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Industry Partnered Learning: A strategy to enhance STEM student employability and career development

Angela Carbone, Belinda Domingo, Jing Ye, Gerry M. Rayner
Learning, Teaching & Quality, STEM College, RMIT University, Australia.

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Abstract

This paper outlines an approach by the STEM College, RMIT University to enhance student employability and long-term career outcomes by embedding Industry Partnered Learning (IPL) across STEM degrees. Through a curriculum mapping exercise led by the Learning, Teaching & Quality Portfolio in the STEM College, we identified gaps in integrating career development, employability skills and industry engagement throughout these degrees. To address this, we developed STEM IPL Standards aligned with institutional principles, providing a structured framework for embedding industry engagement and professional connections within curricula. The outcomes highlight the importance of a whole-of-program approach to career development, moving beyond late-stage WIL experiences to create more scaffolded development for students. This structured approach provides a model for colleges seeking to better prepare students for their future careers through IPL-related curriculum innovation.

Keywords: *Industry Partnered Learning; Career Development Learning; Industry Embedded Activities; Work-Integrated Learning; Graduate employability*

1. Introduction

Efforts to enhance graduate employability and long-term career outcomes have driven the global adoption of work-integrated learning (WIL) across institutional and disciplinary contexts. Vocationally aligned degrees, such as nursing and teaching, have long embedded industry placements and internships as integral components. Contrastingly, disciplines such as arts and science, while fostering valuable generic skills, have often provided less clearly defined pathways to employment after graduation (Palmer et al., 2018). To address this, WIL initiatives have expanded to include internships, placements, research projects, and field trips (Kaider et al., 2017), with evidence of their benefits in boosting student engagement, academic success (Trede, 2012), graduate employability (Jackson & Cook, 2023), and skills development

(Jackson, 2013). Despite such evidence, WIL remains predominantly confined to the later stages of degree programs, such as capstone courses and final-year placements. What is often missing is a holistic approach to integrate career development, employability skills, and industry-engaged activities across degrees.

In response to both national (Social Research Centre, 2020) and institutional data showing a lack of career readiness and low graduate employability in areas of Computing, and Natural and Physical Sciences, RMIT University implemented the Industry Partnered Learning (IPL) framework in 2021. The framework aligns with the Australian Government's Job-Ready Graduates Package and National Priorities (Australian Government, 2020) and strengthens the Government and tertiary sector focus on graduate employability.

This paper outlines the approach the Learning, Teaching & Quality (LTQ) Portfolio in the STEM College undertook to scaffold IPL in their undergraduate Science and Computing programs. The LTQ Portfolio provides support in designing and delivering strategic learning and teaching initiatives, drawing on expertise from third space professionals such as learning specialists, learning designers, and quality teams. The Scaffolded IPL Project aims to determine the extent to which its STEM curricula embed industry experiences and connect learners with industry and professional communities. The project had four main objectives:

1. Map IPL activities across programs and identify IPL gaps in curricula
2. Set STEM IPL Standards to guide expectations of IPL activities in programs
3. Support Program Managers and teaching teams to gain a solid understanding of IPL
4. Embed scaffolded IPL activities in all STEM undergraduate programs.

2. Background

2.1. What is IPL?

IPL embeds industry engagement and professional connections into curricula, meeting RMIT's promise of authentic, industry-ready pedagogy. The University's IPL framework provides high-level principles to be interpreted and implemented within College programs. Developed with industry input, the IPL framework is grounded in contemporary theories of experiential learning (Kolb, 1984), the 'learning view' (Campbell et al., 2021), and service learning (Hickey, 2016), bridging discipline knowledge and skills with real-world practice. While IPL aligns with other WIL models that connect course and industry learning, such as cooperative education (Jackson & Cook, 2023) and apprenticeship programs (Hughes & Saieva, 2019), IPL is designed as a systemic, whole-of-course experience for students, connecting learning with career development and strengthening their employability skills. The IPL framework comprises three elements: Career Development Learning (CDL), Industry-Embedded Activities (IEA), and Work Integrated Learning (WIL) (Table 1).

Table 1. The three interconnected IPL elements (CDL, IEA, WIL) at RMIT University

Element	Descriptor	Examples
Career Development Learning (CDL)	CDL prepares students for career management and equips them to plan and make informed career decisions as they develop a professional identity. Students can better articulate their skills and knowledge to future employers.	Career planning and reflection Industry networking Professional identity development Mentorship opportunities
Industry Embedded Activities (IEA)	IEA embeds industry and community partner contributions into curriculum activities not independently warranting academic credit. When strategically integrated with CDL, these activities are credit-bearing outcomes.	Guest lectures, industry panels Industry co-designed assessments Hackathons, competitions Entrepreneurial activities Joint research projects
Work Integrated Learning (WIL)	WIL integrates practical, real-world work experiences into curricula, enhancing students' employability through discipline-specific industry experiences with targeted pre- and post-experience support. Students engage with real-world problems and collaborate directly with industry and community partners	Placements, internships Industry co-designed projects Simulated workplaces Capstone courses Online WIL via Industry Partnered Online Learning (IPOL) projects

RMIT's programs have structured curriculum blocks: a foundational first-year block (FYB), a major (primary focus study area), a minor (secondary focus study area), and a capstone. The IPL framework mandates one IPL experience in the FYB, two in a major and one in a minor.

2.2. IPL Principles in the RMIT Curriculum Architecture

Implementation of IPL at RMIT is guided by four principles (RMIT University, 2023a):

- **Integration:** IPL is embedded across all programs, scaffolding WIL, career development learning and industry/community connections throughout curricula.
- **Alignment:** IPL is fully integrated and contextualised within RMIT curricula, aligning with the University's Capabilities framework.
- **Employability-Focused:** Underpinned by data, IPL is designed to enhance students' employability, deepen their understanding of industry, inform career planning, and strengthen professional identities.
- **Applied and Equitable:** IPL ensures accessibility and equity, incorporating authentic, meaningful assessments.

3. Research methods

The study was grounded on RMIT institutional frameworks and strategies, including the College's Education Plan. The Plan identified IPL as a key priority to deepen students' understanding of their values and professional aspirations, refine their career identity, awareness and opportunities, and enhance their engagement with networks and industry. IPL was also framed contextually with the RMIT Capabilities: Ethical Global Citizens; Connected; Adaptive; Digitally Adept; Expert; Critically Engaged (RMIT University, 2023b).

An important part of the Scaffolded IPL project was the LTQ team's engagement and collaboration with the University's Education Portfolio and school leaders, together with course coordinators and academics at the teaching coalface. This process facilitated a bottom-up approach, as relevant educational leaders provided the context for program and course coordinators, and strong leadership and support to strengthen educator engagement to design and implement context-specific IPL in bespoke learning activities.

The Scaffolded IPL Project comprised two phases. Phase 1 included two parts: (i) Mapping of IPL in Science and Computing programs; (ii) Development of STEM IPL Standards based on the institutional principles. This paper reports on Phase 1 of the Scaffolded IPL Project.

Phase 2 of the IPL project, to be reported later, focuses on implementation of discipline-specific, capability development workshops for educators to review IPL mapping and address IPL gaps, evaluate their understanding of IPL, the strength of their industry connections and perceived challenges to the implementation of IPL in their programs.

3.1. IPL Mapping

The mapping of IPL activities across programs was a crucial first step in benchmarking industry engagement and identifying opportunities for enhancement. The mapping used CDL, IEA, and WIL descriptors (Table 1) to categorise and analyse the extent of IPL across five programs in the Schools of Science (SSCI) and Computing Technologies (SCT).

IPL mapping involved a comprehensive analysis of and course syllabi to identify explicit references to student career development and industry interactions. A systematic approach was used to the location and sequencing of IPL experiences in the first-year block, and in minors, majors and capstone courses. Key elements reviewed were course learning outcomes (CLOs), assessment tasks, and industry-partnered components (e.g. industry guest lectures, industry projects, placements and career planning activities). A framework, developed by LTQ, linking CDL-specific CLOs to RMIT's Graduate Capabilities (Table 2) was used to determine where CDL was taught, practiced and assessed across early, mid and late stages of a program.

Table 2. Framework linking CDL-specific Course Learning Outcomes and RMIT Capabilities (*Italicized*) across early mid and late stages of a program

Early (Introducing)	Mid (Reinforcing)	Late (Mastery)
Explore individual interests, motivations, and values related to career options and industry expectations *(Adaptive)*	Demonstrate awareness of career progression, industry trends and the evolving nature of work *(Critically Engaged)*	Articulate a clear professional identity, integrating feedback from peers, mentors, and industry *(Adaptive)*
Identify personal strengths, areas for growth and strategies for adapting to change and new opportunities *(Adaptive)*	Reflect on personal values, interests, align with professional practice opportunities and career paths *(Adaptive)*	Develop a career management plan that includes strategies for adaptability and lifelong learning *(Adaptive)*
Discover and connect with professional groups, networks, and associations relevant to career interests *(Connected)*	Actively engage with professional contacts, build connections in industry and community settings *(Connected)*	Develop strategies to strengthen, maintain industry and professional networks *(Connected)*
Investigate digital platforms and tools relevant to professional and enterprise opportunities in the field of study *(Digitally Adept)*	Apply digital skills in *workplace or simulated contexts*, integrating these with interpersonal and professional competencies *(Digitally Adept))*	Validate proficiency in using digital tools to solve complex problems, collaborate, communicate in professional settings *(Digitally Adept))*
Identify key skills, qualifications, and industry expectations related to the field of study *(Critically Engaged)*	Investigate employment landscapes, use insights to create a critically informed career plan *(Critically Engaged)*	Critically evaluate career options using self-awareness and industry insights *(Critically Engaged)*
Develop a plan for activities aligned with career goals and skills development *(Expert)*	Use reflection to refine career goals based on professional experiences *(Expert)*	Assess advanced professional skills, aligning expertise with career goals *(Expert)*

The type and sequencing of IPL experiences in a program were then classified based on their location (early, mid, or late stages) and the nature of the IPL (CDL, IEA WIL). This mapping generated an 'IPL program map', highlighting both strengths and gaps for further review and remediation. Particular attention was given to the extent of structured scaffolding that provides students with engagement with industry at multiple points in their program. Insights gained through the mapping informed part (ii) of the project: the IPL STEM Standards.

3.2. IPL Standards

To operationalise the IPL Principles, the STEM IPL Standards were designed to provide structured guidance for implementation and application by program teaching teams. Development of the Standards was iterative and collaborative, underpinned by contextual education research (Dean et al., 2022) and best practices in employability skill development (Jackson, 2015). Initial drafts were developed, incorporating insights and feedback at multiple

stages from academic colleagues and curriculum leaders across the STEM College, allowing for progressive refinement before educators to consider. For practical application, an exemplar IPL-embedded Biotechnology program was used as a model for educators, illustrating how discipline-specific learning activities can authentically meet the STEM IPL Standards.

4. Results and Discussion

4.1. IPL Mapping

Mapping of IPL in the SSCI (85 courses) and SCT (28 courses) revealed strengths and areas requiring development. While both Schools had implemented early-stage CDL, together with reflective assessments, and IEA, they differed in how IPL was distributed across programs.

For the SSCI, IPL activities were concentrated in later stages of programs, typically through capstones or final-year WIL experiences. However, there was a lack of mid-stage CDL & IEA strengthening (together with associated assessments), both of which are crucial for progressive skill development and industry exposure before students undertake their final year.

Programs in the SCT included early-stage IPL activities, connecting students with industry early in their programs. However, later-stage IPL experiences, particularly those focusing on mastery and professional readiness, were less developed. While capstone projects exist, WIL delivery varied across programs; some offered robust, structured WIL experiences with strong industry engagement, while others had few or no WIL opportunities embedded. This inconsistency underscores the need for enhanced industry engagement initiatives to ensure all students are adequately prepared for complex, real-world professional challenges.

For both Schools, IPL was absent in certain minors and the lack of explicit integration of CDL into Course Learning Outcomes (CLOs) meant it was absent in some assessment activities. While some IEA was identified in early and mid-stages of programs, it was rarely assessed.

4.2. IPL Standards

The IPL Standards (Table 3) were structured to articulate expectations and provide guidance on how IPL activities can meet the Standards. The Standards provide criteria for embedding CDL, IEA, and WIL at early, mid, and late program stages, together with discipline-relevant examples of IPL activities, drawn from existing practice for adoption by educators.

Table 3. The STEM IPL Standards

#	Standard
1	IPL experiences are sustainable and meaningfully embedded across a Program
2	WIL activities are student-focused and authentic, providing students with opportunities to gain valuable professional experience and apply their learning in novel employment contexts
3	CDL is scaffolded at Early, Mid and Late stages of a program, in both disciplinary and interdisciplinary contexts
4	IPL activities [such as Industry Embedded Activities (IEA)] connect theory with practice to enhance students' professional identity and employability skills
5	IPL activities integrate, strengthen and assess future-focused RMIT Capabilities &technologies
6	IPL activities include co-curricular, career-related events contextual with curricula
7	IPL is co-designed with industry/community partners, using authentic pedagogical principles, including active learning
8	IPL is informed and refined by evidence and data from multiple sources
9	IPL activities are equitable and accessible to support diverse learners and support our culture
10	Assessment of IPL activities must be authentic, enhance students' higher-order thinking skills (such as reflection) and the application of knowledge and skills

As IPL practices evolve and further discussions take place in the next phase of the project, the STEM IPL Standards remain a living document, subject to ongoing refinement and application. Future iterations will incorporate structured validation with industry partners to ensure the Standards reflect evolving workforce needs, strengthen industry-university collaboration, and enhance student readiness for professional practice.

5. Conclusions and future work

This paper outlined the approach undertaken by the LTQ Portfolio to scaffold IPL across undergraduate programs. Systematic IPL mapping across SSCI and SCT identified strengths and areas for improvement, particularly the need for mid-stage IPL scaffolding and greater integration of CDL with specific CLOs and assessments. Leadership within Schools and LTQ support from third space professionals have been central to this process, facilitating implementation and reinforcing IPL as a core curricular component of programs.

To strengthen IPL integration, CLOs should be reviewed and aligned with the CDL framework, ensuring structured progression from early (Introducing CDL concepts), mid (Reinforcing and applying CDL skills) to late (Mastering CDL competencies) stages of learning. Additionally, assessment tasks should be refined to explicitly evaluate CDL outcomes, enabling students to demonstrate and articulate their industry-related learning to better align with professional expectations. Stronger integration of IEA with CDL, with contextual assessments, will enhance

students' industry connections, employability skills and ability to recognise and leverage industry-related learning and career progression.

Phase 2 of the project will focus on educator capability development through discipline-specific workshops to support staff in authentic IPL design and scaffolding, using the IPL Standards. We will also evaluate Program Managers' and teaching teams' understanding of IPL, and by capturing IPL activities embedded in STEM undergraduate programs, determine the project's impacts to refine IPL scaffolding. Finally, Phase 2 will provide insights into how the project meets industry and workforce needs, further informing future curriculum development.

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