

GIFTS: Integrating Informational Interviewing, Entrepreneurial Mindset, and AI Literacy in First-Year Engineering Education

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This Great Ideas For Teaching/Talking with Students (GIFTS) paper presents a scaffolded framework for first-year engineering students to conduct informational interviews with practicing engineers, integrating Artificial Intelligence (AI) literacy and the KEEN Entrepreneurial Mindset (EM) 3C's framework consisting of Curiosity, Connections, and Creating Value. The module addresses three critical objectives: (1) establishing informational interviewing as a lifelong professional skill, (2) introducing AI literacy in professional contexts, and (3) reinforcing EM competencies through practical application [1-3]. Students use AI chatbots to prepare by developing purposeful questions aligned with the 3C's and by running mock interviews. They then conduct live interviews with engineering professionals and critically reflect on the differences between AI-generated and authentic human interactions.

Objectives

First-year engineering students can benefit from opportunities to better connect classroom learning with professional practice. While technical coursework dominates the curriculum, essential professional skills, including networking, informational interviewing, and professional communication, frequently receive insufficient attention. Yet these "soft skills" prove critical for career success, helping students explore career paths, build professional networks, and develop the curiosity-driven learning habits that define successful engineers [4].

Simultaneously, AI has become a transformative force in professional settings. Future engineers must develop AI literacy: understanding both the capabilities and limitations of AI tools while learning to use them ethically and effectively. Rather than treating AI as either a solution or a threat, engineering educators should help students develop thoughtful, critical perspectives on the role of AI in professional practice [5,6].

Background and Motivation

Introduction to the Engineering Experience is a required course taken by approximately 400-600 first-year engineering students at Wentworth Institute each fall semester. The content of this two-credit course, described in detail in another publication by this author, emphasizes professional skills development including time management, collaboration, reflection, and networking, competencies often underdeveloped in traditional engineering curricula [4]. As a key milestone, each student conducts at least one informational interview with a practicing engineer. Beginning in Fall 2023, the course introduced an AI literacy module in response to growing use of AI in academic and professional settings. Engineering graduates need not only fluency with AI tools, but also critical thinking to decide when and how to use them appropriately [5]. The idea of integrating AI literacy with informational interviewing came from three observations:

1. Practice opportunities: Students had limited opportunities to practice interviewing skills before engaging with busy professionals, leading to anxiety and missed learning opportunities.
2. Preparation barriers: Students struggled to develop meaningful interview questions, often defaulting to generic queries that yielded superficial responses.
3. Critical thinking needs: Students needed frameworks for evaluating AI-generated content and understanding AI's limitations in replicating human insight and connection.

By combining these elements with the KEEN 3C's framework [7], a module that simultaneously develops networking skills, AI literacy, and entrepreneurial mindset was created.

The KEEN Three C's Framework for Informational Interviewing

The KEEN Entrepreneurial Mindset framework's three C's naturally align with the practice and purpose of informational interviewing:

Curiosity

Informational interviewing gives students a natural way to act on their curiosity. Students learn to ask thoughtful, open-ended questions that explore an engineer's experiences, challenges, and insights. Rather than seeking simple answers, they develop genuine intellectual curiosity about how engineering works in practice, what problems engineers solve, and how careers evolve. The AI preparation phase helps students move beyond surface-level questions ("What's your job title?") to deeper inquiries ("What was the most unexpected challenge you faced transitioning from school to industry?").

Connections

At its core, informational interviewing is about building professional connections. Students learn to identify potential contacts, craft professional outreach messages, conduct meaningful conversations, and maintain relationships over time. They discover common interests, explore mutual connections, and begin building the professional networks that will support their careers. The module emphasizes that networking is not transactional but relational, about building authentic connections based on shared interests and mutual value.

Creating Value

Informational interviewing creates value in a lot of different ways. Students learn about career paths, industry trends, and what professional work entails. They also start to see opportunities for growth, internships, and future roles. Interviewees benefit too, often taking time to reflect on their own careers, share advice, and reconnect with students and their former school. The module encourages students to see interviews as a two-way exchange where both sides gain something meaningful, and to carry that mindset with them as they move forward in their careers.

Practical Implementation Details and Modules

The module follows a scaffolded sequence that builds skills over time while remaining flexible for different course settings. Because the steps in the module take time for students to research, reach out, schedule, and conduct informational interviews, it works best when introduced early and spread out over a few weeks, so students have enough time to complete each step.

Week 1: ePortfolio Introduction and Setup (Optional)

Students set up digital ePortfolios where they document their progress, reflections, and outcomes throughout the module. While optional, ePortfolios facilitate sharing, peer feedback, and ongoing reflection. A template Google Site is provided, though institutions may use alternative platforms or traditional notebooks for tracking student progress [8].

Week 2: AI Literacy Introduction

A lecture and hands-on workshop introduce AI literacy concepts and practical applications. Students create accounts with AI chatbot platforms and begin exploring engineering disciplines through AI-generated responses. This early use helps students get comfortable with AI as a learning tool and prepares them to evaluate their responses more critically later in the module. At this point, students are assigned to use AI chatbots to explore engineering fields of interest, generating questions about roles, responsibilities, and career paths. They document both the AI responses and their own reactions to these responses.

Week 3: Informational Interview Skills and Professional Networking

This week combines lecture content on effective informational interviewing with hands-on practice in professional networking. Topics include:

- Researching individuals, companies, and industries.
- Creating or updating LinkedIn profiles.
- Exploring alumni databases and company information.
- Professional correspondence etiquette.
- Using AI chatbots to draft outreach emails.

Assignments:

1. Develop interview questions aligned with the 3C's (Appendix A).
2. Generate a list of at least five prospective contacts (specific individuals or general roles).
3. Conduct a mock interview using an AI chatbot role-playing as an engineer.
4. Reflect on the mock interview experience using AI-generated feedback.

Weeks 4-5: Processing Time

Students conduct outreach to potential interviewees and schedule interviews. This 2-3 week window accommodates professionals' schedules and teaches students persistence, most successful students contact 3-8 people before securing an interview.

Supports provided:

- Email templates for initial outreach, follow-up, and thank-you messages.
- Guidance on how to identify contacts through alumni networks, LinkedIn, and professional organizations.
- Optional faculty connections for students struggling to identify contacts.

Weeks 6-12: Live Interview, Comparison of AI to Live interviews, and Reflection

Students conduct their informational interviews, ensuring they address questions from all three C categories. Following the interview, they complete a structured reflection documented in their ePortfolios. Reflection components and template is provided in Appendix B.

Optional Challenge: Students are encouraged to conduct a second informational interview, applying lessons learned from their first experience and deepening their professional network.

Additional Implementation Details, Modifications, and Adaptations

Timing and Scaffolding: This module is intentionally scaffolded and should begin around Week 2-3 to allow sufficient processing time. Each step requires time for student learning and application. The sequence is flexible, and many activities don't require full lecture periods and can be integrated into existing sessions.

Supporting students with difficulty finding contacts: Helping students access professional networks ensures everyone has equal opportunities to connect and can be especially valuable for first-generation students and those who hold identities which have been historically underrepresented in the field of engineering [9]. Additional support may be needed for many students, and can be provided in many ways, including the following:

- Provide lists of alumni willing to be contacted.
- Arrange guest speakers who volunteer for student interviews (as a panel).
- Create partnerships with local engineering firms for interview opportunities.
- Offer one-on-one coaching for students struggling with outreach.

Faculty Interview Policy: Students frequently ask to interview course instructors or other faculty. This is generally discouraged for two reasons: (1) the learning objective is connecting with practicing engineers in industry, and (2) with large enrollments, faculty cannot accommodate numerous interview requests. Be flexible, and if needed, interview them, maybe as a panel.

Adapting to Different Course Structures and formats:

- Compressed timeline: The essential elements (AI practice, live interview, and reflection) can be completed in 4-6 weeks if needed.
- Asynchronous formats: All components except the live interview can be completed asynchronously using recorded lectures and online resources.
- Small enrollments: With smaller classes, consider having students present their interviews to peers, adding a presentation component.
- Large enrollments: Use peer review of interview questions and reflections to build community while managing grading load.

Technology Alternatives: While the module uses AI chatbots and digital ePortfolios, neither is strictly required:

- Traditional role-playing with peers can substitute for AI mock interviews.
- Physical notebooks or learning management system journals can replace ePortfolios.
- However, both AI and ePortfolios add value worth considering if resources permit.

Assessment Methodologies

Assessment focuses on process and reflection rather than outcomes, recognizing that even unsuccessful outreach or challenging interviews provide valuable learning experiences. Appendix B provides a template which students complete at the end of the semester. This template combines transcription of highlights from conversations, reflection, and metacognition.

Conclusion

Informational interviewing is a simple, high-impact way for students to build professional skills while learning what engineering really looks like. By adding AI literacy and the KEEN Entrepreneurial Mindset, this module makes the experience more meaningful and relevant. It shows students that even though AI can support their learning, real insights come from curiosity, conversation, and making connections. More importantly, it highlights that engineering is not just about technical skills, but also about how you think, communicate, and engage with others. For first-year students, this module gives them tools and perspectives they can carry with them throughout their careers.

Extensions and future developments may include the following:

1. Exploration and evaluation of AI use within the module, including how different modalities such as text, voice, and video influence interview preparation, reflection, and overall learning, as well as how students interact with and assess chatbot-generated content.
2. Analysis of how AI literacy developed in this module transfers to other academic, professional, and real-world contexts.
3. Assessment of long-term outcomes, including networking behaviors, career pathways, and student retention in engineering.
4. Investigation of how the KEEN 3C framework shapes students' approach to professional skill development and engagement.

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Appendix A: Sample Interview Questions by 3C Category

Curiosity

1. What aspects of your current role were you least prepared for coming out of school?
2. What emerging technology or trend in your field excites you most right now?
3. Can you describe a project that challenged your assumptions about engineering?
4. How has your field changed since you started your career?
5. What questions are you most curious about in your current work?

Connections

1. How did you build your professional network when you were starting out?
2. What professional organizations or communities have been most valuable to you?
3. Are there any mentors who significantly influenced your career path?
4. How do you stay connected with your field and continue learning?
5. What advice would you give about building meaningful professional relationships?

Creating Value

1. What impact does your work have on users or society?
 2. How do you balance technical excellence with business or social value?
 3. Can you describe a project where you felt you created meaningful value?
 4. What advice would you give to someone wanting to make meaningful contributions in your field?
 5. How do you measure the success or impact of your engineering work?
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Appendix B

Assessment: AI, Informational Interviewing, and Entrepreneurial Mindset

The Goal: You and a partner will work together to draft ideas about how you used AI this semester, what you learned from your informational interview, and how you're thinking about entrepreneurial mindset as an engineer. This will help you organize your thoughts before writing your individual paper.

The Individual Paper (submit on Bsp individually)

Write **1–1.5 pages** reflecting on three key areas from this semester:

1. **AI Literacy:** How you used AI and what you learned about using it responsibly.
2. **Informational Interviewing:** What you gained from talking with a practicing engineer.
3. **Entrepreneurial Mindset:** How you're thinking about creating value and contributing as an engineer.

Your paper must address these six questions:

1. How has your understanding of AI changed?
2. How did AI support your learning and interview preparation?
3. What did you learn from your informational interview that changed how you think about engineering?
4. When did AI fall short or when did you need to do the work yourself?
5. Your thoughts about curiosity, connections, and creating value as a future engineer.
6. What's your strategy for using AI responsibly and thinking entrepreneurially going forward?

Step 1: Find a Partner

Grab someone nearby. Make sure you both have laptops ready. Instructor may assign partners

Step 2: Draft Together (20-30 minutes)

Work through each question below. **Talk it out and write down ideas together.** You should both end up with similar notes from your discussion.

Question 1: How has your understanding of AI changed? (5 min)

Talk about:

1. What did you think AI could/couldn't do at the start of this class? What do you think now?
2. What moments or assignments shifted your thinking?
3. What surprised you about AI's capabilities or limitations?

Write down 2-3 sentences that capture how your understanding evolved.

Question 2: How did AI support your learning and interview preparation? (5 min)

Talk about when AI actually helped you:

1. Course tasks: brainstorming, understanding concepts, generating or improving questions.
2. Interview prep: researching the company/field, refining interview questions, practicing professional communication, clarifying technical concepts.
3. Organizing your thoughts or building confidence.

Also talk about:

4. What did you still have to do yourself that AI couldn't help with?
5. How did using AI change the quality of your questions or preparation?

Write 3-4 sentences about the most significant ways AI supported you and what you contributed yourself.

Question 3: What did you learn from your informational interview? (5 min)

Talk about:

1. What did you learn about the engineering profession that surprised you?
2. How did talking with a real engineer change what you think about your field or career path?
3. What insights did you gain about how engineers create value or contribute to their organizations?
4. Did the interview help you understand what stakeholders engineers serve or what problems they solve?
5. How did the interview affect your confidence or clarity about your future?

Write 3-4 sentences about the most important takeaways from your interview experience.

Question 4: When did AI fall short or when did you have to think for yourself? (5 min)

Talk about:

1. Times when AI gave you bad, incomplete, or generic answers.
2. Moments when you realized you had to bring your own curiosity, judgment, or personality.
3. What you had to verify or correct.
4. Times when the real learning happened because you did the work yourself.

Write 2-3 sentences with specific examples of AI's limitations and why your own thinking mattered.

Question 5: How are you thinking about creating value as a future engineer? (7 min)

Talk about the **KEEN 3 C's of the Entrepreneurial Mindset** and how you interpret them:

Curiosity:

1. What questions are you asking now that you weren't asking at the start of the semester?
2. How did your informational interview spark curiosity about real engineering problems?
3. What made you curious about your interviewee's work or field?

Connections:

4. What connections did you make this semester? (People, ideas, concepts across different areas)
5. How did your interview help you connect classroom learning to real-world practice?
6. What unexpected connections did you discover between different aspects of engineering?

Creating Value:

7. What does "creating value" mean to you now after this semester?

8. Who are the stakeholders you might serve as an engineer? (Customers? Communities? Your organization? Society?)
9. What problems do you want to help solve or what contributions do you want to make?
10. How did the informational interview help you understand how engineers create value in the real world?

Write 3-4 sentences covering curiosity, connections, and creating value.

Question 6: What's your strategy going forward? (3 min). Talk about:

- How will you use AI responsibly in future courses and work?
- What guidelines will you follow to keep your work authentic and ethical?
- How will you continue to seek out real engineers and learn from their experience?
- What entrepreneurial or value-creation mindset will you bring to your future coursework?

Step 3: Pick One Big Insight (5 minutes)

Look back at everything you just drafted. What's the most interesting or important thing that emerged about AI literacy, informational interviewing, or entrepreneurial thinking?

Write one sentence (maybe two) that captures it. Could be:

- Something you learned about balancing AI help with your own thinking.
- An insight from your interview that changed your perspective.
- How you're thinking differently about creating value as an engineer.
- A tension or challenge you're still working through.

Step 4: Personal Note to Yourself (to be used in portfolio)

On your own, write 2-3 sentences:

- Which question resonates most with your experience?
- What specific example from your interview or AI use will you include in your paper?
- What do you still need to think about before writing your final reflection?

This is just for you—you won't read it out loud.

Step 5: Share Out

Instructor may call on you to share your one-sentence insight to the class.

- Read your sentence.
- Say briefly why it matters for your development as an engineer.

Summary

1. Interview Summary: Students categorize key insights from their interview according to the 3C's, noting specific examples and quotes (with permission).
2. AI vs. Human Comparison: Students critically analyze differences between their AI mock interview and live interview:
 - a. What insights emerged in the live interview that AI couldn't provide?
 - b. Where did AI preparation prove helpful vs. inadequate?
 - c. How did the human connection add value beyond information exchange?
3. Skills Assessment: Students evaluate their own performance:
 - a. What went well in the interview?
 - b. What would they improve next time?
 - c. How effectively did they demonstrate curiosity, build connection, and explore value?
4. Future Actions: Students identify specific next steps:
 - a. Appropriate follow-up with the interviewee.
 - b. Additional information to research based on the conversation.
 - c. Plans for future informational interviews.