

Connecting the Dots: Professional Networking for Engineering Students

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Introduction

One current gap in many engineering programs is a focus on teaching students how to create relationships with professionals from scratch, a.k.a. build social capital at the organizations where they might want to work after graduation. The skillset of building professional relationships is considered the most important aspect of career education because it accelerates the career exploration process, leads to internship and job opportunities, and increases student's self-confidence related to life after college [1]. This is particularly relevant as 70% of jobs and internships go to professionals who already have a connection with the company [2]. These internships and jobs are located in what is referred to as the 'hidden job market'. Structured practice in this career skill is key to reducing opportunity gaps particularly for students from historically minoritized backgrounds who are less able to rely on family or friend networks to build these professional relationships.

To fill this current career education gap, some institutions are offering, and in some cases requiring, career preparation courses or extracurricular opportunities [3]. The National Association of Colleges and Employers (NACE) Career Services Benchmark Survey [4] in 2018-19 revealed that only 37% of responding institutions offered for-credit career courses [3]. These courses were much more prevalent at larger, doctorate granting institutions than at small, undergraduate focused institutions where a reliance on career advising from a career center was higher [3]. Career Launch [5] is a social enterprise that was scaled through Professor Sean O'Keefe's participation in Santa Clara University's (SCU) Venture Accelerator. Career Launch consists of a book [6] and an interactive workbook [7] and associated content delivered virtually in a microlearning format, a learning pedagogy defined as a "brief and targeted learning approach where learners consume instructional content in short chunks or bites" [8]. We designed and offered a 1-unit interdisciplinary course, offered Pass/No Pass, based on Professor O'Keefe's Career Launch curriculum. The purpose of the course is to teach and guide students to be intentional and proactive to build professional relationships from scratch. Students learn how to access companies and organizations they are interested in. The overall goals for the course were for students to increase their self-confidence and professional skills in order to access the hidden job market.

Course

The course was titled 'Career Launch' and a course description was created as follows:

"The purpose of the course is to teach students how to be intentional and proactive in creating relationships with professionals, at employers of interest to each individual student, from scratch. Students will also learn outreach best practices, how to conduct an effective career conversation, how to follow-up, and how to sustain a professional

relationship over time. As a result of the course, students will strategically expand their professional network, learn more about potential career paths in their field of interest, increase self-confidence related to career, and learn the professional skills needed to access the hidden job and internship market.”

The 1-unit, five-week course consisted of three modes of delivery:

- 1) Asynchronous micro-learning
- 2) The *Launch Your Career* workbook [7]
- 3) Weekly Q&A style class sessions

Content delivery was taught mostly asynchronously in a microlearning format that delivered content via text message and email that contains a link to a personalized student portal. These bite-sized pieces are prepared using various media types to make them more interesting, easy-to-consume and assimilate. The course also included an interactive workbook, and five weekly group coaching class sessions hosted by course instructors; these coaching sessions were done synchronously or in-person as allowed by COVID precautions.

A new Canvas course site was developed for the five week course. The homepage for the course was the course schedule and course syllabus. As an example, the course schedule and syllabus learning objectives from Winter 2023 is available in the Appendix (Figure A1). The course content was separated into weekly modules that included a weekly page summary for the expected micro-learning content, in-class activities, and homework assignments. Course goals and learning objectives as communicated to the students are below:

By the end of this course, students will be able to

1. Reflect on interests and potential career paths
2. Leverage existing digital technologies ethically and efficiently to solve the problem of how to create professional relationships from scratch
3. Perform outreach and schedule career conversations, via video chat, with professionals via warm networking and cold networking strategies
4. Effectively conduct career conversations (making small talk, active listening, asking smart questions, expressing gratitude, etc.)
5. Develop a professional brand, including an effective LinkedIn profile
6. Utilize newfound relationships to access jobs/ internships/ research positions, internal advocates and referrals

Course Offerings

This course was offered multiple times. In Winter 2022 and Winter 2023, we offered the course with cross-listed course codes ASCI 10/ENGR 35 to a wide range of students across SCU’s three main undergraduate schools, the College of Arts and Sciences, School of Engineering, and School of Business. In addition, we have offered an ‘engineering-only’ version of this course

targeted specifically for our engineering undergraduate students, both in Fall 2022 and Fall 2023, with course code ENGR 35. This was offered through our General Engineering department, and the format and content is largely the same, including students from multiple majors, including those outside engineering, allowing for comparison to our interdisciplinary-listed course. A table summarizing these offerings is shown in Table 1. Details relevant to these offerings follow chronologically. Analysis for the courses are in the Analysis section.

Table 1. Summary of course offerings including quarter course was held, course code(s), number of students initially enrolled and number of students enrolled after withdrawal deadline

Quarter Course Offered	Course Code(s)	# Students initially enrolled	# Students enrolled after withdrawal deadline
Winter 2022	ASCI 10/ENGR 35	30	17
Fall 2022	ENGR 35	11	11
Winter 2023	ASCI 10/ENGR 35	24	23
Fall 2023	ENGR 35	8	8

Winter 2022 [ASCI 10/ENGR 35]

Over 30 students were accepted into this course offering (5 more than our capacity limit of 25 students). This was still during the COVID-19 in-person class restrictions, so attendance was relatively low (regularly 10-12 students per week, mostly on Zoom), and we were down to 17 students enrolled after the withdrawal deadline. Also due to COVID restrictions, the class sessions were held on Zoom for the first 4 weeks, with a hybrid class session for the 5th and final week.

Overall, 17 students were enrolled in this first offering of the course. Students ranged in age/year in school as juniors and seniors as represented by Figure 1.

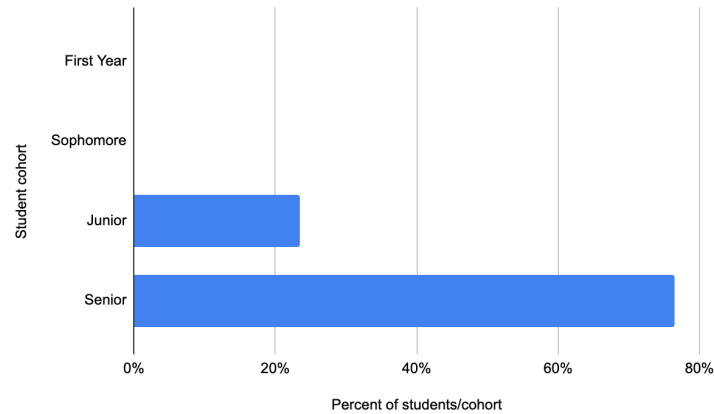


Figure 1: The year-in-school of the W2022 Career Launch student cohort

The students enrolled were multidisciplinary, with students enrolled from the College of Arts and Science, the School of Business, and the School of Engineering. The percentage of students from each school/college is shown in Figure 2.

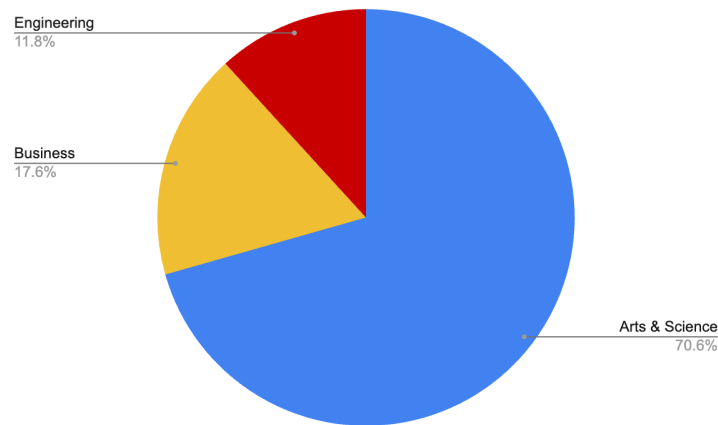


Figure 2: The school/college of enrollment for the W2022 Career Launch student cohort

The course microlearning format was in small ~10 minute learning modules from Career Launch that were sent daily for 28 days. A complete table describing the microlearning schedule including the title, type (Teaching, Inspiration, or Accountability), and associated workbook pages is available in the Appendix, Table A1. In summary, the content is separated into steps, as listed below:

- Step 1: Discernment: Prioritize the Organizations You Want to Work For
- Step 2: Strategic Research: Discover Professionals Who Can be Helpful to You
- Step 3: Professional Brand: Enhance Your Online Reputation
- Step 4: Outreach: How to Play the Student Card to Set Up Career Conversations
- Step 5: Preparation: Strategies and Best Practices for Career Conversations

- Step 6: Advanced Preparation: Turn Career Conversations into Interviews, Referrals and Mentorship
- Step 7: Effective Follow-Up: Differentiate Yourself and Build Long-Term Relationships
- Step 8: Ace the Job Interview: Convey your Value and Land the Position

In-class activities were created to supplement and enhance the microlearning content. For example, in Step 1, the microlearning modules were around Ikigai, a Japanese method for finding your purpose in life. We supplemented this activity with an in-class activity around Asset Mapping to help students discover their personal strengths, goals, and experiences that may be valuable to a future employer. Homework assignments were largely around completing these in-class activities and completing microlearning prompts and workbook activities.

In-class activities were especially helpful to students who were struggling with research aspects of finding professional contacts. While the workbook and microlearning did prompt students to find email addresses for professionals in their ‘top 10 organizations’, students often struggled to use supplied information to locate these work addresses. In this case, class time was devoted to demonstrations around finding professional email addresses. The Career Development Specialist for STEM and Innovation from the Career Center came to demonstrate many of these web-based email-finding tools, especially connecting tools to LinkedIn and Gmail where possible. Additionally, this served the purpose of introducing students to a member of the career center, which many had reported not visiting previously, thus lowering barriers to access to a key resource on campus.

Overall, the class was successful, with 15 of the 17 students successfully completing course activities and passing the course. Analysis and reflection from the course is available in the Analysis section.

Fall 2022 [ENGR 35]

The Fall 2022 cohort enrolled 11 students and 11 students persisted past the withdrawal deadline. Class sessions were all held in-person with Zoom optional for students who were unable to attend due to illness or other excuse. Class attendance was regularly 10 students, with 1-2 students attending via Zoom.

Students in this cohort were a higher percentage of sophomores as we specifically targeted new sophomores in our advertising for the course. Figure 3 shows the F2022 student cohort by year.

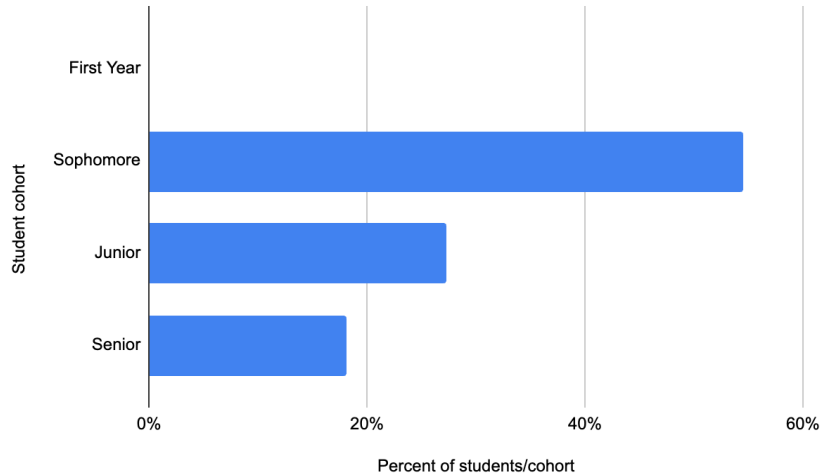


Figure 3: The year-in-school of the F2022 Career Launch student cohort

Again, the students enrolled in Career Launch were multidisciplinary, with students enrolled from the School of Business, and the School of Engineering. The percentage of students for the F2023 cohort from each school/college is shown in Figure 4.

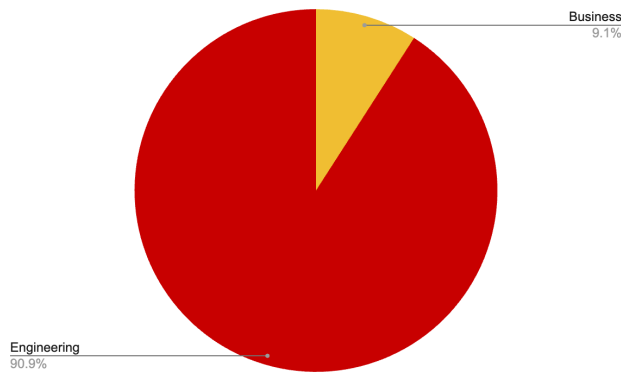


Figure 4: The school/college of enrollment for the F2022 Career Launch student cohort

The course content, both microlearning and in-class activities were largely kept from W2022 with only minor modifications.

Again, overall the class was successful, with 11 of the 11 students successfully completing course activities and passing the course. Analysis and reflection from the course is available in the Analysis section.

Winter 2023 [ASCI 10/ENGR 35]

Registration for Winter 2023 resulted in 24 students enrolled and 23 students persisted past the withdrawal deadline. Class sessions were all held in-person with Zoom optional for students who

were unable to attend due to illness or other excuse. Class attendance was regularly 21 students, with 1-3 students attending via Zoom. Figure 5 shows the W2023 student cohort by year.

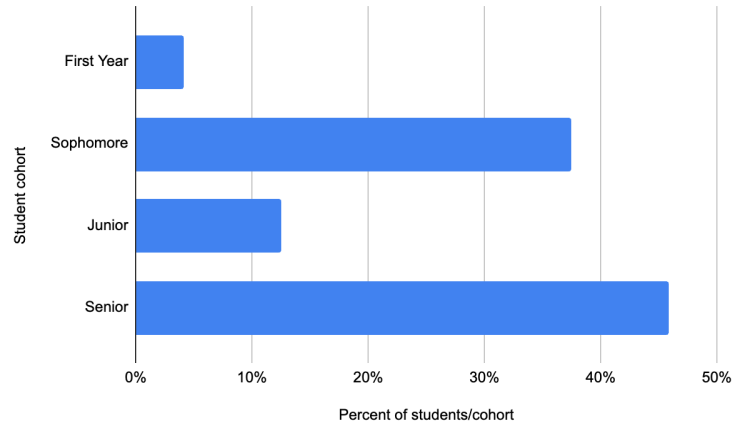


Figure 5: The year-in-school of the W2023 Career Launch student cohort

Again, the students enrolled in Career Launch were multidisciplinary, with students enrolled from the College of Arts and Science, the School of Business, and the School of Engineering. The percentage of students for the W2023 cohort from each school/college is shown in Figure 6.

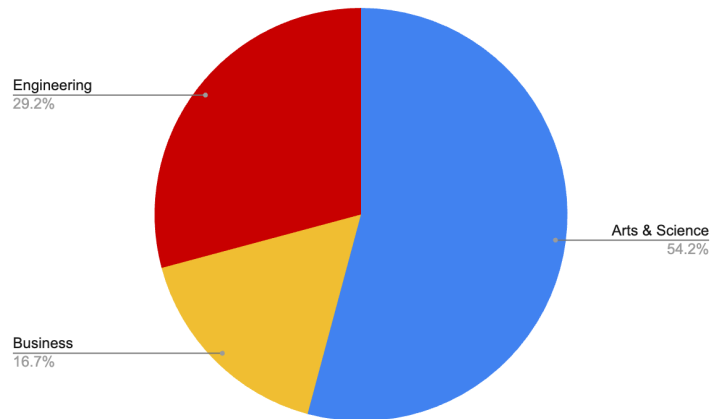


Figure 6: The school/college of enrollment for the W2023 Career Launch student cohort

The course microlearning format was changed for this quarter. Instead of daily ~10 min learning modules, the content was organized into 13 content ‘days’ released on Mondays, Wednesdays, and Fridays, as shown in Table 2. This was a change made by Career Launch as feedback from students indicated that the daily release of content was difficult.

Table 2: W2023 Career Launch microlearning schedule

Microlearning Day	Topic
1	What is social and cultural capital?
2	Welcome from Career Launch
3	Step 1 - Discernment & Ikigai
4	Step 1 - Top 10 list
5	Step 2 - How to identify professionals who can be strategically helpful to you
6	Step 3 - Professional Brand; Email signature and LinkedIn profile
7	Step 4 - Playing the student card, why professionals say “Yes”
8	Step 4 - Outreach strategy [Part 1]
9	Step 4 - Outreach strategy [Part 2]
10	Step 5 - Preparation
11	Step 6 - Turning career conversations into referrals, interviews, and internal advocates
12	Step 7 - Effective follow-up
13	Step 8 - Interviewing Best Practices

In-class activities were largely kept from previous offerings with only minor modifications.

Again, overall the class was successful, with 21 of the 23 students successfully completing course activities and passing the course. Analysis and reflection from the course is available in the Analysis section.

Fall 2023 [ENGR 35]

Fall 2023 enrollment was 10 students with 8 students persisting past the withdrawal deadline. Class sessions were all held in-person. Class attendance was regularly 7 students. Figure 7 shows the F2023 student cohort by year.

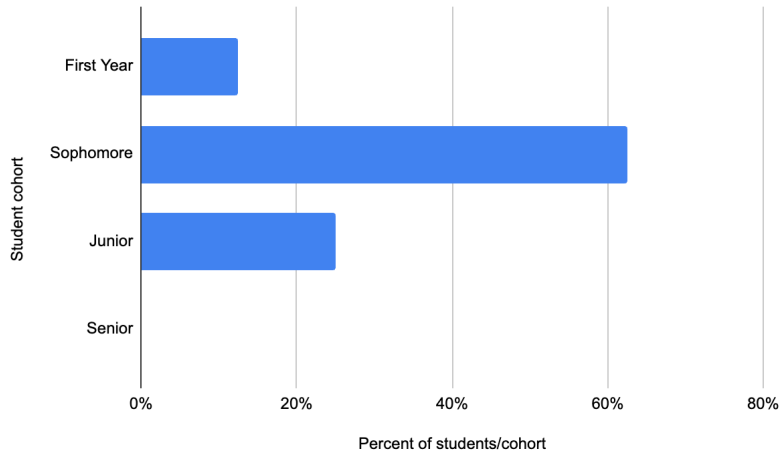


Figure 7: The year-in-school of the F2023 Career Launch student cohort

Again, the students enrolled in Career Launch were multidisciplinary, with students enrolled from the School of Business, and the School of Engineering. The percentage of students for the W2023 cohort from each school/college is shown in Figure 8.

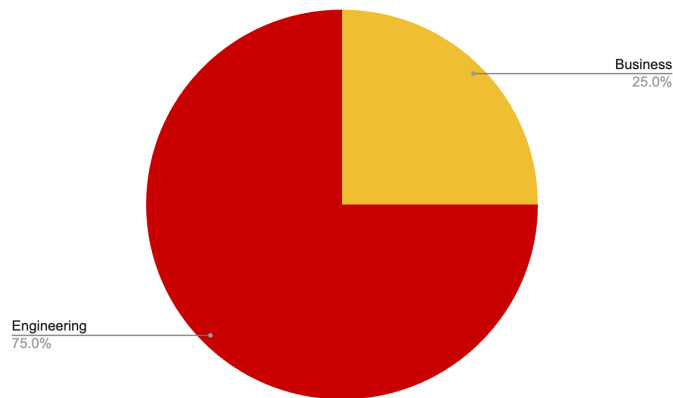


Figure 8: The school/college of enrollment for the F2023 Career Launch student cohort

The course content, both microlearning and in-class activities were largely kept from W2023 with only minor modifications.

Again, overall the class was successful, with 8 of 8 students successfully completing course activities and passing the course. Analysis and reflection from the course is available in the Analysis section.

Career Launch Analysis

Students enrolled in the Career Launch course achieve the learning objectives of the course with assignments that are either directly part of the Career Launch microlearning activities (My Top 10 organizations, Email signature, and Strategic contact list), assignments that are unique to the course (pre-class survey, elevator pitch, and final reflection), and in class activities (Table 3). Assignments were graded on a pass/no pass basis. Students must complete 75% of assignments to pass the course.

Table 3. Curriculum mapping and assessment

Learning Objective	Corresponding Assignment
Reflect on interests and potential career paths	Pre-class survey Asset mapping activity
Leverage existing digital technologies ethically and efficiently to solve the problem of how to create professional relationships from scratch	My Top 10 organizations Strategic Contact List
Perform outreach and schedule career conversations with professionals via warm networking and cold networking strategies.	Strategic Contact List
Effectively conduct career conversations (making small talk, active listening, asking smart questions, expressing gratitude, etc...)	Career conversation outreach debrief Storyboard Career Conversation plan Elevator pitch
Develop a professional brand, including an effective LinkedIn profile.	Building a LinkedIn profile Email signature
Utilize newfound relationships to access jobs/internships/research positions, internal advocates and referrals.	Final reflection

We performed a qualitative analysis of the final reflections from both courses to identify words used when students described how they felt about reaching out to professionals at the beginning of the course compared to the end of the course. A word cloud generated to visualize the most frequently used terms indicates that all respondents felt empowered to reach out to professionals after participating in the career launch course and much less nervous and intimidated. Note that in the word cloud (Figure 9), larger words indicate they were used more frequently.

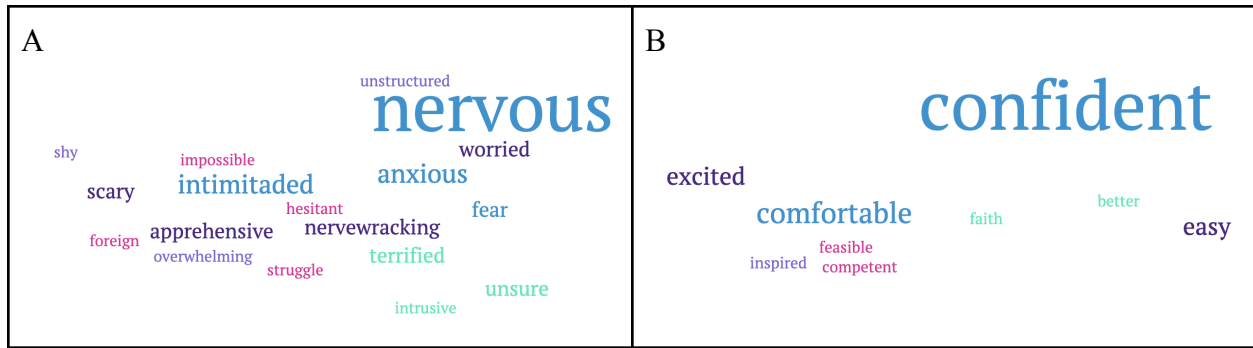


Figure 9: Word cloud generated to visualize the most frequently used terms included in their final reflection where they were prompted to discuss how they felt about reaching out to professionals prior to starting the career launch course (Panel A) and how they felt at the end of the course (Panel B).

In addition, student open-ended final reflections were coded to highlight the impact of the course on a set of five career readiness categories described in Table 4. The majority of students discussed gaining experience in every single category with nearly all of the students reporting gains in career planning & exploration and internship/job search & interview preparedness skills (highlighted rows in Table 4).

Table 4. Learning gains after participating in 5-week career launch course

Career Readiness Categories	% of students who reported a gain in this category in their final reflection	% gains based on Pre/Post survey analysis from Career Launch
Relationship building skills	53%	15%
Professional Communication	65%	18%
Career Planning & Exploration	82%	22%
Career & Self-development	65%	15%
Internship/job search & interview preparedness	82%	23%

These gains based on qualitative measures are consistent with quantitative learning gains from a Career Readiness Assessment administered at the beginning of the course (pre) and at the end of the course (post) to the Winter 2023 and Fall 2023 cohorts. Responses to question sets were scored to assess career readiness along the five categories listed in Table 4.

Students demonstrated a significant improvement in their career readiness score in all five categories based on student t-test ($p < 0.01$), as shown in Figure 10. Students showed the greatest learning gains, a 45% improvement between the pre- and post-survey, in the Relationship Building score ($p < 0.00001$).

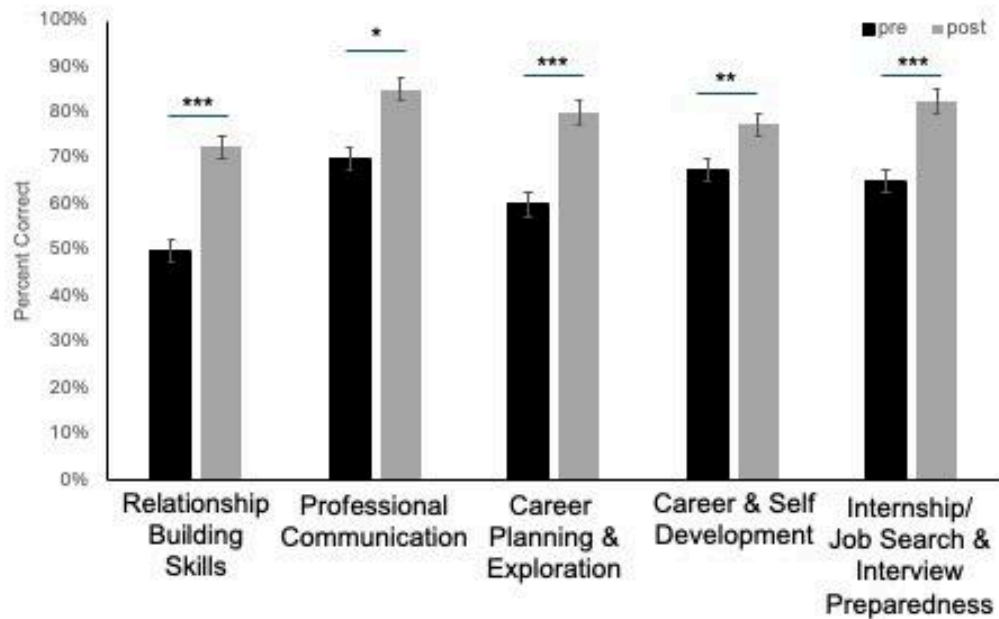


Figure 10. Student assessment scores increase in all five career readiness categories (Table 4) after completing the career launch course. Pre/post test data completed by 15 students. Group comparisons based on student t-test, * $p < 0.01$, ** $p < 0.001$, *** $p < 0.0001$

A more detailed look at individual assessment questions in the pre/post survey revealed some additional findings:

- Upon Career Launch completion:
 - 100% of students report confidence in introducing themselves to professionals they have never met
 - 58% of students reported reaching out to an alum from their school to learn about their career path. Other students reached out to professionals who are not SCU alumni.
 - 100% of students have a written/typed list of 10 organizations/employers/graduate schools where they want to work/attend
 - 92% of students report feeling prepared to land internships / jobs / research positions that have not been posted online

Additionally, analysis of subsets of students indicated that Career Launch was particularly effective for students who initially self-reported difficulty in various areas:

- 100% of students who initially reported feeling anxiety around coming up with high-quality questions to ask in a professional setting prior to the class improved by the end of the class. After the class, 0 students reported having anxiety.

- Upon completion, 100% of students who couldn't summarize a professional interest in one or two sentences before the program now can. After the class, all students could create these summaries.
- 100% of students who initially didn't feel prepared to strategically set up career conversations with professionals now report feeling prepared after Career Launch.
- 72% of students who initially reported little to no confidence that upon college completion they will earn a job that they will find fulfilling and now report greater confidence.

Finally, as the purpose of the course is to teach and guide students to be intentional and proactive to build professional relationships, we specifically reviewed student open-ended final reflection responses for language indicating success in conducting career conversations. We were able to determine from student final reflections that, on average, students who participate in the career launch course completed two career conversations and many reported that they were planning on continuing their networking beyond the course. A few students even reported having found an internship as a result of the career launch method. The small number of internships or jobs is not surprising given the short five-week duration of the course. However, successful career conversations are an important precursor to future job opportunities.

In the future, we can strive to maintain contact with students who have taken this course and try to determine if they were able to find an internship or career job using the methods they were introduced to in this course. For this study, we can determine that we were successful in our overall goals to increase students' self-confidence and professional skills in order to connect with individuals in companies and organizations they are interested in.

Conclusions

The Career Launch course was successfully offered to four student cohorts, two sections were intentionally interdisciplinary and two additional sections were more engineering focused. Course content was developed and assigned through Canvas, with support from the microlearning modules from Career Launch. Students exhibited learning gains in all five career development skills and strategies measured, and also demonstrated improved confidence in their relationship building skills with professionals.

References

- [1] S. O'Keefe and B. Posner, "Research: Cold networking key to finding internships and Jobs," <https://www.nacweb.org/job-market/internships/research-cold-networking-key-to-finding-in-ternships-and-jobs> [accessed Jan. 4, 2024].
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- [7] O'Keefe, Sean, et al. *Launch Your Career Workbook: How Any Student Can Create Relationships with Professionals and Land the Jobs and Internships They Want*. Self-published, 2022.
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Appendix

YYYY/ZZZZ Schedule & Syllabus

The purpose of the course is to teach and guide students to be intentional and proactive to build professional relationships from scratch as a means to access the hidden job market. Students will learn how to access companies and organizations they are interested in. As a result of the course, students will expand their professional network, learn more about potential career paths in their field of interest, and develop the self-confidence and professional skills to access the hidden job market.
Prerequisites - none. This 2-unit class is P/NP

Welcome to Career Launch! Class meets in _____ Fridays 2:15-3:20p (Weeks 1-5)

Date	Topics & Assignments	Links
Fri Jan 13	Week 1 – Introductions Before Class: Complete pre-class surveys and review syllabus (below) During Class: Introduction to the course; sign-up for microlearning; develop time management plan Before Next Class (Homework): Career Launch Pre-Survey	Pre-Class Survey Career Launch Pre-Survey
Fri Jan 20	Week 2 – Reflection Before Class: Complete Microlearning Days 1-3 During Class: Identifying your strengths Before Next Class (Homework): Top 10 Organizations	Top 10 Organizations
Fri Jan 27	Week 3 – Planning Before Class: Complete Microlearning Days 4-6 During Class: Building strategic contacts list/LinkedIn networking Before Next Class: Email signature (Day 6) and Strategic Contacts List Draft (Day 8-9)	Strategic Contacts List Draft Email Signature
Fri Feb 3	Week 4 – Career Conversations Before Class: Complete Microlearning Days 7-9 During Class: Workshoping career conversations Before Next Class: Bullet Point/Storyboard career conversation plan (Day 10); Script/Video of Elevator pitch (Day 11) – NO SUBMISSION (will workshop in class next week!)	Career Conversation Plan
Fri Feb 10	Week 5 – Elevator Pitch Before Class: Complete Microlearning Days 10-12 During Class: Elevator pitch workshop; Interview stories? Complete: Final Reflection; Career Launch Post-Survey	Elevator Pitch (Final) Final Reflection Career Launch Post-Survey

Syllabus

Instructor Contact Info:

Dr. [Redacted] Office: [Redacted] Email: [Redacted] Student Email: [Redacted]

Dr. [Redacted] Office: [Redacted] Email: [Redacted] Student Email: [Redacted]

Required Text:

Launch Your Career Workbook: How ANY Student Can Create Professional Relationships and Land the Jobs and Internships They Want (2021). O'Keefe, S. in partnership with The Career Leadership Collective. Oakland; with support from Berrett-Koehler.

Course Goals & Objectives:

By the end of this course, students will be able to

- Reflect on interests and potential career paths
- Leverage existing digital technologies ethically and efficiently to solve the problem of how to create professional relationships from scratch
- Perform outreach and schedule career conversations, via video chat, with professionals via warm networking and cold networking strategies
- Effectively conduct career conversations (making small talk, active listening, asking smart questions, expressing gratitude, etc.)
- Develop a professional brand, including an effective LinkedIn profile
- Utilize newfound relationships to access jobs/ internships/ research positions, internal advocates and referrals

Promoting an Inclusive “In a world where you can be anything, be kind.”

Figure A1. Winter 2023 Canvas homepage that includes course schedule and student learning objectives from the syllabus.

Table A1. Describes the microlearning schedule including the title, type (Teaching, Inspiration, or Accountability), and associated workbook pages from the W2022 student cohort

Day	Title	Type	Workbook Pages
1	Most career paths are not linear	Teaching	
2	Why college?	Inspiration	8-9
3	Step 1: Ikigai and reflection questions	Teaching	11-15
4	Step 1: Discernment & career exploration	Teaching	15-20
5	Step 2: How to identify professionals who can be strategically helpful to you	Teaching	21-36
6	Ivanna & Melina testimonials	Inspiration	
7	Step 3: Personal brand	Teaching	37-49
8	Step 4: Three groups of people in your warm network and how to utilize them	Teaching	51-73
9	Step 4: How to reach out to professionals you have never met	Teaching	51-73
10	Step 4: Outreach strategy; Kevin's story	Teaching/Inspiration	51-73
11	Step 4: What does it mean to be professionally persistent and how to handle rebuttals	Teaching	51-73
12	They said "Yes", now what?	Teaching	
13	Step 5: Preparation: What to wear, how to make small talk, what questions to ask	Teaching	75-81
14	Step 6: Turning Career Conversations to referrals, interviews, and internal advocates	Teaching	83-87
15	Step 7: Effective follow-up	Accountability	
16	The power of vulnerability (Brene Brown)	Inspiration	
17	What is 'failing forward' and why should you embrace it?	Inspiration	
18	Step 8: Acing formal interviews	Teaching	107-119
19	Check in and Student Testimonials	Accountability	
20	Overcoming procrastination	Inspiration	
21	Effective elevator pitches; Know your WHY and share it with others	Teaching	
22	Mindset: How to handle failure (The Rock)	Inspiration	
23	Check in	Accountability	
24	Did you make your bed this morning?	Inspiration	
25	Feedback		
26	Tracking	Accountability	
27	Inky Johnson's story	Inspiration	
28	Program Recap		