Assessing Work-Integrated Learning Program Students' Sources of Career Development: A Validation Study

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***Abstract*—This full research paper presents the development of the *Career Development Supports* (CDS) instrument and established evidence of validity for utilizing the CDS in assessing engineering students' sources of career development within work-integrated learning (work-integrated learning) programs. Mentors in work-integrated learning programs (e.g., Co-op programs, internships, and workforce development programs) play a crucial role in developing students' informal and formal networking and promoting their persistence in the field. We propose the CDS survey, a name and resource generator that assesses how mentors support students' self-efficacy, outcome expectations and interest and goal development adapted from Lent's Social Cognitive Career Theory. We distributed the survey to two work-integrated learning programs over the course of a year: a large Co-op program at an R1 institution and a Defense funded microelectronics workforce development program. In total, 497 students completed the survey. We performed confirmatory factor analysis and examined data fit holistically with multiple absolute and relative fit indices. Our findings provide evidence that the CDS instrument can be used to assess work-integrated learning programs engineering students' sources of career development. Specifically, based on the confirmatory factor analysis, the CDS survey can be used to measure students in work-integrated learning programs sources of self-efficacy, career outcome expectations and interest and goal development. Researchers, faculty, and program managers can use the Career Development Supports instrument to understand the supports that students are not receiving and inform the supports, resources, and opportunities they provide to students.**

Keywords—assessment, social cognitive career theory, work-integrated learning programs, factor analysis

I. Introduction

Work-integrated learning programs (e.g., internships, Co-op programs, workforce development programs, etc.) are an essential part of undergraduates' engineering experiences—since these programs provide students with invaluable career development opportunities. In *Infusing advanced manufacturing into undergraduate engineering education*, the National Academy of Engineering reports that work-integrated learning programs provide opportunities to apply course knowledge in apprentice-style learning environments, develop professional and technical skills and build connections with industry professionals [1]. With work-integrated learning programs often being students' first experience in an industry setting, these apprentice-style learning opportunities have been identified as influential in students' academic success [2], engineering identity, engineering self-efficacy [3], and retention from their undergraduate degree to their career [4].

However, access to work-integrated learning programs does not guarantee positive impact on students' career development; for these programs to be impactful, students need quality mentorship that actively provides career-related self-efficacy and positive career outcome expectations. Social cognitive career theory has substantial empirical research that establishes the relationship between engineering students' access to environmental supports and resources and their career interests and pursuits [5]. Environmental supports and resources, such as the support from work-integrated learning program mentors, build students' confidence and positive expectations for their engineering career. Specifically, social supports were found to be a significant predictor of students' self-efficacy in engineering and can bolster engineering students' goals to persist [6].

Quality of mentoring and availability of resources can either promote or hinder students in their path to becoming engineering professionals. Within work-integrated learning programs, students navigate informal and formal professional networking, leveraging those networks to access career-related information and persist in their careers [7], [8]. Martin et al. [8] found students reported utilizing their social networks with employers and coworkers to learn about career opportunities, career resources, and access general support for their success in their majors and the workforce. On the other hand, a lack of mentorship negatively impacts students' interest and persistence in their careers. In a study on the socialization of cooperative education students, women engineering students reported feeling frustrated with the lack of support from other cooperative education students or the lack of support from their institution [9]. Similarly, Chopra et al. [10] found that women were less satisfied with their workplace, specifically around opportunities to expand their professional network. Engineering students need career-related support from their work-integrated learning mentors to persist in their engineering careers.

To better understand how engineering students are supported in their career development by mentors, there is a need to measure the types of perceived support students can access. This study addresses the need for an assessment specifically designed for students' sources of career development in work-integrated learning programs. Specifically, the purpose of this study is to provide validity evidence and guidance on the scoring and use of the *Career Development Supports* instrument as a means to assess the impact of these programs on students' career development and social capital. We ask the following research question, *to what extent do the items in the Career Development Supports assessment instrument function as theoretically conceptualized?*

II. Instrument Development

Netemeyer et al. [11] define the first step of instrument development as having a clearly defined construct definition rooted in a strong theoretical framework. We selected Lent, Brown and Hackett's [12] social cognitive career theory as our theoretical framework as it is a well-established framework for understanding how students build career interests and make career decisions. Social cognitive career theory has established a stable model for understanding career interests and pursuits across many contexts, including race, gender, STEM career interest development, and mentoring interventions [5], [13], [14], [15]. Social cognitive career theory is a particularly salient framework for studying mentoring as it models how environmental factors such as personal identity and contextual supports impact one's self-efficacy and career outcome expectations [6].

Social cognitive career theory models the relationship between students' environment, personal experiences and their interest and actions towards an engineering career. In social cognitive career theory, students develop interest and goals in career paths when they believe in their own abilities (self-efficacy) and the benefits of pursuing that career path (career outcome expectations). Mentors can help students develop self-efficacy in four ways: supporting students in having mastery experiences, sharing experiences for vicarious experiences, verbally persuading students, and reducing physiological states and reactions (e.g., anxiety, imposter syndrome) [16]. Positive expectations for an engineering career can also be encouraged by a supportive mentor; mentors can encourage students to pursue engineering careers that have extrinsic value (i.e., tangible value), self-directed value (i.e., personal value), benefit to society and values aligned with their own personal values [12, p. 199], [13], [17], [18]. As students develop positive forms of self-efficacy and outcome expectations, they develop interests and goals related to that career path. Students who feel as if they can succeed in the field and that there are benefits to pursuing that career work-integrated learning l be more likely to develop interests, set educational and occupational goals and take action to achieve those goals. Achieved goals then become new forms of self-efficacy and career outcome expectations.

We operationalized three factors for measurement using Lent et al.'s [12] interest model, mentorship literature and established mentorship assessments. We utilized definitions from Bandura [16] and Lent et al. [12] to develop a construct definition for three factors: *Mentors supporting students' self-efficacy, Mentors supporting students' positive career outcome expectations* and *Mentors supporting students' interest and goal development* (see Tables I-III). For example, Lent et al.'s [12] definition of extrinsic career outcome expectations (i.e., tangible benefits or rewards) was used to develop a construct definition of how mentors develop extrinsic outcome expectations; mentors build positive career outcome expectations for pursuing an engineering career through establishing employment demand, and highlighting job potential through professional networking

We developed and evaluated 32 items to assess the construct definitions developed from the theory. Items were primarily created and adapted from Pfund et al.'s [18] work defining attributes and metrics of effective mentorship, Lent et al.'s [19] social cognitive career theory scales, and Crisp's [20] *College Student Mentoring Scale*. Items went through multiple phases of revisions, including cognitive interviews and expert review [21]. After revisions, 28 items were retained for assessing students' sources of career development.

TABLE I. Construct definition of how mentors support students' building self-efficacy.

Sub-factor: Definition	*Construct definition*	*Example item*
Mastery experiences: The interpreted result of ones' previous attainments or experiences *[22]*	Mentors building students' belief in their own capabilities by increasing students' ability to have mastery experiences through skill development, encouraging decision making and fostering independence *[23], [24]*.	*My mentor… provides feedback on the technical areas I need to strengthen [23]*
Vicarious experiences: Observing others succeed and judging ones' success based on others *[22]*	Mentors building students' belief in their own capabilities by creating vicarious experiences through role modeling or sharing real life experiences *[23]*.	*My mentor… shares personal examples of difficulties they have had to overcome to accomplish goals*
Verbally persuasion: Encouragement from others *[22]*	Mentors building students' belief in their own capabilities by verbally persuading students of their capabilities through advocating, motivating, providing feedback, and sharing personal examples of persistence.	*My mentor… expresses confidence in my ability to succeed [25]*
Reducing physiological states and reactions: Limiting the impact of heightened negative physiological states *[22]*	Mentors foster an environment safe for learning through actively listening, making expectations clear, developing engineering identity, facilitating coping efficacy, reducing bias, and reducing stereotype threat.	*My mentor… assigns projects that are appropriately challenging for me [23]*

TABLE II. CONSTRUCT DEFINITION OF HOW MENTORS SUPPORT STUDENTS' BUILDING POSITIVE EXPECTATIONS FOR ENGINEERING CAREER.

Sub-factor: Definition	*Construct definition*	*Example item*
Extrinsic outcomes: Tangible benefits or rewards *[26]*	Mentors build positive expectations for pursing an engineering career by creating expectations for positive extrinsic outcomes through establishing employment demand and highlighting job potential through professional networking.	*My mentor… affirms that I am going into a field with high employment demand [27]*
Self-directed outcomes: Intangible benefits or rewards of value to oneself *[26]*	Mentors build positive expectations for pursing an engineering career by creating expectations for positive self-directed outcomes through importance/value of their work to themselves.	*My mentor… encourages me to do work that I would find satisfying [27]*
The importance of their work to society: Tangible or intangible benefits or value to society	Mentors build positive expectations for pursing an engineering career by creating positive expectations for the importance/value of their work to society.	*My mentor… establishes the importance of my work to society [23]*
Safe environment: An environment that is safe for learning	Mentors build positive expectations for pursing an engineering career by creating positive expectations for an environment safe for learning at their workplace through helping students establish a sense of belonging at their workplace and teaching students' unspoken rules of the workplace.	*My mentor… makes me aware of the social, organizational, and political norms of the organization [28]*

TABLE III. CONSTRUCT DEFINITION OF HOW MENTORS SUPPORT STUDENTS' BUILDING POSITIVE EXPECTATIONS FOR ENGINEERING CAREER.

Sub-factor: Definition	*Construct definition*	*Example item*
Interest: A dynamic desire to pursue an activity that is fostered by ones' self-efficacy and outcome expectations	Mentors encourage students to pursue interests and create outlets for interests to become goals.	*My mentor… encourages me to pursue my interests [26]*
Goals: A determination to engage or pursue an activity or outcome *[26]*	Mentors develop student goals by encouraging creation of goals, expanding current goals, and providing support for goal completion.	*My mentor… encourages me to think beyond my current goals [29]*

III. METHODS

A. Research Setting and Participants

The *Career Development Supports* assessment instrument was distributed to approximately 1000 students in two workforce development programs in fall of 2022, spring of 2023 and fall of 2023. Students in the first program, a Department of Defense sponsored microelectronics workforce development program (WFD), completed the survey in fall of 2022 (n = 85) and fall of 2023 (n = 134). Students in the second program, a Co-op program at a large research university in the Midwest, received the survey based on their most recent Co-op session (n = 412). Students with Co-op sessions in the spring and summer received the survey in fall of 2022 and students with sessions in the fall received the survey in the spring of 2023. In total, 631 students completed the survey. Students were asked to answer free-response demographic questions such as gender, race, and ethnicity.

B. Data Pre-processing

Data was cleaned based on two criteria considered for improving response quality: completion rate and correctly answering the filter question. These criteria were selected based on their ability to improve response quality, impacting the quality of inferences determined from analysis [30]. Responses with at least one item answered in each question block were determined complete. Responses with less than three of the five question blocks for only one person listed were removed. This resulted in the removal of 184 responses. Additionally, responses were removed for not correctly checking the question "Please check all boxes for this item" for each mentor listed. In total, 52 students were removed, resulting in a total of 395 student responses. Demographic data from the combined datasets can be seen below in Table IV.

TABLE IV. FACTOR LOADINGS AND DESCRIPTIVE STATISTICS FOR ITEMS IN THE MENTORS SUPPORTING STUDENTS' POSITIVE ENGINEERING CAREER OUTCOME EXPECTATIONS FACTOR FOR MODEL 2.

	WFD	***Co-op***	***Total %***
Gender			
Man	103	154	65
Woman	35	60	24
Nonbinary	1	3	1
N/A	9	30	10
Race/Ethnicity			
White	78	118	50
Black	9	5	4
Asian	35	80	29
Multi-racial	8	8	4
Hispanic	7	4	3
N/A	9	32	10

Each scale was scored. The scales in career social capital instrument were scored by summing the number of resources provided by each mentor for each scale and normalizing the data by the maximum number of mentors possible. Hence, each scale has a minimum score of zero, meaning no mentors provided that type of resource, and a maximum score of five, meaning five mentors provided that type of resource.

To select methods best suited for the data, skewness and kurtosis values were calculated to examine the normality of the data. Scores for each item were within range (±3, ±10) for future predictive statistical analysis. Inter-item correlations were performed for each scale to examine the consistency of the construct; no items were flagged since all items had inter-item correlations greater than 0.3.

C. Confirmatory Factor Analysis

We conducted confirmatory factor analyses (CFA) for the three scales, evaluating two to three models for each scale, using a robust maximum likelihood estimation with RStudio's Lavaan package. In CFA, the model is specified by the researcher and assessed by the fit of the data to the defined model using goodness of fit indices [31]. Models with acceptable goodness of fit indices are considered to have strong evidence that the data fit the proposed theoretical factor structure. We selected a maximum likelihood estimation with robust standard errors and a mean- and variance-adjusted test statistic as it adjusts for multiple population variances—as our dataset consists of two distinct but similar sample populations, WFD students and Co-op students.

For each scale, we evaluated three to four models and compared each model holistically for model fit. For each of the three scales, we conducted at least three models: 1) an unstructured model, 2) a standard specified model, and 3) a model with covariances between factors and specific items with similar phases or exact words repeated in each item. For example, in the *Mentors supporting students' self-efficacy* factor, covariance was established between items 1.2, 1.3 and 1.4 for sharing the topic of skill development and items 3.7-3.8 for sharing the word "diversity."

When holistically evaluating the model fit for the three models, we utilized five goodness of fit indices: a) Chi-squared to degrees of freedom ratio (χ^2/df), b) the Comparative Fit Index (CFI) c) the Tucker-Lewis Index (TLI), d) Root Mean Square Error of Approximation (RMSEA), and e) Standardized Root Mean Square Residual (SRMR). The CFI and TLI are relative indices, meaning the structured model is compared to the unstructured model and increasing values indicate a normalized incremental improvement [31]. CFI and TLI both range from zero to one, with values greater than or equal to 0.95 considered an excellent fit. The RMSEA and SRMR are absolute indices, meaning they do not utilize the null model and instead utilize expected and measured covariances (SRMR) or the covariance matrix (RMSEA). RMSEA and SRMR values of 0.06 or less are indicative of good fit, and values less than 0.08 have acceptable fit [31].

IV. Results

Overall, each CFA model had a better fit than the null model, with the final, most specified model being the best fitting, seen in Tables V - X. For the *Mentors supporting students' self-efficacy* factor, we compared four models: a null model (Null), a first-order model with covariances between each aspect of self-efficacy factor and items between two sets of items, Q1.2-1.4 and Q3.7-3.8 (Model 1), a standard second-order model (Model 2), and a second-order model with covariances between two sets of items, Q1.2-1.4 and Q3.7-3.8 (Model 3). We selected each model based on its theoretical alignment and ideal scoring of the instrument. For example, we evaluated model 1 to evaluate the feasibility of interpreting and scoring the mentors supporting sources of self-efficacy factors individually, whereas we evaluated model 2 and model 3 to evaluate nested relationship between the four first-order factors, the four sources of self-efficacy as defined by Bandura [16], and a second-order factor of self-efficacy.

Conceptually, model 2 and model 3, the second-order models, were the most aligned with the theoretical framework and our intended use of the instrument. Model 3 had excellent goodness of fit indices—meaning that the second order factor structure had TLI and CFI values that were greater than 0.9 and RMSEA and SRMR values were less than 0.08 [32]. The goodness-of-fit indices indicate good model fit and alignment with the proposed theoretical framework (see Table V). The factor loadings for *Mentors supporting students' self-efficacy* Model 2 were within a range of 0.51-0.81 (see Table VI), indicating our items were measuring the *Mentors supporting students' self-efficacy* factors.

TABLE V. Comparison of CFA fit indicies for Mentors supporting students' self-efficacy factor.

Model	χ^2/df	*CFI*	*TLI*	*RMSEA*	*SRMR*
Null	27				
Model 1	2.8	0.924	0.906	0.067	0.043
Model 2	3.45	0.896	0.875	0.079	0.051
Model 3	2.7	0.923	0.906	0.066	0.044

TABLE VI. Factor loadings and descriptive statistics for items in the Mentors supporting students' self-efficacy factor for Model 2.

Item #	**Item**	**F1**	*M*	*SD*
Factor: Mentors supporting students' mastery experiences				
Q1.1	supports me in skill development	0.83	2.69	1.11
Q1.2	provides feedback on the technical areas I need to strengthen	0.72	2.29	1.13
Q1.3	demonstrates confidence in my ability to make decisions	0.79	2.61	1.18
Q1.4	provides feedback on skills I need to strengthen	0.74	2.32	1.15
Factor: Mentors supporting students' vicarious experiences				
Q1.6	relates their real-life examples and experiences to what I'm working on	0.83	2.43	1.18
Q1.10	shares personal examples of difficulties they have had to overcome to accomplish goals	0.71	2.16	1.24
Factor: Mentors verbally persuading students				
Q1.7	brings my accomplishments to the attention of important people	0.70	2.26	1.15
Q1.8	expresses confidence in my ability to succeed	0.85	2.91	1.12
Q1.11	actively listens to me when I talk	0.85	3.01	1.15
Factor: Mentors reducing stressful physiological reactions through an environment safe for learning				
Q3.1	makes their expectations of me clear	0.79	2.44	1.19
Q3.2	recognizes me as an engineer	0.83	2.86	1.28
Q3.3	assigns projects that are appropriately challenging for me	0.74	2.23	1.17
Q3.4	offers support when I have difficulty	0.85	2.75	1.22
Q3.6	creates an inclusive environment	0.82	2.86	1.23
Q3.7	highlights the diversity of the organization	0.53	2.08	1.43
Q3.8	emphasizes the importance of diversity on our team	0.61	2.20	1.41
		Total	**2.51**	**0.92**

Three models were evaluated for the *Mentors supporting students' positive career outcome expectations*: a null model (Null), a standard first-order model (Model 1), and a first-order model with covariances between two sets of items, Q4.1 - Q4.2 and Q4.4 - Q4.5 (Model 2). The most specified model, model 2, had excellent goodness of fit indices—meaning that the TLI and CFI values were greater than 0.95 and RMSEA and SRMR values were less than 0.06 [32]. Factor loadings for the *Mentors supporting students' positive career outcome* expectations factor were ideal, with values ranging from 0.74-0.88 (see Tables VII and VIII).

TABLE VII. COMPARISON OF CFA FIT INDICIES FOR MENTORS SUPPORTING STUDENTS' POSTIVE ENGINEERING CAREER OUTCOME EXPECTATIONS FACTOR.

Model	χ^2/df	*CFI*	*TLI*	*RMSEA*	*SRMR*
Null	66.0				
Model 1	2.04	0.92	0.98	0.051	0.026
Model 2	1.77	0.95	0.99	0.044	0.022

TABLE VIII. FACTOR LOADINGS AND DESCRIPTIVE STATISTICS FOR ITEMS IN THE MENTORS SUPPORTING STUDENTS' POSITIVE ENGINEERING CAREER OUTCOME EXPECTATIONS FACTOR FOR MODEL 2.

Item #	Item	*F1*	*M*	*SD*
Q4.1	affirms that I am going into a field with high employment demand	0.76	2.41	1.37
Q4.2	encourages me to find a professional network to guide me in career decisions	0.79	2.21	1.33
Q4.3	establishes the importance of my work to society	0.74	2.09	1.30
Q4.4	encourages me to do work that I would find satisfying	0.88	2.39	1.30
Q4.5	affirms that I can find work that gives me a feeling of accomplishment	0.87	2.27	1.38
Q4.6	encourages me to create friendships with other members of the team	0.80	2.43	1.34
Q4.7	makes me aware of the social, organizational, and political norms of the organization	0.74	1.87	1.39
		Total	**2.24**	**1.12**

Three models were evaluated for the *Mentors supporting students' interest and goal development*. Similar to the other factors, we compared a null model (Null), a standard first-order model (Model 1), and a first-order model with covariances between with covariances between items Q5.1, Q 5.2, and Q5.4 (Model 2). The most specified model, model 2, had acceptable goodness of fit indices. The TLI and CFI values were greater than 0.95 and the SRMR values were less than 0.06; however, the RMSEA value was greater than expected for a well identified model (*RMSEA = 0.097*) [32]. Factor loadings for the *Mentors supporting students' interest and goal development* factor were strong, with values ranging from 0.85-0.95 (see Tables IX and X).

V. DISCUSSION AND LIMITATIONS

In this study, we conducted three sets of CFA models to provide evidence for the *Career Development Supports* instruments' use to assess engineering students' sources of career development. Each model was evaluated using the goodness-of-fit indices to determine model fit and factor loadings to assess the construct validity. Our results indicate that the *Career Development Supports* instrument can be used to assess how mentors support students' with career development supports as established by Lent et al. [26]. These factor models had strong evidence of their use in assessing career development supports, with good model fit and strong factor loadings.

TABLE IX. COMPARISON OF CFA FIT INDICIES FOR MENTORS SUPPORTING STUDENTS' INTEREST AND GOAL DEVELOPMENT FACTOR.

Model	χ^2/df	*CFI*	*TLI*	*RMSEA*	*SRMR*
Null	184.4	-	-	-	-
Model 1	5.1	0.95	0.98	0.102	0.021
Model 2	4.7	0.97	0.98	0.097	0.019

TABLE X. FACTOR LOADINGS AND DESCRIPTIVE STATISTICS FOR ITEMS IN THE MENTORS SUPPORTING STUDENTS' INTEREST AND GOAL DEVELOPMENT FACTOR FOR MODEL 2.

Item #	Item	*F1*	*M*	*SD*
Q5.1	encourages me to pursue my interests	0.89	2.10	1.50
Q5.2	encourages me to create career goals	0.95	1.86	1.47
Q5.3	helps me think about how to translate my interests into career goals	0.94	1.72	1.40
Q5.4	encourages me to think beyond my current goals	0.90	1.74	1.42
Q5.5	provides resources, paths, or guidance for goal completion	0.85	1.93	1.49
		Total	**1.87**	**1.34**

The factor model results of the *mentors supporting students' self-efficacy* support interpreting and scoring as a single total factor and four individual factors. Based on our factor models, the mentors supporting self-efficacy factor can be scored as a total factor score of *mentors supporting students' self-efficacy* and four individual factor scores: *mentors supporting students' mastery experiences*, *mentors support students' vicarious experiences*, *mentors verbally persuading students*, and *mentors reducing stressful physiological reactions through an environment safe for learning*. We recommend that researchers compute scores for the four mentors supporting self-efficacy scales and total score by averaging the total of all four scales; by examining mentors support of self-efficacy per scale and for the total, researchers can best understand all aspects of students' self-efficacy development.

Researchers can use each scale to assess the career-related supports and strength of those supports available to work-integrated learning students. In our study, students report moderately high levels of support in receiving sources of self-efficacy (M = 2.51, SD = 1.16), moderate levels of mentors supporting positive outcome expectations (M = 2.24, SD = 1.12) and low levels of mentors supporting interests and goals (M = 1.87, SD = 1.34). Students report the least amount of support in developing career interests and goals, whereas students' report being the single driver of their own career interests and goals due to little to no tangible support from mentors [21]. We encourage researchers to use the cut-offs and interpretations for the scale scores found in Table XI when interpreting their results.

TABLE XI. SCORE RANGE AND INTERPRETATION FOR SOURCES OF CAREER DEVELOPMENT.

Score Range	***Level of Support***	***Percentile***
0 < x < 1.9	Low	25%
1.9 < x < 2.5	Moderate	50%
2.5 < x < 3	Moderately high	75%
x > 3	High	99%

Limitations of the study are the limited number of items developed for each factor and the limited amount of data for the model's complexity. While we could remove the item causing the Heywood case, it is preferable to retain the item as there are only three items in that subfactor and its alignment with the theoretical framework. Future work work-integrated learning l focus on performing additional CFA models with additional data and developing additional items for the Mentors verbally persuading students factor.

VI. CONCLUSION

The purpose of this study was to provide evidence for the *Career Development Supports* assessment instruments' use to assess sources of career development for engineering students in work-integrated learning programs. While constructing and piloting our instrument, we considered our instrument's validity in each step. The *Career Development Supports* assessment instrument was developed from a strong theoretical framework, Lent et al.'s [12] social cognitive career theory interest model, and mentoring literature across multiple STEM fields. The name and resource generator method is a well-utilized assessment method in understanding engineering students' strong ties [33], [34], [35]. Results of the cognitive interviews, expert review and CFA all provide evidence for its use in assessing sources of career development for undergraduates in work-integrated learning programs.

The *Career Development Supports* instrument can be used as a tool to better understand the role of work-integrated learning programs in developing a students' interest in an engineering career. Little work has been done to assess the experiences of engineering students in work-integrated learning programs, despite these experiences being instrumental in a students' career development. This instrument can be valuable in understanding the supports that engineering students in work-integrated learning programs have available to them and, perhaps more importantly, the supports they do not have available to them. The results of the *Career Development Supports* assessment instrument can be used to inform individual and institutional level supports. Engineering faculty can actively provide career-related resources such as discussing potential careers related to their major and helping students set goals related to those careers (e.g., courses available in said topic). Institutions can provide more opportunities for students to create the social networks needed to access these resources, and supporting students in their work-integrated learning programs (e.g., providing opportunities for students to learn about mentorship, connecting students to industry mentors, advocating for marginalized students in work-integrated learning programs). Potential future work can include a longitudinal analysis of the work-integrated learning programs and an examination of differences in students' sources of career development through item response theory analysis.

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