Building Career Awareness in Early Chemical Engineering Courses: A Modular Approach

Dr. Mechteld Veltman Hillsley, The Pennsylvania State University

Dr. Hillsley is a Teaching Professor in the Department of Chemical Engineering at Pennsylvania State University. She received a BS in Chemical Engineering from Virginia Tech in 1988 and an MS and PhD from Penn State in 1990 and 1994, respectively.

Dr. Stephanie Butler Velegol, The Pennsylvania State University

Stephanie Butler Velegol is a Teaching Professor in Chemical Engineering at Penn State University. She pioneered the use of Flipped classes to increase active leaning in the classroom and works on water treatment.

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Abstract

Many chemical engineering students struggle to identify potential career paths within the discipline, which can lead to disengagement and a lack of motivation when faced with a rigorous curriculum. To address this, we developed a sustainable career discovery module integrated into a required second-year course—Material Balances, the first core chemical engineering class. Delivered via Canvas, the module aims to help students explore career opportunities, reflect on their strengths, and begin building a professional development plan.

Our research investigates two key questions:

1. Do career discovery modules support students in creating a career development plan?

2. Does increased awareness of career possibilities enhance student motivation to learn chemical engineering content?

The module consists of eight components: career exploration, resume and career fair preparation, networking strategies, CliftonStrengths® assessment coupled with AI interaction, skills grid development, and structured reflections that culminate with a student-developed plan for career development. Students engage with over 20 short alumni video interviews that showcase diverse career trajectories and offer advice to current students. They are asked to view at least five videos and reflect on insights gained, which inform their preparation for internships or co-op opportunities.

Following the CliftonStrengths® assessment, students construct a personalized skills grid aligned with industry-valued competencies such as critical thinking, communication, teamwork, and leadership. They then connect these competencies to personal experiences and identify gaps in their resumes. Reflection activities are embedded throughout to encourage deeper engagement and self-awareness.

This work will present the module design, implementation strategy, and preliminary student feedback. The module has potential for longitudinal integration across the curriculum, supporting sustained professional development and career readiness.

Introduction

Many chemical engineering students struggle to identify potential career paths within the discipline, a challenge that can undermine motivation and persistence in an already demanding curriculum. National calls for change, including the *Inclusive Mindset for Engineering Education* report [1], emphasize that departments must move beyond optional, opt-in career resources and instead create intentional, curriculum-embedded structures that ensure *all* students have equitable access to career exploration, professional skill development, and job-relevant experiences. When exposure to careers depends on informal networks, prior knowledge, or extracurricular

availability, some students are disproportionately excluded from opportunities that help them see where they might belong within the profession.

Monty Alger has drawn significant attention to the need for stronger career development during undergraduate education through his work as AIChE President and as a professor of chemical engineering [2]. Alger argues that career discovery and skills assessment should be intentionally integrated into students' academic pathways, enabling them to build a "skills grid" that helps them tailor their undergraduate experiences, both curricular and co-curricular, to align with their career interests. Complementing this, Carrico et al. [3] found that while chemical engineering students are often technically prepared for their first professional role, many lack the skills necessary to *secure* that first job. Both works highlight the importance of starting career conversations early, helping students understand the skills required for entry-level positions and how to access resources such as career fairs, internships, and co-ops. Although these resources are widely available, students often lack guidance on how and when to make the best use of them. To ensure equitable access, departments increasingly embed career and professional development into the curriculum, often through dedicated courses [4-6]. Our department offers a professional skills course, but it places limited emphasis on job-search readiness. Notably, Furst [4] demonstrated that introducing résumé writing and career-fair preparation in an early engineering course provided substantial benefits. This evidence motivated us to integrate similar structures into an early required chemical engineering course.

From a motivational perspective, this lack of structured career discovery limits students' development of a future time perspective (FTP) - the ability to connect present academic effort with meaningful and attainable future goals. Prior research [7-11] shows that students are more engaged and persistent when they can envision possible future selves and understand how current coursework contributes to those futures. Without this connection, core chemical engineering courses may feel abstract, disconnected, or merely punitive, rather than purposeful. This misalignment between curricular rigor and students perceived futures is particularly acute in the second year, when coursework intensifies just as students are expected to commit to the major. Studies show a positive relationship between FTP and time spent studying, better use of learning strategies and self-esteem. In their thesis, Kirn [9] suggests that the *"…discussion of careers and tasks performed by engineers should be visited throughout the tenure of students' experience while working on an engineering degree."* We are also interested in maintaining student agency that aligns with the recommendations by Husman and Shell [11] that students discover their futures for themselves, rather than being told to learn for their vague future. Together, these findings suggest the need for intentional instructional interventions that embed career discovery directly into the curriculum, normalizing exploration and helping students link who they are becoming to what they are learning.

Our goal in this work was to create eight career discovery modules and integrate them into a required second-year course. This Material Balances course is the first chemical engineering course that students encounter. These modules were designed to normalize exploration, broaden students' awareness of diverse chemical engineering pathways, and ensure equitable access to career discovery regardless of prior experience, social capital, or extracurricular availability. Components include guided career exploration activities; résumé development and career fair preparation; explicit instruction in networking strategies; completion of the CliftonStrengths®

assessment paired with structured, AI-supported reflection; development of a personalized skills grid; and a series of written reflections that culminate in a student-generated plan for ongoing career development. Together, these elements are intentionally sequenced to help students move from exploration and self-awareness toward articulation of skills and concrete action steps.

To support students in envisioning possible futures within chemical engineering, the first module incorporates more than 25 short (5 minute) alumni video interviews representing a wide range of industries, roles, and career trajectories. Alumni discuss their educational pathways, current roles, and lessons learned, with particular attention to how chemical engineering skills translate across sectors. Students are required to view a minimum of five videos and reflect on what surprised them and what they can take away.

In Modules 2 and 3, the students used information given to develop a resume and were required to attend one of the many career fair and career networking receptions offered by the university. They were also asked to reflect on their experiences. Students are asked to reach out to three professionals in chemical engineering in Module 4 and reflect on what they learned through these interactions.

In Module 5 students complete the CliftonStrengths® assessment to identify their top five personal strengths. The department covered the cost of these assessments. Through guided interaction with AI, students generate and refine possible future career scenarios that align with their strengths, helping them envision multiple, personalized professional pathways and expand their understanding of what it means to "fit" within the discipline.

Students develop a skills grid focused on competencies commonly sought by employers in Module 6, including communication, teamwork, leadership, and technical problem solving. Students map these industry-valued skills to prior academic, work, research, and co-curricular experiences, creating a concrete record of evidence that can be translated into résumé language or interview examples. This process also enables students to identify gaps in their current skill sets, reframing these gaps not as deficiencies but as opportunities for intentional growth through future coursework, internships, research, or leadership experiences.

Modules 7 and 8 ask students to reflect on what they have learned to promote deeper engagement, self-awareness, and iterative refinement of students' possible future careers. Module 8 includes a second set of 5 minute alumni videos that focus on alumni advice. Students are asked to watch at least 5 of these videos and then create a plan for how they will use what they have learned from these modules to prepare them for their 3 possible futures.

The purpose of this paper is to describe the design and implementation of these curriculum-embedded career discovery modules integrated into a required second-year Material Balances course and to examine its potential impact on students' career development and motivation. Specifically, this study investigates two research questions: (1) To what extent do career discovery modules support students in developing a coherent and actionable career development plan? and (2) Does increased awareness of possible chemical engineering career pathways enhances students' motivation and engagement with core chemical engineering content? The remainder of this paper describes the module structure and implementation in detail, outlines the

assessment methods used to address these questions, and presents preliminary findings and implications for broader curricular integration.

Methods

Description of course and career discovery unit

Eight career discovery modules were designed and were incorporated into the career discovery unit on Canvas for a Material Balance course typically taken by 2nd year students. This course is also the first in-major course for chemical engineering students. The number of students and breakdown of year is shown in Table 1. Note that the class started with 120 students enrolled and ended with 104 students enrolled. That means that 89% of the students took the pre-survey and 84% took the post survey. Table 1 shows that over 80% of the students surveyed were in their 2nd year.

Table 1: Number of students enrolled in Material Balances class and taking the pre-survey and post-survey.

	Pre-survey	Post-survey
# of students	107 (89.2%)	87 (83.7%)
# of women	47 (43.9%)*	36 (42.4%)*
# of international	12	6
2nd year students	88 (82.2%)	71 (83.5%)
3rd year students	18	12
4th year students	1	1

**The rest of the students identified as men. No students identified as non-binary, Genderqueer/Gender Non-Conforming or not listed*

A short description of the modules is shown in Table 2. Each career discovery module was designed as a Canvas "quiz" and was auto graded. The first 3 modules were required at the beginning of the semester to help them prepare for the career fair, which happens within the first month of the semester. The remainder were spaced out over the semester. The course was run as a standards-based course. The career unit had minimum completion requirements for different final course letter grades. A final grade of B^+, C^+, C and a D or higher required at least 80%, 75%, 70%, 65% completion, respectively. The modules had suggested due dates but there was no deduction for late completion. Students were told that these modules were for their benefit and should not add extra stress. Out of 104 students completing the class, 80 (77%) completed 100% of the modules. Only 3 students completed less than 50% and thus missed the C grade requirement, 6 students completed 75%, and 15 completed up to 87.5%. The minimum required for an A in the course was 80% completion. Most students completed more than the minimum required, indicating they found the activity useful.

Table 2: Description of Modules including what the students need to do and reflection prompts.

#	Title/Topic	Content in Module
1	Exploration of Chemical Engineering	Watch 5 alumni videos (each approximately 5 minutes in length) *Reflect: What surprised you? What did you specifically learn about the value CHEs bring to the world* List three possible futures (right after graduation, 5 – 10 yrs, "big dream") List how you will connect with mentors in the field
2	Resume/ prepare for career fair	Submit a draft of resume (given resources) Prepare a "elevator pitch" for career fair (given resources) Which career fair will you attend? Research three attending companies
3	Career fair reflection	List the companies and people you met at career fair. How prepared did you feel going into the fair? What feedback did you receive? *Reflect: What were the surprising insights you gained? Did attending career fair change or reinforce your interest in a career path?*
4	Networking	Connect with three professions in your field (career fair, faculty, LinkedIn, "coffee chats". List people and how you initiated. *Reflect for each interaction: Why did you chose to speak with them and ask the questions you asked? What advice stood out to you? How did you feel and what did you learn? Any follow-up action?*
5	CliftonStrengths®	Take the CliftonStrengths® Assessment (~$25/each paid for by the department) and list your top 5 strengths. *What surprised you? How could you use these strengths to create value in the world?* Use generative AI and write a prompt using your strengths, professional interests, experiences and hobbies, "Based on this, tell me ***3 career paths*** in chemical engineering that might be a good fit for me. Give me more information about one of the career paths. Give me a few sentences that I can use when I talk to someone about jobs

		that include my strengths, experiences, and interests. What are the first steps I should take to obtain these career paths?" *Reflect: What surprised you the most? What are the next steps you should take?*
6	Skills grid	Fill in skills grid template (see Appendix A) with your experiences using skills requested by companies (like critical thinking, communication, teamwork, etc.) *Reflect: What skills are missing? How can you enhance these skills while in school?*
7	Overall Reflection	*Reflect: Create two or three possible future careers for yourself based on career videos, career fair experience and top strength and skills grid.* Create an elevator pitch to introduce yourself and your career goals.
8	What's next?	Watch 5 alumni videos that include advice (approximately 5 minutes in length each). Write down their name and advice. *Reflect: What surprised you the most?* Write a plan for how you will use what you have learned from these modules to prepare you for your 3 possible future.

Assessment method for students

We used a pre- and post- survey of our students to help us answer our research questions. This research was determined to be IRB exempt (STUDY00027533) research. The students were given an opportunity to complete a pre survey during the first week of class. A research team member who was not the instructor of the class administered the survey during class time. Participation was optional. At the end of the semester students were similarly given class time to complete the post survey. All students in the class, whether they responded to the survey or not, received a few bonus points to use towards homework and participation grades for the class participating in the survey. Both the pre and post assessments can be seen in Appendix B.

Data from the survey was analyzed to address our research questions. Likert-type survey responses were coded numerically (1 = Strongly Disagree to 5 = Strongly Agree or 1 = Strongly Disagree to 7 = Strongly Agree). Two-tailed independent sample t-tests assuming unequal variances were conducted to compare group means. Statistical significance was determined at $\alpha = 0.05$. Error bars on Figures represent 95% confidence intervals. All analyses were performed using Microsoft Excel.

Results

We were first interested in the way students interacted with the modules. The survey showed that over 97% of the students completed Modules 1 – 6 while 92% and 85% completed Modules 7 and 8, respectively. This is encouraging since we only required 70- 80% completion. Figure 1

shows the average of the level of agreement on a Likert scale from 1 (strongly disagree) to 5 (strong agree) with the statement:

I found that module ____ was helpful in discovering my possible futures.

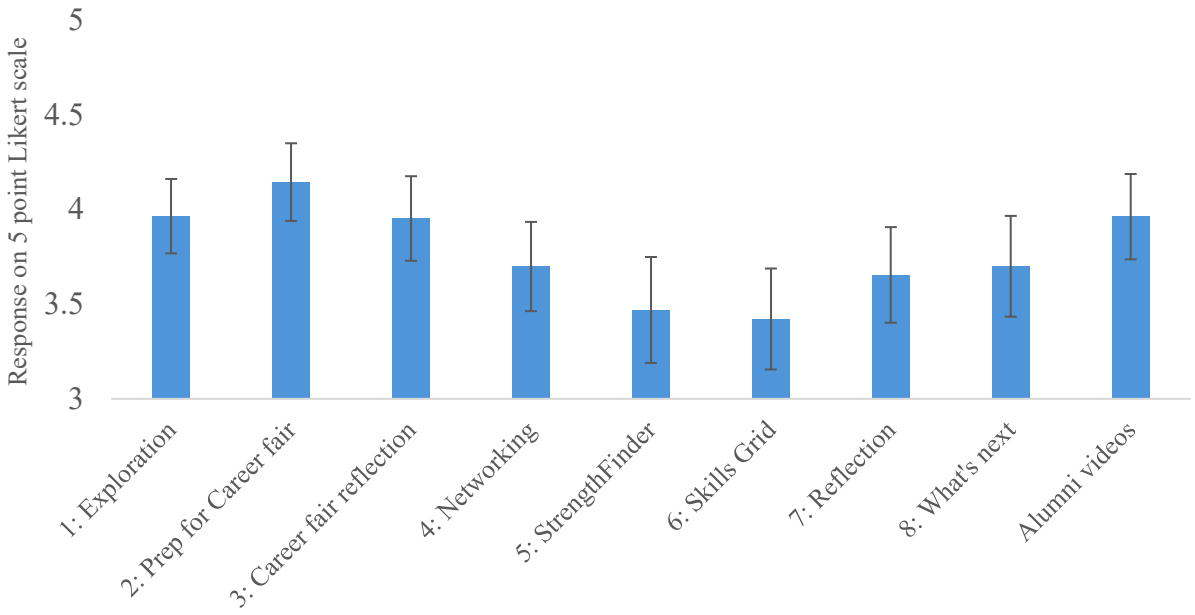

Figure 1: Helpfulness of modules. Students were asked in the post survey on their level of agreement on a Likert scale from 1 (strongly disagree) to 5 (strongly agree) with the statement: "I found __ module helpful for discovering my possible futures". Error bars represent 95% confidence intervals. The data is shown starting at 3 or neutral indicating that the students found all modules helpful.

In Table 3 we show the p values of the pairwise comparisons of the students' responses for the usefulness of each module. This analysis indicated that students found Module 1 (Exploration of Chemical Engineering), Module 2 (Career Fair Preparation), Module 3 (Reflection on the career fair), and the alumni videos in general as statistically more helpful compared to Modules 5 (Strength Finders), Module 6 (Skills grid) and Module 7 (overall reflection). Module 2 contained specific suggestions for making a resume and preparing for the

Table 3. p-values from pairwise two-tailed t-test comparing student ratings of module usefulness. Modules 1–3 and alumni videos were rated as statistically significantly more useful than Modules 4–8 when $p < 0.05$.

	4: Networking	5: Strengths-Finder	6: Skills Grid	7: Reflection	8: What's next
1: Exploration		0.0024	0.0005	0.0190	0.035
2: Prep for Career fair	0.0030	0.000063	0.0000068	0.0006	0.0017
3: Career fair reflection		0.0055	0.0013	0.0374	
Alumni videos		0.0056	0.0013	0.0382	

career fair. Overall, we found that students see value in something that is tangible and of immediate use, such as preparing for the career fair, rather than something that might help them later such as developing skills and planning their future careers. Even though students deemed some modules more helpful than others, they still found all modules helpful.

To help answer our first research question; "To what extent do career discovery modules support students in developing a coherent and actionable career development plan?", we first sought to see if the modules helped students prepare a resume, create a LinkedIn profile, attend career fair and have conversations with chemical engineers in the field. Figure 2 shows an increase of each of these from the beginning and end of the semester We were particularly excited to see the large increase in students attending the career fair from 50% to 97%. We did not perform statistics on this data since it is a yes or no answer (e.g. "Do you have a resume?).

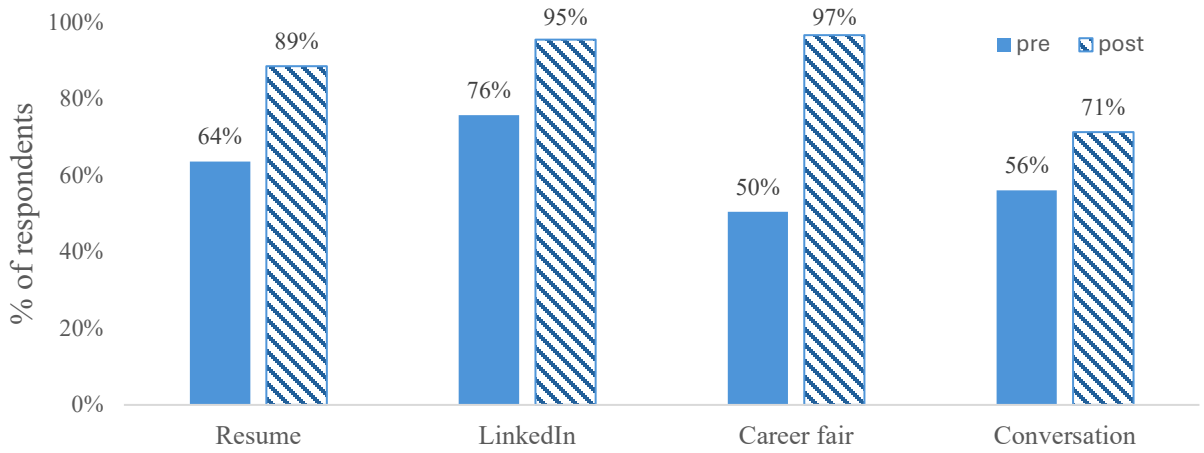

Figure 2: Percentage of students who have a resume, have a LinkedIn profile, have attended career fair, and have had a conversation with a chemical engineer in the field before and after the course.

Figure 3 shows the pre and post averages of agreement to several statements on a Likert scale from 1 (strongly disagree) to 5 (strongly agree). While most students feel it is important to obtain an internship and generally feel prepared to obtain one, we see that there is a statistically significant increase between the pre and post-test is on the statement "I know what steps I need to do to obtain an internship/co-op".

We were also interested to see if students became more knowledgeable about possible chemical engineering career descriptions. To address this, we asked students about their knowledge and interest in different job titles in chemical engineering. The results from the pre-survey and post-survey are shown in Figures 4-6. Figure 4 shows the percent of students who responded, "I do not know what this means" to different chemical engineering positions. We were encouraged to note that these responses went down and were nearly eliminated after the career modules were completed. Similarly, Figure 5 shows that students learned that many of these career titles are possible entry level positions for them after graduation. In addition, we see an increase in students' interest in various positions within chemical engineering after the modules in Figure 6. Interest has increased for all except for environmental engineer title, which students may be

more familiar with in general. These data show that students did learn about chemical engineering job titles and how they might apply to their own futures.

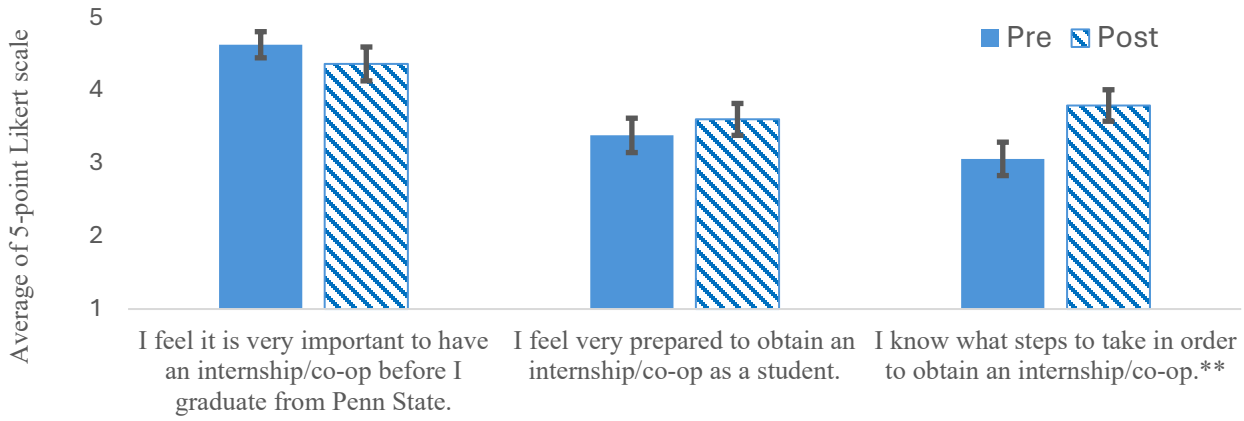

Figure 3: Student beliefs about internships/co-ops change from the beginning to the end of the semester. Results shown are mean values on a 1 (strongly disagree) to 5 (strongly agree) Likert scale. The error bars represent 95% confidence intervals. ** represents a $p < 0.01$

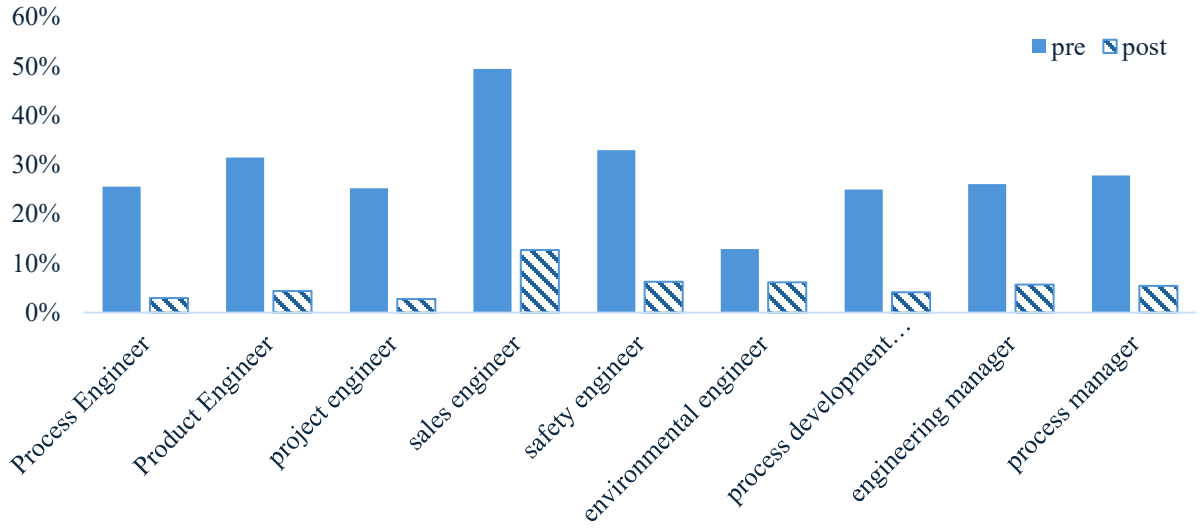

Figure 4. The percentage of students who answered "I don't know what that means" to different job titles in chemical engineering decreased dramatically after the Career Development unit.

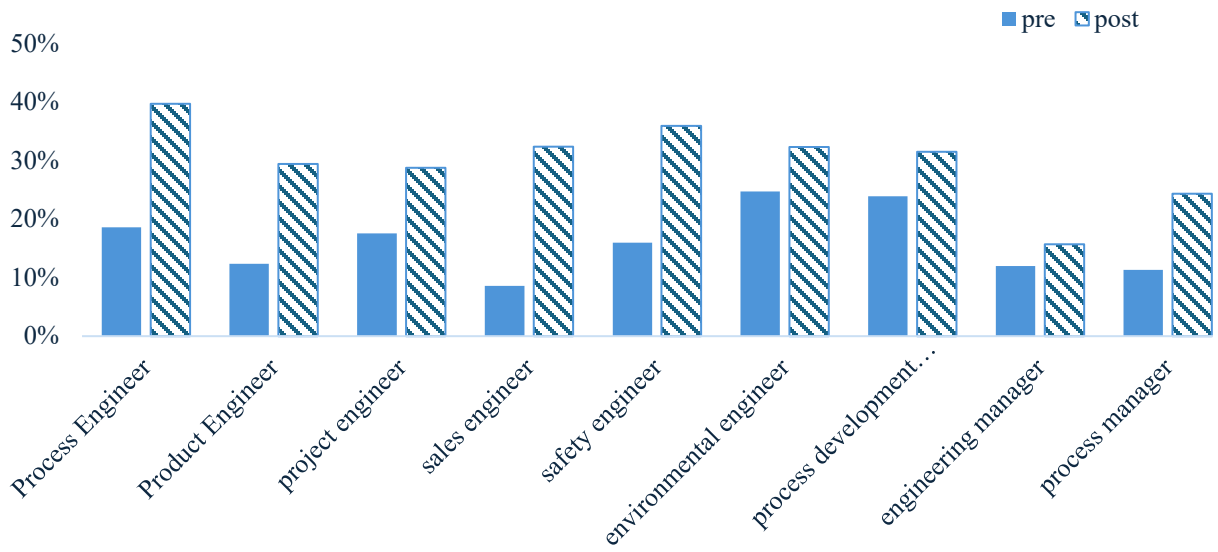

Figure 5. The percentage of students who answered "This is a possible entry level CHE position" to different job titles in chemical engineering increased after the Career Development unit.

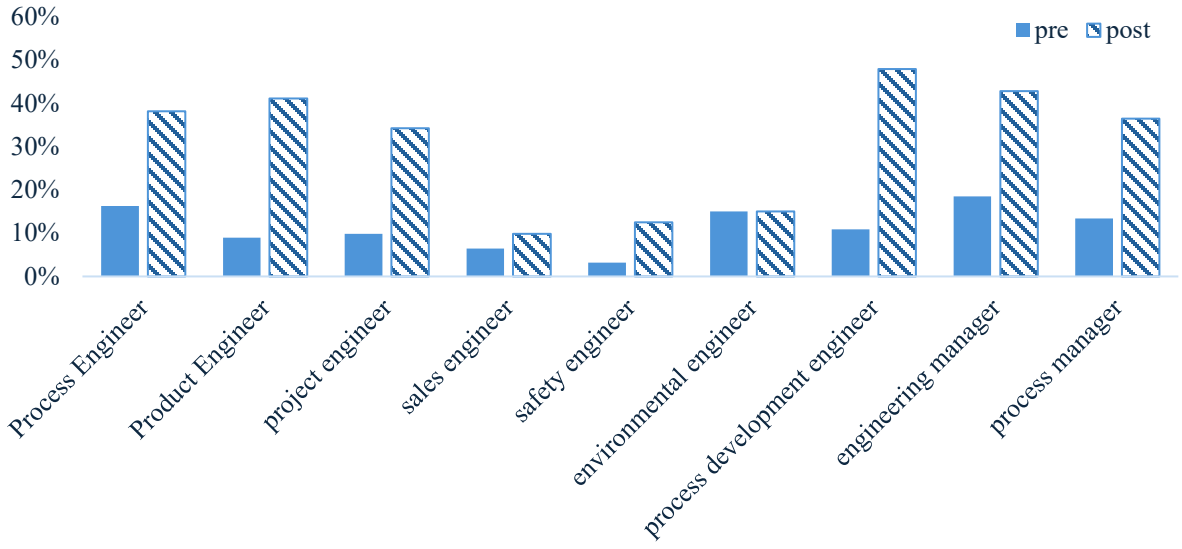

Figure 6. The percentage of students who answered "I have interest in working in this position" to different job titles in chemical engineering increased after the Career

Our final research question was whether increased awareness of possible chemical engineering career pathways enhance students' motivation and engagement with core chemical engineering content. To answer this question, we asked students on the post survey to agree or disagree on a 7-point Likert scale with three questions shown in Figure 7.

Knowing where I might go with my career has:

Motivated me to learn material balances

Motivated me to stay in chemical engineering

Made me more confident in my choice of major

Figure 7 shows that students generally believe that knowing where they might go helps them learn material balances and helps them be motivated to stay in the major with more confidence in their choice of major.

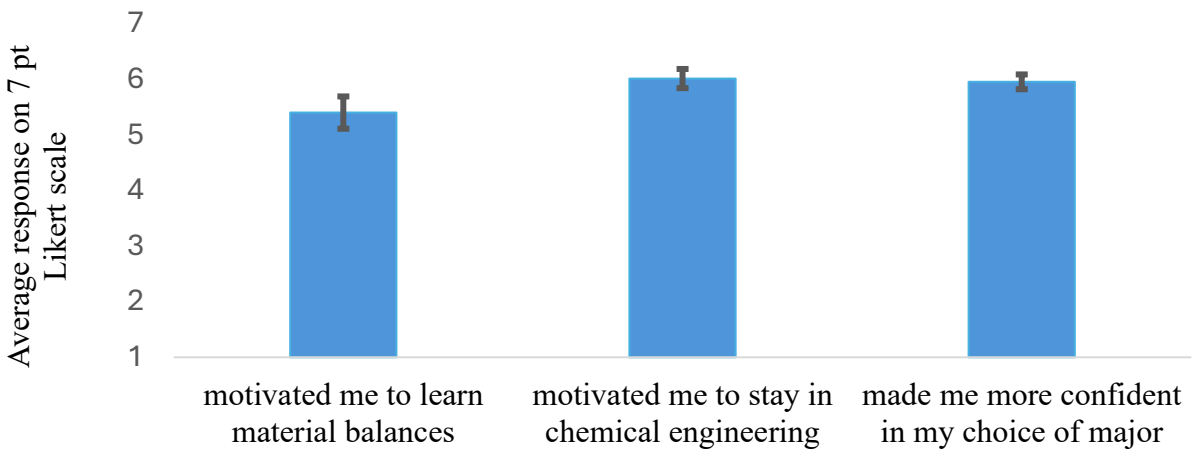

Figure 7. Students were asked to rank their agreement on a 7-point Likert scale with three questions: Knowing where I might go with my career has 1) motivated me to learn chemical engineering, 2) motivated me to stay in chemical engineering, 3) made me more confident in my choice of major.

Conclusion

This study demonstrates the value of embedding structured career discovery activities within a required second-year chemical engineering course. By integrating eight low-stakes career exploration modules into a required second year course, we provided students with equitable access to professional development while supporting their understanding of how present coursework connects to future career possibilities. Pre- and post-survey results indicate increased engagement in career-preparation behaviors, expanded awareness of chemical engineering career pathways, and greater confidence in students' choice of major. Notably, students reported that

increased clarity about potential futures enhanced their motivation to learn core chemical engineering content and to persist in the major.

These findings suggest that curriculum-embedded career discovery can support the development of future time perspective at a critical point in the curriculum. Ongoing work will examine longitudinal impacts and refinement of specific module components to further strengthen student motivation, identity development, and career readiness. In addition, future efforts will explore alternatives to the cost-based assessment of strengths used in Module 5 to improve its transferability and ensure that the module can be more easily adapted across courses and contexts.

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Appendix A: Skills Grid

LightcastLinks to an external site. is a company that analyzes labor market trends and identifies the top skills employers seek in chemical engineers. The following chart is a summary of the insights they've compiled:

Skill Area	Specific Skills	Description
Critical thinking and Problem Solving	Technical / Core CHE skills in Material & Energy Balances, Transport Phenomena, Reactor Design, Thermodynamics, Process Modeling & Simulation, "What if" scenarios, Chemistry	Design, analyze, and optimize chemical processes using quantitative tools and software (e.g., Excel, Python, Aspen, COMSOL).
Communication	Technical Writing, Report Generation, Technical Presentations	Summarize complex data for stakeholders; Lightcast notes strong demand for report-writing and communication skills.
Initiative & Leadership	Sales Acumen, Stakeholder Engagement, Change Management, Taking initiative, EQ	Engineers often bridge technical and commercial domains; skills in negotiation and leadership boost career growth.
Business Operations	Cost Analysis, Techno-Economic Assessment, ROI / Economic Feasibility, Supply Chain, Systems thinking.	Evaluate project viability, CAPEX/OPEX, optimize resource use, and drive profitability.
Innovation/Creativity	Creativity, Problem Solving, Critical Thinking, & Innovation. New ideas that satisfy constraints, Troubleshooting, Continuous Improvement, Process Improvement & Optimization	Essential for on-site reliability and innovation; troubleshooting and RCA skills prized.
Project Management	Project planning, time management, risk management, cost control/budgeting, stakeholder management	Defining scope, tasks, milestones, timelines, schedules; forecasting budgets and timelines; identifying and mitigating risks.
Teamwork	Cross-Functional Collaboration, Interpersonal Skills, Active Listening	Coordinate with operators, management, and specialists; interpersonal skills cited as key by practicing chemical engineers.

**The first category (critical thinking and problem-solving) involves more specialized CHE skills (e.g., from courses).*

**The other skills are more common across most job types.*

A **skills grid** is a tool that helps you connect your real-world experiences—like jobs, clubs, volunteer roles, or team activities—to key professional skills employers value, such as communication, problem-solving, teamwork, and leadership.

By organizing your experiences into this format, you'll start to see patterns in your strengths, identify areas for growth, and gather language you can use for resumes, interviews, and networking conversations. Below is an example of a skills grid. As you review it, **click the information icons** for a few key elements to keep in mind when creating your own.

Roles	Critical thinking & problem solving	Communication	Initiative & Leadership	Business Operations	Innovation & Creativity	Project Management	Teamwork
High School Swim Team	Quick Strategist "Dropped 8 sec in 100m fly"	Clear Communicator "Led 2 huddles/week"	Swim Captain "Mentored 6 teammates"			Meet Manager "Coordinated 10+ meets"	Team-First Mentality "Daily with 20 teammates"
Starbucks Part-Time	Fast Fixer "Resolved 12+ order issues/week"	Customer Whisperer "100% CSAT on 50+ shifts"	Shift Starter "Covered 10+ open shifts"	Workflow Pro "Reduced stockouts by 30%"	Service Improver "Suggested process fixes"	Shift Organizer "Trained 4 new hires"	Shift Collaborator "Co-led 8-person team"
Student Design Team Lead		Lead Presenter "Delivered 6 updates"		Ops Aware "Tracked $1.2K budget"		Milestone Tracker "Met 6 deadlines in 12 weeks"	
THON Fundraiser	Tactical Thinker "Pivoted campaign mid-event"	Public Voice "Spoke at 3 events"	Event Leader "Led 3 events; $6K raised"	Fundraising Planner "Managed $3.5K budget"	Creative Strategist "Tested donation messaging"	Event Planner "Executed 3 fundraisers"	Unity Builder "Coordinated 15 volunteers"
UG Research Assistant		Scientific Storyteller "Presented at symposium"		Lab Flow Analyst "Improved sample processing"	Lab Innovator "Saved 4 hrs/week via automation"		Lab Teammate "Co-authored paper with 3 others"

Now it's your turn to create a skills grid!

Identify your skills gained from experiences. This exercise isn't just about filling in boxes—it's about **building confidence** in what you've done and **recognizing** how it prepares you for what's next.

Instructions

- **Download** the Skills Grid Template
- **List some significant experiences** you have had in your jobs, volunteer activities, social clubs, high school activities or teams, scouts, etc., and **check the specific skills** required for that activity
- List **at least 3** activities, but more if you have them
- Use the **key elements** identified in the example grid above
  Remember: not all boxes need to be filled out!

Roles	Critical Thinking & Problem Solving	Communication	Initiative & Leadership	Business Operations	Innovation & Creativity	Project Management	Team work

Appendix B

Below are the pre- and post- questionnaires we used for the class.

F25 career pre-questionnaire

In Fall 2025, we are going to introduce some career discovery to help each student discover what they might want to do with their chemical engineering degree. The questions below will help us on our journey. By continuing with this survey, you are consenting to our use of your anonymous feedback in evaluating the effectiveness of the module and writing up the results for a paper or presentation to help other educators. Feel free to only answer the questions you want to answer. Thank you!

30 Do you currently have a resume that includes activities from Penn State?

Mark only one oval.

- ◯ Yes
- ◯ No
- ◯ my resume is updated but I have nothing from Penn State on it.
- ◯ Other: _____

40 Do you have a LinkedIn account?

Mark only one oval.

- ◯ Yes
- ◯ No
- ◯ I am not sure

50 Have you attended a Penn State Career fair before?

Mark only one oval.

- ◯ Yes
- ◯ No
- ◯ I am not sure

60 Are you currently planning to go to the Penn State career fair this semester?

Mark only one oval.

- Yes
- No
- I am not sure

70 Do you have an internship/co-op for Summer 2025?

Mark only one oval.

- Yes
- No
- I have a few leads but nothing concrete
- I am planning to attend career fair to look for one.
- Other:

80 Are you currently doing research at Penn State?

Mark only one oval.

- Yes
- Not yet but I have reached out to some faculty
- No, but I hope to do research in the future
- No, I have not considered this possibility
- Other:

90 Have you had conversations with chemical engineers practicing in the field?

Mark only one oval.

- ◯ no
- ◯ yes - one of my relatives is a chemical engineer yes - one of my friends is a
- ◯ chemical engineer yes - I talked to a chemical engineer that I found (e.g. at career
- ◯ fair, through LinkedIn) Other:
- ◯

: 0 What plans do you have after graduation? (select all that you are thinking about)

Check all that apply.

- ☐ I want to get a job in chemical engineering but I don't know specifics.
- ☐ I know a specific type of job that I want.
- ☐ I want to get a PhD in chemical engineering
- ☐ I want to get a professional masters degree (e.g. MBA)
- ☐ I want to get a professional advanced degree (e.g. med school, law school) I have
- ☐ long term career plans (I have a good idea of where I want to be in 20 years)
- ☐ Other:

; 0 For each of the following statements, indicate your level of agreement

	strongly disagree	disagree	neutral	agree	strongly agree
I feel it is very important to have an internship/coop before I graduate from Penn State.					
I feel very prepared to obtain an internship/coop as a student					
I know what steps to take in order to obtain an internship/coop.					
I believe that the skills I have from working and volunteering are valuable for getting a job in chemical engineering.					
I feel stressed about getting a internship/coop in summer 2026.					

I feel confident that if I had an internship, I could do the work required.

320 For the following job titles, please check all that apply (you may check multiple boxes).

Check all that apply.

	I do not know what this means	I have some idea of what this means	this is a possible entry level CHE position	I have interest in working in this position
process engineer	☐	☐	☐	☐
product engineer	☐	☐	☐	☐
project engineer	☐	☐	☐	☐
sales engineer	☐	☐	☐	☐
safety engineer	☐	☐	☐	☐
environmental engineer	☐	☐	☐	☐
process development engineer	☐	☐	☐	☐
engineering manager	☐	☐	☐	☐
process manager	☐	☐	☐	☐

330 What is your gender identity?

Mark only one oval.

- woman
- man
- non-binary
- Genderqueer/Gender Non-Comforming
- not listed

340 How many years have you been at Penn State?

Mark only one oval.

- This is my first year at Penn State
- This is my second year at Penn State
- This is my third year at Penn State
- Other:

350 Are you a change of campus student? (i.e. Did you start at a campus that is not University Park?)

Mark only one oval.

- yes
- no
- Other:

360 Are you an international student?

Mark only one oval.

- yes
- no
- Other:

370 What is your GPA?

Mark only one oval.

- > 3.9
- 3.7 - 3.9
- 3.5 - 3.69
- 3.2 - 2.49
- 3.0 - 3.19
- 2.8 - 2.99
- 2.6 - 2.79
- <2.6
- Other:

F25 career post questionnaire

In Fall 2025, we are going to introduce some career discovery to help each student discover what they might want to do with their chemical engineering degree. The questions below will help us on our journey. By continuing with this survey, you are consenting to our use of your anonymous feedback in evaluating the effectiveness of the module and writing up the results for a paper or presentation to help other educators. Feel free to only answer the questions you want to answer. Thank you!

1. Did you complete the pre-survey in this class?

Yes
no
not sure

2. Do you currently have a resume that includes activities from Penn State?

Mark only one oval.

- Yes
- No
- my resume is updated but I have nothing from Penn State on it.
- Other: _____

3. Do you have a LinkedIn account?

Mark only one oval.

- yes
- no
- I'm not sure

4. Have you used LinkedIn to learn about chemical engineers in the field? *Check all that apply.*

- yes, I've looked at profiles of people who have jobs that look interesting
- yes, I've contacted someone for a "coffee chat"
- yes, I've come close to asking for a "coffee chat" but have not done so yet
- I build my LinkedIn profile and plan to explore more when I have some time
- I do not have a LinkedIn account
- I already had a LinkedIn account before this semester

5. If you reached out to someone for a "coffee chat", please share why you chose to do so and how it went.

6. If you did not reach out for a "coffee chat", please let us know what kept you from doing this.

7. Did you attend any career fair or networking receptions at Penn State?

Mark only one oval.

- Yes, several times including this current semester
- Yes, this semester for the first time
- Yes, but not this current semester
- No

I am not sure

8. Which career fair did you attend this semester, check all that apply.

- co-op/intern career fair at Penn State
- full time career fair at Bryce Jordan Center
- one of the engineering networking receptions on Monday or Tuesday evening
- The chemical engineering career fair
- Other

if you marked "other", please elaborate

9. If you did not go to any of the career fair opportunities listed in the previous question, please explain what kept you from going?

10. Do you have an internship/co-op for Summer 2026? Mark only one oval.

Yes
No
I have a few leads but nothing concrete
I am planning to attend spring career fair to look for one.
Other: _____

11. Are you currently doing research at Penn State?

Mark only one oval.

Yes
Not yet but I have reached out to some faculty
No, but I hope to do research in the future
No, I have not considered this possibility
Other: _____

12. Have you had conversations with chemical engineers practicing in the field?

Mark only one oval.

- ◯ no
- ◯ yes - one of my relatives is a chemical engineer
- ◯ yes - one of my friends is a chemical engineer
- ◯ yes - I talked to a chemical engineer that I found (e.g. at career fair, through LinkedIn)
- ◯ Other: _____

13. What plans do you have after graduation? (select all that you are thinking about)

- ☐ I want to get a job in chemical engineering but I don't know specifics.
- ☐ I know a specific type of job that I want.
- ☐ I want to get a PhD in chemical engineering
- ☐ I want to get a professional masters degree (e.g. MBA)
- ☐ I want to get a professional advanced degree (e.g. med school, law school)
- ☐ I have long term career plans (I have a good idea of where I want to be in 20 years)
- ☐ Other

14. For each of the following statements, indicate your level of agreement

Mark only one oval per row.

	strongly disagree	disagree	neutral	agree	strongly agree

I feel it is very important to have an internship/co-op before I graduate from Penn State

I feel very prepared to obtain an internship/co-op as a student

I know what steps to take in order to obtain an internship/co-op.

I believe that the skills I have from working and volunteering are valuable for getting a job in chemical engineering.

I feel stressed about getting an internship/coop in summer 2026.

I feel confident that if I had an internship, I could do the work required

15. For the following job titles, please check all that apply (you may check multiple boxes).
Check all that apply.

	I do not know what this means	I have some idea of what this means	this is a possible entry level CHE position	I have interest in working in this position
process engineer	☐	☐	☐	☐
product engineer	☐	☐	☐	☐
project engineer	☐	☐	☐	☐
sales engineer	☐	☐	☐	☐
safety engineer	☐	☐	☐	☐
environmental engineer	☐	☐	☐	☐
process development engineer	☐	☐	☐	☐
engineering manager	☐	☐	☐	☐
process manager	☐	☐	☐	☐

Career Discovery Module Feedback

We are interested in feedback on the career discovery modules that you worked through.

16. Please check all the modules that you completed

Check all that apply.

- ☐ 1 Exploration of Chemical engineering opportunities
- ☐ 2 Resume/Prepare for Career Fair
- ☐ 3 Final Resume/Post-Career Fair
- ☐ 4 Networking
- ☐ 5 StrengthsFinder Assessment
- ☐ 6 Skills Grid/Futures
- ☐ 7 Reflection
- ☐ 8 What's Next? Alumni Feedback (Videos)

17. For each of the following modules and activities, indicate your level of agreement with the following statement:

I found that the _____was helpful in discovering my possible futures.

Mark only one oval per row.

	strongly disagree	disagree	neutral	agree	strongly agree	NA
Module 1 Exploration of Chemical engineering opportunities	⬭	⬭	⬭	⬭	⬭	⬭

Module2 Resume/Prepare for Career Fair						
Module3 Final Resume/Post-Career Fair						
Module4 Networking [Ongoing/Reflection]						
Module5 StrengthsFinder Assessment						
Module 6 Skills Grid/Futures						
Module 7 Reflection						
Module 8 What's Next? Alumni Feedback (Videos)						
AI activity alumni videos						
career fair preparation						
career reflection						

18. Knowing where I might go with my career has motivated me to learn material balances.
Mark only one oval.

1 2 3 4 5 6 7

Strongly disagree strongly agree

19. Knowing where I might go with my career has motivated me to stay in chemical engineering.

Mark only one oval.

1 2 3 4 5 6 7

Strongly disagree strongly agree

20. Knowing where I might go with my career has made me more confident in my choice of major.

Mark only one oval.

1 2 3 4 5 6 7

Strongly disagree strongly agree

21. How many alumni videos did you watch in the first module on career discovery?

Mark only one oval.

- The required amount (3)
- More than the required amount
- less than the required amount

22. Did you watch any of the videos on the extended version to hear a more detailed answer?

Mark only one oval.

Yes
No
Maybe

23. How many "advise" videos did you watch in the last module?

Mark only one oval.

- 1
- 2
- 3
- 4
- 5
- more than 5

24. Please use this space for any specific feedback you would like to share about the videos.

25. Watching the videos changed how I saw chemical engineering and what chemical engineers do.

Mark only one oval.

1 2 3 4 5 6 7

Strongly disagree strongly agree

26. What is your gender identity?

Mark only one oval.

- *Woman*
- *Man*
- Genderqueer/Gender Non-Comforming
- non-binary
- not listed

27. How many years have you been at Penn State?

Mark only one oval.

- This is my first year

- This is my second year
- This is my third year
- Other: _____

28. Are you a change of campus student? (i.e. Did you start at a campus that is not University Park?)

29. Are you an international student?

Mark only one oval.

yes

no

30. What is your GPA? *Mark only one oval.*

- > 3.9
- 3.7 - 3.9
- 3.5 - 3.69
- 3.2 - 2.49
- 3.0 - 3.19
- 2.8 - 2.99
- 2.6 - 2.79
- <2.6
- Other: _____