Validation of a Talent Framework for Work-Integrated Learning Students

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Abstract

We constructed a framework that would guide students, WIL practitioners, and employers in preparing students for what has been termed "Industry 4.0": a labour market disrupted by artificial intelligence, automation, technology, and the "gig economy." Our framework identifies 12 key talents categorized into four main groups. We then derived 49 behaviours that represent these 12 talents. To validate our framework, we surveyed over 1,000 employers who, in the past 12 months, had supervised a student in a co-operative education program. With a particular co-op student in mind, we asked survey participants to assess that student on their "work readiness" in terms of the 49 items that were derived from our talent framework. We defined "work readiness" for participants as the degree to which someone is ready for an entry level role typical of a university graduate, and it was rated using a 5-point Likert scale. Survey participants were also asked to rate the student in terms of eight separate outcome variables. We found that 10 actions or "talents" seem most important for student success in the workplace. These 10 items could potentially be included in students' WIL performance evaluations, considering they were validated by co-op employers as being related to positive outcomes of the experience. Future research could investigate how our framework, or

other competency frameworks, can be useful in examining the development of competencies through multiple WIL experiences.

Keywords: talent, framework, co-operative education, Industry 4.0, work readiness

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WIL students and graduates face a challenging labour market. Workplaces are shifting to the "Fourth Industrial Revolution," or "Industry 4.0" (Schwab, 2017) which is characterized by the implementation of artificial intelligence, automation, and robots. As a result, jobs, roles, and recruitment strategies are being redefined. Employees now more than ever need frequent upskilling or re-skilling, placing an increasing emphasis on lifelong learning. There is also a proliferation of contract work (i.e., the "gig economy") and a decline in standard careers (Royal Bank of Canada, 2018); people cannot expect to remain in a position or with an organization for the total of their working life. Indeed, successful workers are workers who have the skills to cope with VUCA: a world that is volatile, uncertain, complex, and ambiguous (Ajith, 2015). Fuelling our VUCA world are challenges such as climate change, globalization, shifting economic and political landscapes, aging populations, and social and economic divides. These challenges also exert their influence on the world of work.

Given this VUCA world that students and graduates are facing, we designed a Future-Ready Talent Framework (FRTF): a competency framework which would outline the skills, knowledge, and behaviours required for our students to succeed. Our FRTF provides a language for use across our Co-operative and Experiential Education (CEE) portfolio as we support thousands of students in identifying the development of these competencies during their WIL experiences. It profiles the transferable skills expected to be in demand in the emerging economy and can be used to guide students and employers in unpacking these concepts within a future-oriented context (McRae et al., 2019). Below, we describe the methodology through which we developed the FRTF.

Methodology

Overview

The goal of our research was to identify specific skills, or what we call "talents," that will be important to succeed in the future of work. Our efforts to identify such talents involved two related approaches: (1) a review of peer-reviewed literature and industry reports; and (2) consultations with key stakeholders (students, practitioners and faculty members, and employers). Below, we describe these approaches in more detail.

Step 1. Review of the Literature

To construct our FRTF, we searched the academic and grey literature for existing skills and competency frameworks that focused on employment and/or postsecondary education. We also consulted industry reports that predicted what skills will be required for the future workplace. A final sample of 54 frameworks was identified. A mapping exercise was undertaken whereby the 30 skills and competencies included in all 54 frameworks were listed, overlap was analyzed, and a synthesized framework was created. Expert stakeholders in WIL and career development at our institution provided feedback on the proposed framework. This feedback was incorporated to produce a refined framework. This framework includes four different "skill sets," or what we will refer to as "talent sets." Each talent set contains three talents (see Table 1).

Table 1

The Waterloo Future-Ready Talent Framework

Expand Expertise	Develop Self	Build Relationships	Design & Deliver Solutions
information & data literacy	self-assessment	communication	critical thinking

technological literacy	self-management	collaboration	innovation mindset
context-specific knowledge & skills	lifelong learning & career development	intercultural effectiveness	implementation

Step 2. Soliciting Examples of Key Behaviours

After identifying key talents within the FRTF, we sought to identify behaviours that exemplify those talents. This was important because it gives key stakeholders clear examples of ways to demonstrate talent. To identify such behaviours, we consulted WIL stakeholders. Two tasks were organized. For the first task, we solicited examples of behaviours from students, staff, faculty, and employers. These stakeholders were provided with initial definitions of talents in the FRTF. They were asked to provide specific behaviours that exemplify each talent in a workplace setting. This approach has been used in organizational research when the goal is to identify specific actions that contribute to organizational success (Boyatzis, 2006). Students (n = 18), staff and faculty (n = 26), and employers (n = 16) provided a total of 1,806 examples. The average number of examples per talent was 41.05 (*SD* = 3.22).

Using these examples, we sought to identify specific behaviours that demonstrate each talent. Two criteria guided our efforts. First, we sought out those behaviours that were most frequently mentioned by stakeholders. We reasoned that these behaviours would be meaningfully connected to talent. We identified these behaviours by locating examples that were duplicated throughout the data most often. Second, we aimed to identify behaviours that were specific to a

given talent and that did not exemplify a second talent. That is, we wanted to find examples of behaviours that we could use to discriminate between talent "A," talent "B," and so forth.

A working group of staff (n = 3) and WIL researchers (n = 3) was formed to analyze the data. Members of the group reviewed a short-list of behaviours that were initially identified by the authors as being most salient among stakeholders. Over five two-hour long sessions, members of the group discussed which behaviours best represented each talent. They debated about the importance of each example and came to consensus about a list of behaviours that validly represented (a) each talent and (b) the perspectives provided in the stakeholder activity. This list included 59 behaviours.

Step 3. Aiming for Parsimony

We knew that the initial list of behaviours was comprehensive, but we feared that it was too long to implement in a practical way. Thus, we solicited further feedback on our list from WIL practitioners (n = 67) and an online panel of survey respondents (n = 111). We presented these individuals with the list of 12 talents from our proposed framework and the list of 59 behaviours. We asked them to sort the behaviours into the appropriate talent (i.e., to match talents and the behaviours that demonstrated them). Using this task, we identified instances in which behaviours were incorrectly sorted, which was an indication that a given behaviour was a poor example of a particular talent. While most behaviours were sorted correctly by both groups, we identified and then removed from our list 10 behaviours that were incorrectly sorted by both groups. Thus, we used this activity to reduce the list behaviours that represent talents in the Future-Ready Talent Framework to 49.

Step 4. Initial Test of Criterion Validity

We collected additional data to conduct an initial test of the framework's validity. We focused on criterion validity, which is present when one measure (i.e., behaviours in the framework) is associated with other measures to which in theory they ought to be related (Cronbach & Meehl, 1955; Hair, Black, Babin, Anderson, & Tatham, 1998). Employers who had supervised a co-op student in the previous year were recruited to participate in the validation exercise.

Employers were sent an email inviting them to participate in an online survey. They were asked to think about a particular student whom they had recently supervised. They were instructed to assess these students' talents in terms of the 49 behaviours identified in our framework. Specifically, we asked participants to assess these behaviours in terms of whether the student was "work ready." "Work readiness" was described as the degree to which someone is ready for an entry level role typical of a university graduate. Participants rated work readiness of the student using a 5-point Likert scale, coded as -2 = *Not Yet Ready,* -1 = *Almost Ready,* 0 = *Ready,* +1 = *Ready for More*, and +2 = *Ready for Much More.* For each item, participants were also given the option of "unable to evaluate."

Participants were also asked to rate students according to the following eight outcome variables: whether the student made a positive contribution to the team; whether the student made a transformative contribution to the team; whether the student made a significant contribution to the team; the student's overall performance during their work term; the extent to which the employer felt they received a "return on their investment" (ROI) in hiring the student; to what extent they enjoyed having the student on their team; how likely they would be to recommend the student to a colleague; and if they would offer a full-time position to the student if a position became available. All measures except overall performance (which was on a seven-

point scale) were on five-point scales. After completing the survey, participants received a $5.00 e-gift card.

Results

We first addressed missing data. We identified 14 behaviours that a substantial number (over 5%) of participants were "unable to evaluate." These behaviours were removed from subsequent analyses. As well, we removed participants who had more than 5% missing data, as a conservative means of ensuring participants were knowledgeable assessors of their students. This left us with 35 behaviours and roughly 775 participants for our analyses. Using stepwise regression, we entered these behaviours as predictors of each outcome variable. To summarize, all models were highly significant ($p < .001$) and explained between 33% (for enjoyment) and 48% (for overall performance) variance in the outcome variables. Table 2 shows the 10 behaviours that were particularly important in that they were significant (at $p < .05$) predictors of at least two outcomes variables. For brevity, we omitted regression coefficients.

Table 2

Items that Significantly Predicted Two or More Outcome Variables

		Outcome Variables							
FRTF Talents	Behaviours	POS	TRAN	SIG	ROI	ENJ	OFF	REC	OVER
Lifelong learning and career development	Makes plans to achieve learning goals			✓					✓
Implementation	Manages their own deadlines	✓					✓		
Lifelong learning and career development	Seeks learning opportunities, both formal and informal	✓	✓	✓	✓	✓	✓	✓	✓
Communication	Communicates ideas effectively							✓	✓
Lifelong learning and career development	Approaches day-to-day challenges as an opportunity to learn and grow	✓			✓	✓	✓	✓	✓
Self-assessment	Learns from mistakes	✓			✓		✓		
Collaboration	Does a fair share of the team's work	✓		✓	✓	✓	✓	✓	✓
Self-management	Copes with workplace pressures				✓				✓
Context-specific knowledge & skills	Develops knowledge and skills relevant to the specific work context		✓	✓			✓		
Communication	Listens attentively to others	✓				✓		✓	

Note: ✓ = positive regression coefficient at $p < .05$. Abbreviations are as follows: POS = positive contribution, TRAN = transformative contribution, SIG = significant contribution, ROI = return on investment in student, ENJ = enjoyed student on team, OFF = would offer student a position, REC = would recommend student to a colleague, OVER = students' overall performance

Discussion

There is very little discussion in the literature about how skills and competency frameworks are constructed. Here, we illustrated how our Future-Ready Talent Framework was developed and even further, how it was validated. This process enabled us to identify 12 talents common across 54 frameworks that are relevant to the future of work and are appropriate for the WIL context.

With WIL employers, we tested specific behavioural statements that reflect our 12 talents and found 10 items that were most strongly related to positive outcomes, such as a student's contribution to the team and the likelihood that the employer would hire or recommend the student. These 10 items were: make plans to achieve learning goals; manage their own deadlines; seek learning opportunities, both formal and informal; communicate ideas effectively; approach day-to-day challenges as an opportunity to learn and grow; learn from mistakes; do a fair share of the team's work; cope with workplace pressures; develop knowledge and skills relevant to the specific work context; and listen attentively to others. These 10 items could potentially be included in students' WIL performance evaluations, considering they were validated by co-op employers as being related to positive outcomes of the experience.

Limitations and Future Research

Our validation procedures involved only one form of WIL (co-operative education) at one institution. However, our procedures were based on a broad foundation of literature and we involved employers from various industries, organizational sizes, and geographic locations. Future research could investigate how the FRTF, or other competency frameworks, can be useful in examining the development of competencies through multiple WIL experiences.

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