnt that I need to market myself not as a student but as a future professional. Engaging with everyone as a potential person that may know someone to employ me has made me optimistic about how I can grow my network. (Student 1)

Through the program, and really identifying the skills I already had and the skills I was learning in my Science degree, I have actually applied and interviewed for a job (after really addressing the selection criteria!!). Without completing the SCILWORK program, I would not have even considered applying for this role. So, all being well, this is the direction my career will take from now. (Student 2 – post-script: the student did get this job!)

The most impressive session for me is mentor and mentee activity. As a mentor, I needed to get myself well-prepared and tried to link the message to the daily activities of the mentee. By doing so, I can engage and interact more with the mentee. As a mentee, it is a great opportunity for me to learn from others. During the process, I paid extra attention and showed great interest. I found that asking questions is an effective way to interact well with the mentor. (Student 3)

Our experience suggests there is a need for a tailored, for-credit offering like SCIWILWORK in the BSc program at UQ. We believe that what we have done is embedded beyond the project and that it will continue to evolve as an initiative that will be offered to students in the FoS.

## Emerging Issues and next steps

We will continue to develop this unit during 2017. The curriculum and its evaluation will be presented to academic staff in FoS and other engaged stakeholders for consultation. After any required amendments, the curriculum will be submitted in 2017 for establishment as an elective course in FoS degree programs.

Our next challenge is to embed employability and work-readiness training into the BSc at UQ. There are several ways in which we can do this. One option is to provide a full 2-credit course that is dedicated to developing employability – something very similar to SCIWILWORK, but in an extended form with a full set of workshops and assessment items. Another option is to develop a set of activities that can be fitted into courses at various levels of the degree to help students develop their employability. Both approaches have merit, and both will be explored in 2017 through a UQ Teaching Fellowship awarded to team member Rowland.

The UQ Student Strategy will also provide funding for each Faculty to develop a WIL program. Our team will work closely with the FoS to help define how best to develop and sustain WIL for our students. We will begin by mapping all of the WIL activities that are currently offered in the BSc.

## References

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