

A WIL assessment meta-framework for discipline-specific employability learning

Karen Young¹, Kelly Miller¹, Sharon La Fontaine¹, Stuart Palmer², and Malcolm Campbell¹

Corresponding author: Karen Young (k.young@deakin.edu.au)

¹ Deakin University, Victoria, Australia

² WorkSafe Victoria, Geelong, Victoria, Australia

Abstract

Work integrated learning (WIL), particularly placement-based WIL (P-WIL), has gained momentum in Higher Education over the last decade as an educational strategy for enhancing student employability. However, there is very limited guidance on effective ways to embed and scaffold WIL assessments across courses (degree programs). We present the findings from an action-research study, purposed with building academic confidence to review and re-design existing assessments to have intentional and explicit employability foci. Key to the study was the sharing of existing WIL frameworks to build practitioner expertise. What arose was a notable intersection of similar, but unplanned assessments focused on career development learning, authentic assessment, and/or demonstrations of theory-to-practice performance during WIL activities. What was lacking was a means for designing an intentional holistic schema that tagged a suite of assessments dedicated to the development and demonstration of student employability across the course. An outcome was the creation of a novel meta-assessment WIL framework (WAM-F) that supported and purposefully integrated previously independent items: 1) career development learning; 2) transferable skills development; 3) reflections from professional practice theory-to-practice WIL experiences; and explicitly tethered these to the discipline orientation of the course. The overt tethering of discipline-specific learning outcomes to a range of WIL activities, via a course-wide approach, not only assures the regulatory requirement for all WIL experiences to contribute to, scaffold and develop the learning outcomes of a course, but also makes sense of emerging educational approaches for STEM teaching teams not always familiar or confident with how to embed fit-for-purpose employability learning.

Keywords

work integrated learning (WIL), assessment framework, STEM, career, authentic

Introduction

Work integrated learning (WIL) experiences are positioned as a strategic priority in Higher Education (HE) as an educational approach for enhancing student employability (Billett, 2015; Oliver, 2015; Sachs et al., 2016). The growth in WIL experiences for HE students has grown significantly in recent years. In Australia, more than one in three university students have had at least one WIL experience (i.e. placement-based WIL (P-WIL); industry/community project; online, virtual and simulated work; and

foundational curricula co-designed with industry preparing students for the world of work), with more universities now moving beyond P-WIL as the only WIL opportunity (Universities Australia, 2019). This reveals the extent to which institutions are prioritising WIL as an accepted educational approach. Indeed, at the institution in which this study took place, the entire curriculum framework (not just the design and practice of WIL approaches to curricula) supports the University's strategic intent to generate graduates who are employable and engaged citizens who are ready for the jobs and skills of the future.

The future-readiness discourse speaks to Knight and Yorke's (2003) definition of employability and remains relevant today: 'A set of achievements - skills, understandings and personal attributes - that make individuals more likely to gain employment and be successful in their chosen occupations, which benefits themselves, the workforce, the community and the economy'. It is particularly relevant in strategies designating WIL as a vehicle for enhancing student employability. Also relevant to understanding employability is the USEM model of Employability (Knight & Yorke, 2003), a well-regarded and recognised architecture for understanding the key concepts of employability. However, we posit that this model, whilst extremely useful for pinpointing key elements of career development learning (CDL), does not explicitly tie in P-WIL and authentic assessment (AA), nor how to integrate CDL in a programmatic way, and as such, a new schema for conceptualising WIL as a vehicle for enhancing employability across an entire course (degree) of study is timely.

A breadth of WIL, across a course, is reported as critical for enhanced employability (Daniel & Shircore, 2012; Oliver 2015; Kaider et al., 2017; Rowe & Zegwaard, 2017; Dollinger & Brown, 2019; Young et al., 2019; Dean et al., 2020). It is well documented that a key feature of quality WIL programs tends to be an inclusion of placement-based WIL that builds on previous authentic learning experiences (Bates & Hayes 2017; Daniel & Shircore, 2012). Orrell (2011) provides a set of good-practice principles that determine the characteristics of a quality WIL program as those that are 'integrated into the curriculum so that they have clear educational expectations and are a vehicle for integrating theory and practice learning.' (p, 20) As WIL matures across the HE sector, expansive WIL models that consider WIL learning opportunities beyond placement (Collis, 2010) are essential for building sustainable and scalable programs. Programmatic approaches to assessments that collectively cumulate to an enhancement of student employability is key (Young et al., 2019).

However, exactly how courses (and particularly the teaching teams of those courses) can collectively and effectively design a constructively aligned suite of assessments dedicated to the iterative development and demonstration of discipline-sensitive employability skills remains nebulous. Orrell points out that 'assessment is one of the biggest challenges in designing WIL programs. Universities are reluctant to move beyond commonly accepted notions of objectivity and reliability that govern on-campus assessments' (2011, p. 9). The challenge of WIL assessment relates to the need for assessments that are co-designed with industry to align with current authentic practices (Schultz et al., 2022). This is complex because WIL requires a move beyond the normal consideration of the formal teaching and assessment of content, to consideration of workplace learning relating to that content and the assessment of both theory and practice. This highlights why WIL assessment design is complex (Orrell, 2011) but critical (Ferns, 2014) when positioned as an educational strategy for developing employability.

Assessments that capture and evidence both employability skills and work-readiness in relation to work-related practices (Boud & Falchikov, 2006; Boud et al., 2020) reveal another challenge - the tension between in-context discipline-specific knowledge/skills and relevant professional attitudes/competencies (Gulikers et al., 2004; Hildebrand, 2005; Khaira & Yambo, 2005; Poikela, 2004; Smith & Koshy, 2005; Wajrak & Perkins, 2005; Lasen et al., 2018), that are best experienced in proximity to the workplace (Jorre de St Jorre & Oliver, 2018) and with industry experts (Kaider et al., 2017).

The project & the studies: a collective and cumulative building of practices

This study (and the connected WIL on Campus (WOC) project (Young et al., 2022) was part of a series of action-research studies, where nominated academic staff became participants of sponsored research projects to gain a deep understanding of practices related to WIL. These project-based curriculum-led projects were part of a strategic reform to enable innovative WIL approaches, not just for individual assessments or specific one-off cases in units, but our collective practices as a Faculty. The operational imperative to continue to lead good practice in WIL is traced in many of our published action-research studies (Willems et al., 2016; Kaider et al., 2017; Young et al., 2017; Hains-Wesson & Young, 2017; Pollard et al., 2018; Young et al., 2019). A published case study of our strategic approach summarises the series of participatory action-research WIL projects undertaken in our Faculty (Young et al., 2022). It reports on the culmination of all action-research findings as the evolution of whole-of-course approaches to WIL enhancement. What surfaced were two interrelated cultural findings: what was important to individual educators and then what was collectively valued (Young et al., 2017; Young et al., 2019) to enable curriculum shifts (Young et al., 2021a).

This study, as per previous action-research studies, relied on a scholarly approach (Boyer, 1990) to support observations, desk-top audits and discussions during curriculum workshops, and to ground our lived practices (past, current and planned). The primary aim was not to undertake a curriculum review per se, but rather, to empower our staff to update our courses (degrees) to ensure that graduate learning outcomes aligned with contemporary, real-world practices. The monitoring of the curriculum signalled a need to build the capability of academics to innovate assessments relating to WIL approaches to curricula. The secondary aim was to support academics to know how to undertake practice-led self-regulated review (and potentially renewal) of assessments that they, or their colleagues, had designed and implemented. Underpinning the need for updates was a dedication to holistic, course (degree)-wide learning, which we expressed as scaffolded approaches to WIL assessment. The key was to empower those at the coal face to know when to and how to integrate CDL and authentic assessment (AA) approaches to units designated as WIL-oriented units (i.e. not just P-WIL units).

The difference in approach for this study was our single focus on scaffolded WIL assessment as a means to improve a collective mission to enhance student employability across the Faculty. The sharing of WIL assessment literature (Lodge et al., 2023) was a way of building the capability of STEM academics to consider non-traditional assessment practices. We made a point of sharing research from scholars within our institution to provide a context-rich approach to the principles of quality WIL assessment design (Kaider et al., 2017; Boud et al., 2020). The objective was to provide an evidenced-based approach, including findings and suggestions by our institution's WIL experts, to encourage our STEM academics to trial new educational approaches to foster employability learning.

This scholarly approach to building the capability of self-nominated staff to become WIL champions (Young et al.; 2022; Young et al., 2017) was common across all our studies. However, in this instance, while the approach was the same, the goal was broader. The goal was for more STEM academics (including those that did not perceive themselves to be WIL champions), to engage in WIL approaches actively and effortlessly as a vehicle for enhancing student employability. This was strongly influenced by the call from the Office of the Chief Scientist (2013) for current STEM hegemonies to: 1) offer more than placement-based WIL activities as an employability learning vehicle; 2) avoid bolted-on career development learning (CDL) curricula; and 3) reduce prioritisation of discipline-only content knowledge acquisition, transmission and testing (Edwards et al., 2015). These three aims were correlated to a significant observation that the uptake of WIL gained traction when the WIL activity was closely tied to the discipline via assessment (Young et al., 2019).

The perceptions of STEM educators in relation to reforming traditional science pedagogies and assessments (Pollard et al., 2018) provided insight into (STEM) teachers' experiences in undertaking assessment-led reform. A major driver in preparing graduates for the workforce was initiating

authentic assessment reform across the Faculty. In 2016, projects were launched with a focus on industry-oriented curricula (Young et al., 2017; Schultz et al., 2022) and soon after, the compulsory inclusion of a core placement preparation unit, which later evolved into a foundational CDL and WIL unit (Young et al., 2021b). These innovations meant that whole-of-course approaches to WIL were enabled.

We highlighted the power of a series of minor, scaffolded, changes to assessment design, as a means for collectively increasing the embedded employability content and assessment. We presented this as a WIL assessment framework, titled 'WAM-F', explaining that the schema is a novel Faculty-centric course-wide approach to enhance student employability outcomes through WIL. Previous studies revealed that in general our academics prioritised their discipline-specific research and the research output that impacted on content teaching (Young et al., 2017). We shared examples with academics of assessment re-design and findings from Faculty-centric studies so that we could trial a model that would provide even greater emphasis on discipline and course-specific outcomes, than our previous usage and adaptations of WIL typologies and frameworks had done to date.

We explained, at the onset of the action-research, that the rationale and intention for the review and renewal process was to continue the focus on discipline-specific outcomes of the unit and course, but tethered explicitly to a broader employability lens. We shared how science academics were being encouraged by the Office of the Chief Scientist (2013) to rethink the way in which knowledge and content-heavy material was being delivered and to integrate transferable skills, via WIL, into discipline specific knowledge and skills (Edwards et al., 2015). As Reif (1995) argued (notably over two decades ago), it is not the memorised facts that should be important in STEM assessment design, but rather the understanding and practical application of them in changing real world contexts. There have also been recent calls for scaffolded applications of discipline content combined with the demonstration of generic capabilities nested in real-world contexts, across an entire program (Lasen et al., 2018).

During discussions about the possibility of changes to assessment design, there was an initial trepidation by academics in our Faculty to respond to the call to transform assessments to have an employability-lens (Young et al., 2017; Young et al., 2019). The avoidance was similarly described in the study of WIL assessments by Abeysekera (2006) and not uncommon for the discipline area. In STEM, an improved, measurable balance between content knowledge transmission and acquisition and work relevant skills and capabilities (Rayner & Papakonstantinou, 2015), as well as the design of whole-of-course curricula to include varied WIL experiences (Collis, 2010; Greenbank, 2002) has been a challenge. The findings gleaned from previous related studies (Young et al., 2021b; Hains-Wesson et al., 2020) indicated that the transformation of curricula to incorporate embedded and scaffolded learning associated with enhanced employability skills, is challenging both in philosophy and practice for many STEM academics.

Traditional assessments, predicated upon the measurement of the acquisition of discipline-specific knowledge through memorisation of factual information, miss the application and practice elements integral in WIL approaches to assessment. There is also a recognised need for curricula to be linked to industry-oriented learning for enhanced employability (Edwards et al., 2015). However, in STEM, and in particular in the sciences, outside of research pathways, there are a range of challenges in linking universities with industry for the purpose of integrating theory-to-practice learning through authentic assessment (Bosco & Ferns, 2014; Young et al., 2017).

A barrier to progress in contextualised STEM education has also been the lack of a shared definition of authenticity and authentic assessment (Rowland et al., 2016). STEM academics do not always agree and may be uncertain of how to re-imagine traditional assessment profiles that develop and evidence rigorous academic standards for work-related performances and outcomes (Young et al., 2017; Clarke & Burdett, 2007). Young et al. (2019) report that the inclusion of WIL within the curriculum has been noted by some academics as potentially diminishing the time needed to teach, practice and assess fundamental discipline knowledge and skills. The employability literature reveals that academics can

no longer prioritise discipline-specific content, concepts and theories over the explicit development of the professional skills necessary for work-readiness, employability and contextualised career development learning and career transition (Smith et al., 2016; Hansen et al., 2022).

Review of WIL frameworks

The sharing of WIL assessment literature, and in particular, the critique of well-regarded WIL frameworks was fundamental to building academic capability around scaffolded WIL assessment design. Indeed, the unexpected need for a WAM-F was born out of a gap between our theory of scaffolded employability-oriented, discipline-sensitive assessments and practice. In this way, when the following series of frameworks were shared and presented, the theory of WIL approaches to assessment was gained, but a contextualised practice for developing a STEM-centric integrative and scaffolded demonstration of learning was still lacking.

Such was the case when the Expanded Authenticity and Proximity Framework (EAP) by Kaider et al. (2017) was applied to our Faculty context as a means for building capability. The two dimensions of authenticity and proximity in the EAP framework were useful for denoting how and where particular WIL activities and WIL assessments might be plotted within the axes. The plotted positions highlighted the next step - the need for an intentionally connected series of assessments (perhaps building from lower authenticity and proximity to higher authentic and proximal discipline-sensitive assessment examples). The WIL Convergence Curriculum Framework (WCCF) by Young et al. (2017), shared across the Faculty was also useful as an aid to showcase the value of including industry-oriented approaches to WIL curricula but needed to do more in terms of building STEM academics' capability relating to scaffolded WIL assessment design. The use, and also the limitations, highlighted the need for multiple forms and iterative instances of industry-oriented curricula (with a focus on AA and WIL) that integrated CDL and the discipline. Both frameworks and the subsequent visuals arising from our lived-practice assessment mapping, revealed an evidence of WIL assessment across our curricula, but revealed a shortfall in how to improve the alignment and scaffolding.

At the time, one of the disconnected, but promising areas, was CDL. To improve the connections between CDL assessments, two CDL models were presented as a means for theorising the 'what' of CDL and the possible 'how to' of improving scaffolding. We wanted a way to collectively build capability related to discipline-sensitive employability learning enhancements. USEM (Knight & Yorke, 2003), was useful for pointing out critical concepts for CDL. For our purposes, when an integration of assessment approaches and a scaffolding of those assessments was prioritised, the connection of discipline sensitive skills and knowledge (employability skills, mobilised with WIL approaches as the vehicle for tethering the learning to discipline-specific skills) particularly across an entire course of study, for our academics was still unformulated. The Work-Integrated Learning Curriculum Classification (WILCC) Framework (Dean et al., 2020) was useful for the way it included the explicit embedding of CDL as a series of assessment tasks from career planning through to employment acquisition. Dean et al. (2020) exhibited the way in which students learn through WIL. However, again, the connection to the assessment design, particularly across an entire course of study, for our academics was still not overt. Finding explicit and instructive ways for enabling STEM academics to re-approach assessments in an integrative way was flagged for action.

While the sharing of the various frameworks aided conceptual understanding and were invaluable for enabling a critical examination of avenues for enhancing the lived practice of assessment design (and therefore capability), the missing parts of the support required for the curriculum enhancement process were just as important. For example, the mapping/plotting of the multiple WIL activities (made possible because of the framework by Kaider et al., 2017) and the possibility of more industry-oriented assessments (suggested via the framework by Young et al., 2017), the rationale for including CDL (via the frameworks by Dean et al., 2020 and Knight & Yorke, 2003) traced a momentum toward an integrated assessment profile. An attention to the assessments (leaving aside the mapping of the

learning supporting the assessment) was a pragmatic means for narrowing the enormity of the process ahead of us if we were to enhance STEM curricula to move beyond just the discipline (Edwards et al., 2015). This approach is not uncommon to many curriculum review processes where evidence of intended learning in the curricula is measured via assessment.

A new framework for WIL assessment — the WAM-F

An unexpected and yet positive outcome from our wider WIL on Campus (WOC) project (Young et al., 2022) was the need to create a WIL assessment framework – a course-wide schema that would capture how to intentionally integrate idiosyncratic, sometimes disconnected and even overlapping WIL assessment approaches, to better enhance student employability. We argue that scaffolded whole-of-course approaches to assessment design that integrate WIL and discipline content via an intentional and explicit assessment schema are necessary for enhancing student employability outcomes, and useful for empowering teaching teams at the coal face of unit-specific assessment design with a rationale for broadening the learning outcomes beyond discipline-only content. The novel WIL assessment meta-framework (WAM-F) fills a gap in the literature by offering a discipline-specific, authentic and proximal (Kaider et al., 2017) lens for encapsulating a course-wide assessment schema that integrates, and importantly, tethers CDL, WIL experiences, and work-related AA.

A founding principle of the meta-structure of this assessment framework is based on assessments that have workplace relevance. The framework prescribes and aggregates four curriculum dimensions for enabling course-wide design of multiple scaffolded assessments intended to develop work-readiness and enhance employability. These dimensions are: Integrated (I), Career-focused (C), Authentic (A) and Proximal with some authenticity (P>a) (Figure 1). The framework, when used as a meta-structure, is intended to guide the design of the suite of assessments for a well-conceived course. The varying scaffolded combinations of the three dimensions ‘C’, ‘A’, ‘P>a’ must be contextualised and purposefully integrated (‘I’) with the discipline across selected core units. Not all assessment tasks need to demonstrate all dimensions, nor does an assessment task need equal measures of each element. Instead, academics will need to consider the relevance and purpose for each of these elements not just in the individual assessment task, but also in the scaffolded assessment suite. Ideally, a ‘good’ suite of assessment tasks will translate all elements of the ‘C-A-P>a’ in course-wide appropriate ways. Academic teams, when designing well-conceived courses should not assume that every graduate will move into a discipline-focused role (Palmer & Young, 2021). A selection of assessments across a course should also require students to articulate (De Blaquièrre et al., 2019) and evidence a range of transferable skills to meet the criteria for a wide range of graduate professional roles.

‘I-CAP>a’ prioritises Integrative Learning as that which bonds the discipline with the ‘C’, ‘A’, and ‘P>a’ dimensions of WIL approaches to assessment. ‘I-CAP>a’ is a means for ensuring employability enhancement is intentional and purposeful across an entire course, so that assessments to develop and measure a student’s overall readiness for employment is visible and connected.

WIL Assessment Meta-Framework (WAM-F)

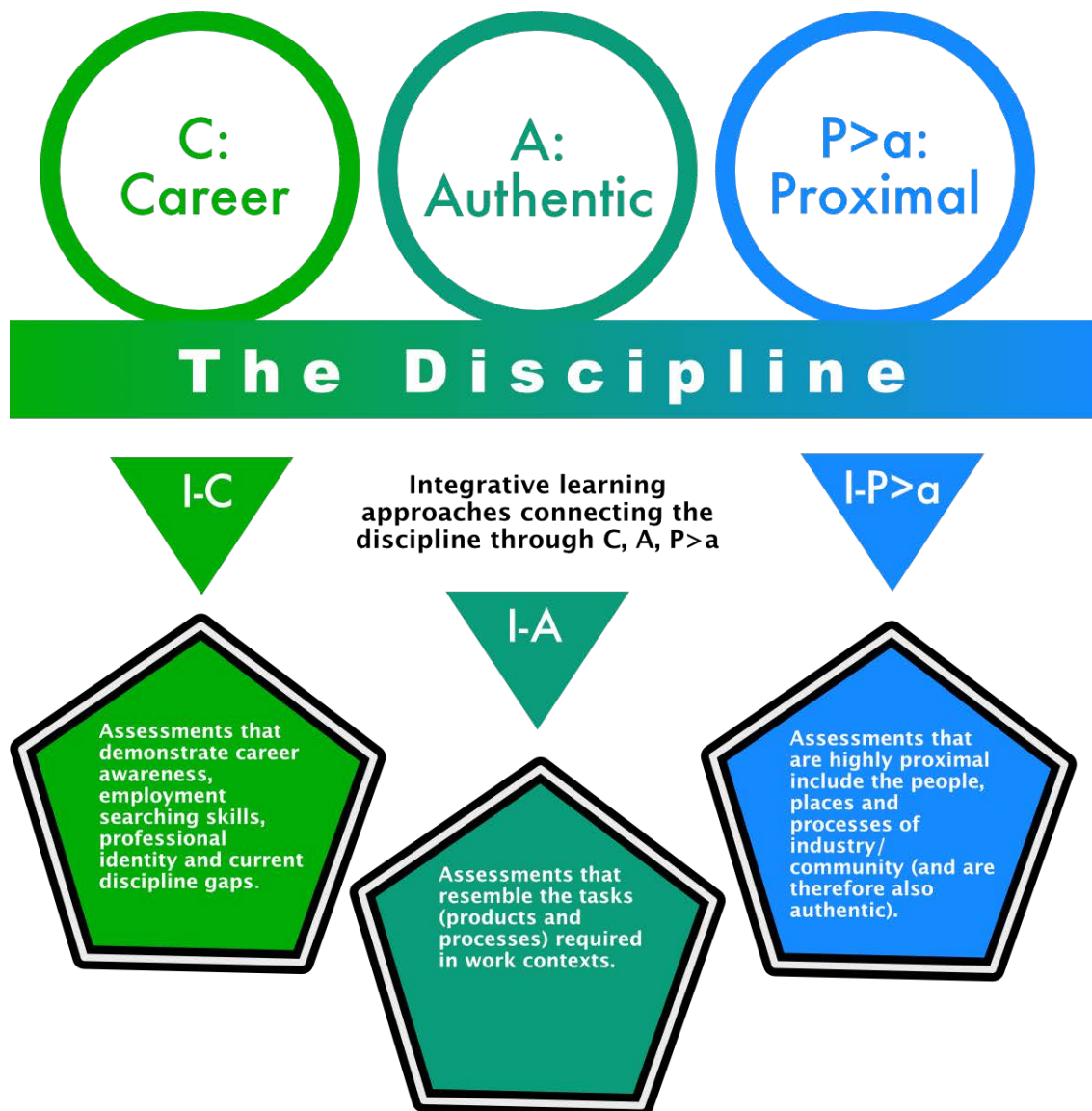


Figure 1: The WAM-F Detailing the 'I-CAP>a' Dimensions

Using this framework and approach, we can apply a similar mapping to Kaider et al. (2017) across the Authenticity-Career and Integrative Learning and Proximity-Career and Integrative Learning dimensions. Figures 2 and 3 show what assessment might look like across low to high measures of the respective characteristics. By adding career learning to considerations of authentic and proximal assessment tasks, the lower quadrants take on a different characteristic - the assessments begin to evidence the student's ability to use the work context to measure their work-readiness.

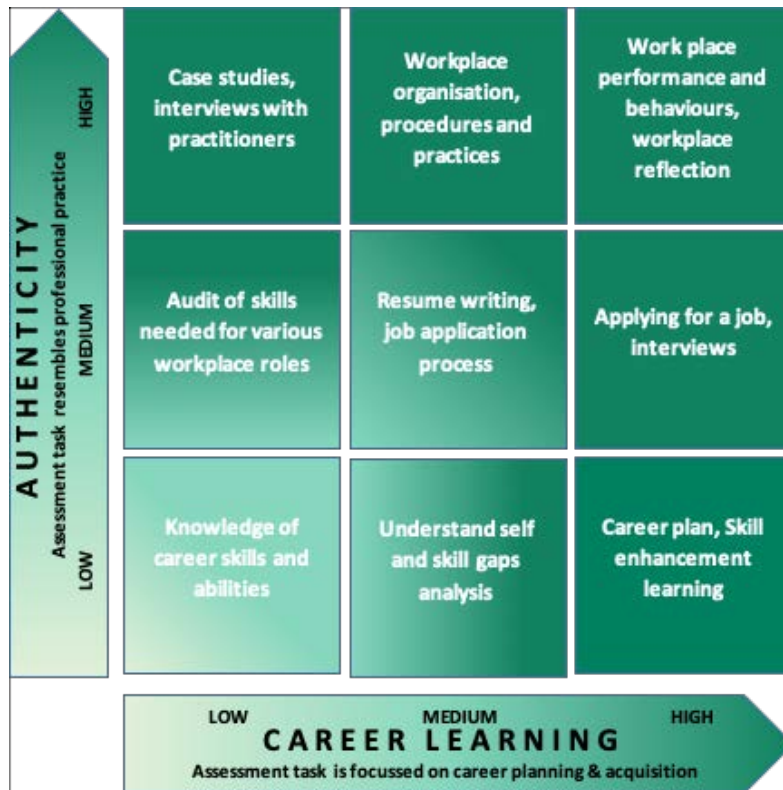


Figure 2: 'I-CAP>a': Integrative Learning Approaches to 'Authenticity/Career Learning' Assessment Dimensions for WIL Assessment (Adapted from Kaider et al. 2017)

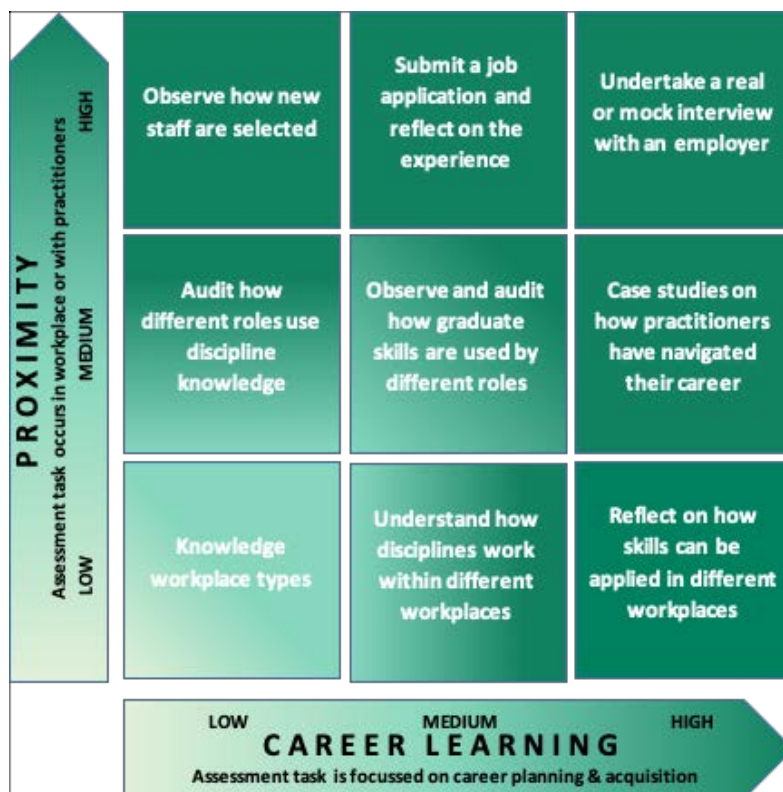


Figure 3: 'I-CAP>a': Integrative Learning Approaches to 'Proximity/Career Learning' Assessment Dimensions for WIL Assessment (Adapted from Kaider et al. 2017)

Dimension I: Integrative Learning

The dimension in which the lens of integrative learning is explicitly explored is in the 'I' dimension of the WAM-F. In the dimension of 'I' – integrative learning - the discipline is foreshadowed as inherent in student learning across the other three dimensions (CAP>a). This is where the measurable balance between discipline-specific content knowledge transmission and acquisition, and work-relevant skills and capabilities (Rayner & Papakonstantinou, 2015) is most obvious. For courses to make an impact upon work-readiness and employability, the 'professional' elements of a degree cannot be separated from the discipline and vice-versa.

Discipline-specific knowledge and skills are intended to be integrated with the career, authentic and proximal dimensions for enhanced employability skill development and thus work-readiness from a whole-of-course perspective. The WAM-F was designed to avoid disaggregation of WIL approaches from the STEM context. The tethering of discipline-based concepts and practices into the assessment tasks must remain central to ensure the effectiveness of course-wide WIL programs. For the achievement of course learning outcomes, assessment of learning should require students to engage in and demonstrate reflection on discipline knowledge integrated with real-world capabilities. Based on our anecdotal evidence accumulated over the many years of action research projects in the Faculty, we propose that the critical nature of the 'I' in the term WIL has often been overlooked. Integration is not only central to the learning approach, but absolutely essential to contextualise the knowledge that is being taught in the classroom. The 'I' dimension provides an opportunity to re-frame traditional STEM assessment profiles to include industry and work-related constructs to evidence employability learning and to drive new or more effective work practices. There are aspects of the discipline that should be encouraged to co-exist in meaningful ways. Traditional assessment forms (such as fact acquisition and memorisation) are still necessary. We suggest that when the acquisition of factual information is avoided in curriculum design, and instead, required to be demonstrated as knowledge and skills in context, then integrative learning is more effective for engagement and therefore a superior approach.

Dimension C: Career Learning

CDL is referred to in the WAM-F as career learning (CL). It is represented by the 'C' in the 'I-CAP>a' schema (see Figure 1). In the workshop, CDL, was referred to as the 'self-management of progression in learning and work, based on reflection on past achievements and what can be learned from and built upon these achievements' (Watts 2006, pp. 16). At this university, CDL is conceptualised as a combination of Watts' DOTS model and a model proposed by Bridgstock (2009) and implemented as an embedded career education program in partnership with the university's careers service (Hansen et al., 2022). It is a reflective and iterative process in which the 'acquisition of capabilities that are useful to the lifelong development and management of one's career, are grounded in ongoing authentic, learning-based processes that build knowledge of the world of work and self' (Bridgstock, 2009). While academics recognise that they have an important role in shaping and supporting students' career development, in general they lack confidence in both providing career advice and in the teaching of career development and employability skills (Amiet et al., 2021; Dean et al., 2022).

The 'C' dimension of the WAM-F relates to the suite of assessments that requires students to engage in and demonstrate reflection on their career management skills, professional identity and the gaps in their 'I'. Potential assessment tasks include reflections on students' developing professional identities, job applications, evidence of learning in relation to the recruitment process and generation of artefacts such as resumes, cover letters, video interviews, professional identity development and career plans. It has long been an assumption that CDL happens automatically for students engaged in WIL, particularly placement-WIL. However, anecdotally, we find that students' CDL is less systematic and often they miss important opportunities to translate the learning that has occurred as a result of being exposed to authentic and proximal settings. Embedding 'C' across a course will ensure that students can accumulate their evidence of success through an employment lens.

We propose that for 'C' to be adopted by course teams, and for it to be regarded as relevant to students, it needs to be strongly contextualised for the discipline. Career development learning, as outlined by others (for example: Gulikers et al., 2004; Hildebrand, 2005; Khaira & Yambo, 2005; Poikela, 2004; L. Smith & Koshy, 2005; Bridgstock, 2009) must connect in-context discipline knowledge to the relevant professional skills. By embedding CL into the curriculum, academics can connect the discipline knowledge to the industry context. Therefore, CL in STEM contexts, needs to be part of the suite of assessments across a course that link learning for work-readiness and employment outcomes impact. We propose that WIL approaches to assessment that, at a minimum, combine the 'I' and the 'C' can be effective for developing a student's life-wide learning and for the preparation for and management of life-long portfolio-careers. Intersecting the 'C' dimension, with the 'I' may function as a viable curriculum intervention that may positively impact on the typical career pathways for graduates who, now more than ever, need to be equipped for expansive portfolio-careers.

Dimension A: Authenticity

While the definition of 'authentic assessment' in STEM is still to be agreed upon, the notion that it tends to indicate an exposure to professional practices is generally accepted (Pollard et al., 2018). Authentic assessment through a WIL-lens can be understood as 'an assessment requiring students to demonstrate the same competencies, or combinations of knowledge, skills, and attitudes that they need to apply in the criterion situation in professional life' (Gulikers et al., 2004, p. 69). WIL assessment profiles across a course need to include elements of authenticity. Of note is the way in which past authentic assessment definitions (Gulikers et al., 2004; Kaider et al., 2017), and particularly, the expanded criteria for authentic assessment in the WIL Convergence Curriculum Framework (WCCF) have informed the refinement of the authenticity dimension in the WAM-F. Our most recent Faculty definition resonates in the 'I-CAP>a' (Figure 1): 'Authentic Assessment requires students to engage with a problem or task that is contextualised within a realistic environment, and assesses the knowledge, skills, and attitudes required in workplaces, community, and for life-long learning.'

Dimension P>a: Proximity (with some Authenticity)

Proximity is a cornerstone of WIL. We therefore retained the concept of 'proximal' from the WCCF during the construction of the WAM-F. From our work with WIL students, it is very difficult to separate proximal activities and assessment from authentic practice. Therefore, in our framework, we have denoted this as 'P>a'. The 'P>a' dimension is intended to capture series of assessment tasks in which partners from industry/community co-create the design of assessment with industry settings and scenarios in mind. WIL assessment profiles across a course, therefore, need the inclusion of the 'P>a' (i.e., the people, places and processes of work). Students need to observe how practitioners use their discipline knowledge and apply their broader skill sets in real-world contexts. They need to adopt practices that demonstrate the mindset of professionals and understand the career structures that exist in the community and workplaces. Graduates should be familiar with how competency evolves in the context of discipline-focused and non-discipline focused 'work' outside the classroom. Assessments that have a high degree of 'P>a' might focus on 'being' a practitioner and demonstrating performance in the places and with the people of that industry/community. Assessments that evidence a connection between the discipline and the various workplaces students might encounter when entering STEM industries, or when using STEM skills in a variety of workplaces, or with the people and processes found in those 'places', are critical to transferable skill development and improving prospective employment outcomes.

In summary, suites of assessments that resemble the products and processes required in work contexts to solve real-world problems need to be mapped and traced across courses. The criteria for 'authenticity' prescribe an assessment task where the performances relate to the completion of workplace-like processes or the generation of workplace-like products. For the WAM-F we retained authentic assessment as that which includes tasks that resemble (work) contextualised outputs

(product), as well as the processes that resemble professional practice (process). The standards of performance demonstrating capacity to function in real-world ways outside of formal learning environments (performance) would be traced in the individual assessment design of the standards.

A final note on the 'A' and 'P>a' dimensions is that they should not be seen as binaries; in some cases assessment criteria can span both dimensions, particularly in the proximal dimension. For this reason, we represent the 'proximal' in the 'P>a' dimension as being greater than 'a'. Essentially, we propose that it is very difficult to argue that a highly proximal assessment is not authentic (however there may be instances where an assessment exhibiting 'A' may not evidence the 'P'). This illuminates the benefits of enmeshing authentic and proximal definitions so as to alleviate some of the practical issues when designing curricula. Further to this, activities with low levels of authenticity and proximity are difficult to separate from non-WIL activities and so academics struggle to conceptualise the WIL approach when authenticity and proximity are low.

WIL Assessment Principles

We do not suggest that the WAM-F be used for the design of individual assessment criteria but rather as an umbrella approach to guide the holistic construction of WIL assessment across courses (degrees). However, the specific assessments within core units (subjects) and, in particular, the final artefacts that the cohort of students will complete as part of their units of study, should be central. There are dedicated studies that are better placed to guide the design process for individual assessments, such as the WIL assessment approach from Ferns (2014) and the WIL assessment guides from Boud et al. (2020). Both provide detail of good practice for WIL approaches to assessment that is beyond the scope of this study.

To support the adoption and utilisation of the WAM-F, we have added to the WAM-F a set of underpinning principles (see below) that we believe are crucial for a STEM-education approach to WIL assessment design. We also recommend that the key concepts of integrated, career, authentic and proximal be traced and mapped across a set series of assessment tasks for a given course. We also add that it is very useful for the architects of similar whole-of-course approaches to WIL curricula to review WIL quality standards, noting that Campbell et al.'s, (2019) quality framework, in addition to standards relating to curricula, also include standards for assuring the student experience, institutional requirements and stakeholder benefits.

During a process of constructive alignment of a WIL approach to assessment, we suggest that the following principles are explored in order to achieve quality WIL learning outcomes. The individual assessment items (that together comprise the suite of vertical and horizontal scaffolded assessments embedded across the whole-of-course) might include elements of the following six learning outcome domains. These can be expressed as follows:

In addition to their discipline-specific knowledge 'students will be able to demonstrate integrated:

1. application of the 'wicked' competencies valued by employers' (Knight & Page, 2007)
2. demonstration of generic capabilities' (Hager & Holland, 2006)
3. consolidation of personal aptitudes and attitudes' (Rowe & Zegwaard, 2017)
4. CDL relating specifically to employability' (Smith et al., 2018; Hansen et al., 2022)
5. reflection on their developing professional practices' (Hains-Wesson & Young, 2017)
6. application of industry-oriented learning' (Edwards et al., 2015) via AA (Schultz et al., 2022)

It is not intended that every assessment include all six learning outcome domains, but rather, that they are seen as useful considerations for discrete units to make up the 'I-CAP>a' as a meta-structure (encapsulated as the WAM-F) to frame course-wide, but course/discipline-centric, assessment design and re-design.

Conclusion

The WAM-F, which was born from academics seeking ways to integrate WIL assessments holistically across a discipline-specific program could well be adopted by others also wanting to further their action-research approaches to innovations in programmatic-lenses to WIL assessment design. Indeed, further research is planned across our Faculty to investigate the way in which employability-oriented assessments are scaffolded across the different courses (and disciplines) offered both for undergraduate and postgraduate courses across our Faculty. The WAM-F will therefore function as a schema for auditing where and how the ICAP components (three years post-WOC), are now traced in our lived curricula. The plan is to present the audit results to all course teams, during annual course review phases, to address the employability assessment landscape. We want to ensure that the message for individual academics is, regardless of the presence or absence of ICAP integration via the WAM-F, the focus for renewal is on first providing transparency of where employability-oriented assessment is (and is not occurring) across an entire course. What will improve the quality of student experience of WIL and the overall design of the WIL-lens curricula (Campbell et al., 2019), is an attention to standards to first ensure inclusion, and a meaningful and practical schema for enlivening uptake, from those at the coal face of assessment design and delivery.

Further to this, the message will be that it is ambitious to prescribe that every assessment within a course, or even that every WIL assessment across that course, can meet all four of the dimensions. However, we posit that a systematic approach toward shuffling existing assessment, often reducing the overlap of purpose and output, and thus rarely creating new WIL assessments, will be viewed favourably by academics. Resourcing is likely to be high-touch in the re-design of each course's overall assessment structure, and low-touch for the possible re-design of three employability-oriented assessments. We foresee that a collective course-centric approach to using the WAM-F to establish a meta-WIL assessment framework, aligned to the prescribed course learning outcomes, is both feasible and valuable.

Nevertheless, whilst the framework and the dimensions offer a malleability for discipline-sensitive applications, history from other action-research studies suggests that course teams will still require guidance and support in the process of mining for, analysing and then re-modelling the assessments based on the integrative approach. Academics are likely to continue to value support from third space academics who are often expert in the aligned pedagogies (i.e. reflective practice, employability skill literacy and CDL) as well as support from industry/community partners who are the experts in current work-readiness capabilities and work-related practices. Given that the 'I' of the assessment design emphasises co-creation of assessments with industry/community, adequate resourcing to enable academics to service such engagements with industry are critical.

In conclusion, this paper has addressed a common problem in STEM education, which is how to tackle barriers to capability building of STEM academics, when the call for traditional assessment (prioritisation of discipline-specific content; see Edwards et al., 2015) to include demonstration of learning that resembles work-related practices, particularly for academics not familiar with WIL approaches to assessment or current industry practices, is needed. By tethering the discipline to the employability-oriented assessments, some of which will focus on CDL, AA, and/or performance-based outputs from WIL activities with industry/community, but all of which will, collectively, develop and demonstrate student employability, provides necessary flexibility for STEM academics to enhance, without overstressing central curricula.

The call in STEM to expand curricula to be inclusive of the employability agenda, by overtly retaining the discipline in WIL assessment design, promises to provide opportunities for academics to adapt current assessment to include context rich WIL assessments that assess for employability, whilst demonstrating the knowledge and skills of the discipline, and thus, the overarching course learning outcomes (Jorre de St Jorre & Oliver, 2018; Oliver, 2015). Embedded and scaffolded WIL assessments, that avoid bolted-on employability learning, by honouring and maintaining the importance of

discipline knowledge and skills and their application, is from our experience over the 15 years of innovating WIL practice (Young et al., 2022), pertinent for STEM, and beyond.

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Declaration of Interest Statement

The authors hereby declare that they have no pecuniary or other personal interest, direct or indirect, in any matter that raises or may raise a conflict of interest in this study with our other roles and duties within the Faculty.

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