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Transition from capstone to workplaces: Examining mechanical engineering graduates' use of socially engaged design practices

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Abstract

Capstone design courses prepare students for professional practice as they learn critical skills and work on real-world design projects. Through appropriate scaffolding, students can develop sociotechnical skills that leverage technical knowledge along with attention to social and contextual factors for a more holistic approach to engineering. The Center for Socially Engaged Engineering and Design (C-SED) developed the Sociotechnical Engineering Toolkit (SET), a collection of resources and lessons to provide training on the skills needed to account for social and contextual dimensions of engineering work. While prior research explored how students adopted recommended sociotechnical engineering and design practices within capstone design courses, limited research examined how these skills translated into workplace activities.

This study examined how mechanical engineering graduates applied skills developed through Sociotechnical Engineering Toolkit (SET) modules in their professional work. In the capstone course, SET modules focused on design requirements and specifications, design interviewing, concept generation and development, and concept selection and prototyping. Six graduates were recruited for semi-structured interviews from a wide variety of fields, including automotive, construction, energy, and manufacturing. In their industry positions, these graduates described the importance of translating customer needs into quantifiable specifications, using specifications to guide their projects, working with diverse stakeholders to gather information and make decisions for their projects, considering multiple concepts for their design work, and using low-fidelity prototypes to gather information. Additionally, graduates described that the use of skills related to SET modules depended on their role, as they may not be engaged in particular design activities. This study demonstrated that training provided by the SET modules aligned with workplace activities for recent mechanical engineering graduates, equipping them with the skills necessary for professional practice.

Introduction

Engineering work requires sociotechnical skills that leverage technical knowledge while also accounting for the human, cultural, economic, and environmental contexts, for a more holistic approach to problem solving [1]. Engineering training has been traditionally rooted in technocentric views, emphasizing technological innovation as the primary means of addressing problems [2]. Engineering curricula often place limited emphasis on the social and contextual dimensions of engineering work [3]. As a result, students may be underprepared for the sociotechnical realities of professional work, which requires social and contextual skills such as engaging stakeholders in communities to understand their context and needs, and creating holistic solutions that address those needs effectively. When engineering training and practice are technocentric rather than sociotechnical, social and contextual considerations are underemphasized or overlooked. Well-intended designs can lead to negative consequences, as there is a disconnect between technology and the needs of stakeholders who are the intended targets for the technology [4].

To ensure more equitable and useful designs that account for the sociotechnical complexity of contemporary engineering work, engineers and designers can leverage socially engaged engineering and design practices, which include understanding and accounting for the cultural, economic, environmental, and political contexts, ethical considerations, potential societal implications, and stakeholder perspectives. The Center for Socially Engaged Engineering and Design (C-SED) developed the Sociotechnical Engineering Toolkit (SET) to provide educational content and training resources to support engineers in identifying and addressing social and contextual aspects of their work [5]. Developing students' abilities to balance technical knowledge with relevant social, cultural, and contextual factors is also central to ABET accreditation, as described in student outcomes 2 and 4 [6]. Recent studies have examined the effectiveness of training engineering students with social and contextual skills in developing and utilizing these skills [7], [8], [9].

Several SET modules have been implemented in capstone courses that focus on providing unique opportunities for students to integrate their prior coursework and develop new professional skills as they address real-world, open-ended projects. Capstone design courses play an important role in preparing engineering students with the necessary skills to transition to professional practice [10]. Studies examined the impact of training students with social and contextual skills within design courses and demonstrated the benefits of leveraging these important skills for their projects [9]. However, research has underexplored the uses of these skills as students graduate and transition into professional environments. This study examined recent undergraduate students' use of social and contextual skills in their workplaces after receiving training during their senior capstone design course.

Background

Sociotechnical Engineering Toolkit (SET)

The Sociotechnical Engineering Toolkit (SET) was developed to provide students with the skills needed to identify and address social and contextual aspects of their engineering and design work [5]. The SET is a collection of educational resources and instructional materials on a wide range of topics, including a socially engaged design process model, problem definition and needs statements, requirements and specifications, stakeholder mapping, concept selection, prototyping, design interviewing, managing power and identity in design, and a variety of sociotechnical case studies [5]. The SET modules are grounded in research on recommended practices [11], [12], and they have been developed by a multidisciplinary team with expertise in varying areas of engineering, design, and education.

The SET is designed to be adaptable to a variety of educational contexts and needs. SET resources can be employed as a hybrid learning approach to provide on-demand lessons online, combined with in-person coaching and feedback sessions. The hybrid approach guides students through reflection on their past experiences and pre-existing ideas, provides foundational knowledge on a topic through readings and videos on diverse topics, and offers assessments of student learning on key concepts. Students then have an opportunity to apply their new skills through real-life case studies or projects, and receive feedback on their work. Alternatively, SET topics can be presented as in-person or virtual sessions to provide training, discussion, and practice of specific skills.

The SET is designed to be adaptable for many learning purposes, including providing professional training, integration into engineering coursework, and supporting students' work in extracurricular activities. In many cases, SET content can be delivered as customized educational sessions to support instructors in integrating social and contextual engineering content in their existing courses to complement learning objectives with hands-on activities, discussion, and training on course-relevant topics. For example, when students begin their course projects, they can receive SET training on design interviewing to help them learn to plan and conduct interviews to elicit information needed for their projects.

Research Question

The present study explored the following research question:
How do mechanical engineering graduates describe the use of skills related to SET in their workplaces?

Study Design

Four SET modules were implemented in a two-semester mechanical engineering capstone course at a large Western University. All students were required to complete the SET modules individually and reflect on their learning experiences throughout the semester as course requirements. Students were divided into 7 teams to work on varying projects (industry-sponsored, community-sponsored, or student-led projects) within the course environment to implement socially engaged design practices, and each project was composed of 4-6 students. Examples of projects include creating an accessible food pantry for wheelchair users, developing a hands-on display for an arboretum, and designing a tissue testing device for a biomedical company. After students completed the capstone design, recent graduates from the course were contacted to examine how they utilized skills related to the SET modules at their current workplaces.

SET Modules Used in Capstone Design

The senior design course required students to meet once a week for lectures and team meetings. Several teams that worked with external companies or community partners needed to schedule additional meetings outside of the course. A total of four SET modules that focused on design requirements and specifications, design interviewing, concept generation and development, and concept selection and prototyping were used during the fall semester. In addition to complementing the senior design curriculum, these modules focused on developing sociotechnical skills by providing scaffolding and support in preparing student teams to engage with a variety of stakeholders to understand their contexts and gather information. For example, the design requirements and specifications module described the importance of gathering information to inform high-quality requirements that are grounded in an understanding of the perspectives of a broad range of stakeholders and their contexts. It also described multiple methods for gathering stakeholder information, such as through interviews, focus groups, observations, surveys, and benchmarking, to understand the real needs of users and others who might be impacted by or have an interest in a design. The design interviewing module prepared students to build rapport during their interactions with stakeholders and conduct semi-structured interviews to balance systematic data collection with flexibility to explore responses in depth to understand the contexts in which they were designing. Students were required to go through the SET asynchronous learning modules on Canvas, except for the Design Interviewing module. After the modules, in-person sessions were held on each topic, and application assignments were given for all students to apply key principles of the SET modules to their projects, regardless of the project topic. The learning objectives of each SET module are shown in Table 1.

Table 1. The learning objectives for the SET modules used in this study.

SET Module	**Learning Objectives**
Design Requirements and Specifications	- Describe the difference between needs and requirements - Describe the process of identifying requirements - Differentiate between requirements and engineering specifications - Translate requirements into their corresponding specifications
Design Interviewing	- Define the goals of a design interview - Recognize what goes into planning & conducting an interview - Describe different interview approaches and question types
Concept Generation and Development	- Apply the guidelines needed to successfully generate concepts - Use a variety of ideation strategies and tools to generate and develop concepts - Generate many concepts without evaluation
Concept Selection and Prototyping	- Organize and filter through potential solutions in a meaningful way - Use data gathered through the design process to effectively evaluate solution concepts - Objectively compare solution concepts against a need specification to determine what concepts to pursue - Demonstrate the value of prototyping at any stage of the design process - Describe when and how to use different types of prototyping techniques - Evaluate prototypes

Participants

Participants were recruited through targeted emails to recent undergraduate mechanical engineering students who participated in the senior capstone design course that incorporated the SET modules. Participants received a $50 gift card incentive for participating in the interviews. A total of 6 participants were interviewed for this study (Table 2). The participants in this study represent engineers working in diverse industry sectors. The intent of the study was to examine the use of the SET skills in various industry sectors and roles. As a qualitative study, the results provide evidence of observed patterns but are not intended to generalize to other settings. Qualitative studies focus on the transferability of results, allowing other researchers to make connections in their contexts [13]. The purpose of this study was to focus on an in-depth understanding of participants' experiences, and using small sample sizes is common in design studies (e.g. [14], [15]). All participants recently completed their senior design course that incorporated SET modules and worked in their current position for less than 2 years. The study protocol was approved by the Institutional Review Board.

Table 2. Participant information

Pseudonym	**Gender**	**Race**	**Industry**
Andrew	Male	Hispanic	Automotive
Ben	Male	Hispanic	Energy
Charlie	Male	Asian	Consulting
David	Male	Asian	Manufacturing
Fernando	Male	Hispanic	Construction
Grace	Female	Two or more races	Construction

Data Collection and Analysis

Data were collected through semi-structured interviews, allowing exploration of participants' experiences and opinions while enabling probing questions to gain additional clarification [13]. The interview questions focused on discussing participants' capstone design experiences, describing their current work activities, and comparing their capstone and work experience (Appendix 1). The content of the interview questions was guided by literature examining recent graduates [10]. These interview questions were developed through multiple iterations with the research team and further refined through two pilot interviews to address their clarity. Pilot tests are important in ensuring that there are no weaknesses within the interview protocol and allow researchers to make adjustments before the research study [16]. The results of the pilot interviews were not included in the analysis. For consistency, all interviews were conducted using Zoom by one researcher trained in qualitative research methods. Interviews lasted between 55 and 95 minutes.

All interviews were recorded and transcribed for analysis, and they were examined by a researcher who listened to each interview session to correct any errors in the transcription. The interviews were analyzed for emergent themes through iterative, detailed readings of the raw interview transcripts by examining the whole interviews instead of focusing on responses to specific questions. During the analysis, identified themes were continuously compared to newly emergent themes and revised throughout the process, following recommended practices by Boeije [12]. These themes were discussed with two researchers for consistency. For example, one theme that emerged through multiple quotes was that participants worked with diverse stakeholders to gather information or make decisions needed for their projects. A participant described the need to regularly work with different stakeholders to make decisions that work best for everyone:

> *"Being able to* ***have strong interpersonal relationships with the people that you're working with from these different organizations and being able to amicably come to solutions*** *when you know I want it this way, and you want it that way and trying to find something that works best for everyone."*

She described throughout the interview the need to communicate with her stakeholders, including their engineers, inspectors, crew, and city staff, who have different goals and needs to make decisions for their project. After multiple iterations, the list of themes was finalized, and inductive themes were categorized to align participants' practices with particular SET topics.

Findings

Key findings from the interviews indicate that participants used varying skills related to the SET modules to support different aspects of their work (Table 3). In the following sections, each theme is further elaborated with interview excerpts as evidence to support it.

Table 3. Description of how the skills from SET topics are being used in workplaces.

SET Module	Description of how workplace practices aligned with each SET module
Design Requirements and Specifications	- Participants needed to translate customer information into quantifiable specifications. - Participants used the specifications provided to guide their projects.
Design Interviewing	- Participants worked with diverse stakeholders to gather information or make decisions needed for their projects.
Concept Generation and Development	- Participants described the importance of considering multiple concepts for their design.
Concept Selection and Prototyping	- Participants reported the benefits of using low-fidelity, rough prototypes to gather information.

Work Practices Related to Design Requirements and Specifications

Participants described the need to quantify engineering specifications from customer needs at their current job. Andrew, working in the automotive industry, needed to examine and quantify the brake system in a car for his project.

> *"**Customers stating that my brake is going soft…And so to try and quantify…What does that translate to in data**? Can I compare it [to a] likewise vehicle? Now, if I do? How can I compare it [to] a likewise vehicle? Am I looking for distance overall? Am I looking for pressure in the system? Can I put a pressure force transducer on the pedal and figure out how much pressure it needs to move the pedal from point A to point B, and compare it to an example, and how that translates to distance and the time needed…"*

Other participants often received engineering specifications from another department or used existing engineering standards. These specifications guided their projects. For example, Ben, who works in the energy industry, described the importance of using various engineering codes to create his design:

> *"**We have to go through either NFPA codes or ASME codes or API codes,** and pretty much. It's all in there, and those are pretty much the guidelines that we operate on. **That's how I was able to do my work.**"*

Grace, who works in construction and manages projects, also indicated the importance of understanding specifications for each project to guide her work:

> *"**Being able to read and understand specifications and understand what the design requirements are in a project is an essential part of what I do in my day-to-day job**. My job, specifically, is interpreting those design documents for my field crew and making sure that **they're building according to the specs and design requirements.**"*

Work Practices Related to Design Interviewing

All participants emphasized the importance of working with diverse stakeholders to gather information or make decisions for their role. Ben described the importance of asking the right questions to his stakeholders to understand challenges and find ways to troubleshoot the current problem:

> *"Because a lot of the troubleshooting efforts involve talking to the operators. **So I need to know how to talk to the operators and ask them the correct questions, to kind of get the information that I'm looking for.** So that was something that's actually very useful… Because they're the ones operating these units 24/7. They know it better…They really are [the] best source of knowledge when it comes to troubleshooting…Their input is extremely valuable to us and **knowing how to talk to them and ask the correct questions, is very important.**"*

Similarly, Grace described the need to interview different stakeholders, including other engineers and inspectors at the construction site, to understand the current condition prior to implementing their design:

> ***“You're interviewing engineers or inspectors in the field, and you need to understand.*** *You go on field visits with people to examine the conditions at the site and to understand how we're gonna approach something.”*

Work Practices Related to Concept Generation and Development

Participants described the process of considering multiple different concepts with other engineers to solve problems together. For example, Charlie worked with his engineering team to consider a number of ideas together in a room during a concept generation session:

> *“**I remember…tossing up ideas, not anything to abide by. That still happens in the workplace.** We have an engineering [booth] as we like to call it, multiple engineers in the room, and if we have a problem, we'll kind of get together and kind of think through this problem together. We even have... groups… teams will kind of bounce off ideas. How should we approach this problem?”*

Fernando discussed the importance of documenting various ideas and synthesizing some of these ideas to develop them into better potential solutions:

> *“**So kind of throwing or writing down ideas on a piece of paper, and kind of seeing my ideas. And then sometimes 2 ideas can kind of reduce to one that speeds up the process**, or sometimes just finding one idea or writing [it] down. One idea really helps me. That actually happened to me today, where I was like, oh, I can do this instead.”*

Work Practices Related to Concept Selection and Prototyping

Participants discussed how they used low-fidelity, rough prototypes to gather information for their project before finalizing their design ideas. Grace, who works in construction, used rough prototypes to help her gather information and iterate on their design ideas. She indicated that she considered various possible solutions and iterated using PVC pipes instead of using stainless steel, the final material needed for installation:

> *“We had to come up with a few different game plans. Because if one method didn't work, we would need to try a couple of other ones…**We ended up prototyping a schedule 80 PVC. Pipe with perforations in it to mimic the stainless steel basket, and we had to kind of go back and do multiple iterations** of this to get the flow rate through the PVC.”*

Low-fidelity prototyping was evident in other participants’ descriptions as well. One of Charlie’s projects required him to reconstruct a vehicle crash, and he created rough prototypes using simplified simulations instead of creating detailed prototypes during his early stages:

> *“**Instead of just waiting for all the facts to show up and figuring out what's the best analysis to save the client money, maybe I will just put a rough simulation together**. I want to see what these vehicles do and…their post-crash vehicle dynamics. What happens if I put… so it's, in a way, prototyping.”*

Usage of the SET Modules Depended on Role

Some participants described that they might not leverage all the SET module topics, as their role might not require them to be involved in certain design activities. The usage of skills related to the SET modules depended on the role. For example, Andrew's position requires him to focus on technical analysis and investigate any automotive product liability or safety issues. Due to his role, he indicated that he did not have opportunities to generate or develop concepts for a new design:

> *"Because in my line of job… we're not developing concepts. It's just more of an analysis point of view."*

Another participant who worked in a manufacturing role indicated that he did not have opportunities to develop prototypes, as he mainly focused on mass-producing parts that have been designed by other engineers within his company:

> "***I don't do too much prototyping yet, but I know in the R&D department, they do that.*** *Prototyping could not be used, because for me, I'm [in] a production line. So I make sure that production goes out, and then not much designing goes into my department."*

Discussion and Implications

Recent mechanical engineering graduates articulated how they used key skills related to each SET module in their workplaces to support their design projects. The findings described the need to work with stakeholders in identifying design requirements and translating them into meaningful specifications for their projects. User requirements describe qualitative needs or desires of stakeholders for potential solutions, while engineering specifications focus on quantified, measurable design parameters that engineering designers use to evaluate their solutions [18]. Participants worked with stakeholders and utilized additional information sources, such as benchmarking similar devices and identifying engineering standards to develop their specifications. Prior studies have documented engineering students' resistance to working with stakeholders as data sources to support their projects [19]. The structure of the SET modules and training provided to recent graduates may have led them to include stakeholder perspectives in developing their requirements and specifications with a greater emphasis. These findings provide evidence that graduates draw on structured sociotechnical training to engage stakeholders as integral contributors to their engineering work.

The findings pointed out the importance of interviewing diverse stakeholders to gather information or make decisions throughout a project. More specifically, recent graduates used design interviewing skills and emphasized the importance of preparing and asking appropriate questions to draw out information needed for their projects. Prior research examining recent graduates pointed out the importance of teamwork, communication, and interpersonal skills in workplaces as engineers interact with clients and coworkers [20], emphasizing that technical competence is not considered enough, and employers look for graduates who can enhance their technical expertise with social skills [21]. This study revealed that training on interacting with stakeholders to gather information and make decisions is an important aspect of their workplace responsibilities. These findings extend prior research that broadly emphasizes communication skills by illustrating how stakeholder engagement functions as an everyday problem-solving mechanism in engineering work.

Participants also described the importance of generating multiple solutions with their teams to address design problems. Recommended practices in ideation emphasize considering multiple, diverse ideas [22]. By creating multiple, varying ideas, engineers and designers are more likely to generate non-obvious solutions that have not been considered [23]. The SET module on concept generation and development equipped them with the guidelines needed to generate many concepts without evaluation. Also, the SET modules provided training on how to use a variety of ideation strategies and tools to further promote divergent thinking. Recent graduates have used these skills in their workplaces to generate varying solutions to their problems before narrowing down solutions to pursue.

Participants also emphasized sharing low-fidelity prototypes with stakeholders and clients to receive feedback and iterate on their design. Prior research demonstrated the usefulness of using prototypes throughout an entire design process [24], [25] and they can use prototypes to communicate, elicit input, and select from new ideas [26], [27]. A recommended practice in prototyping encourages using crude and simple representations to enable iteration and decision-making before incurring substantial costs in development [22]. The SET module on prototyping emphasizes these prototyping practices, and participants described the benefits of utilizing these skills at their workplaces to support their projects and decision-making.

Recent graduates described that their use of social and contextual skills related to the SET modules varied based on their roles. Engineering graduates often specialize in different roles that focus on certain skills over others. Participants in this study had varying roles, including consultant, design engineer, project engineer, and manufacturing engineer, engaging in different aspects of engineering and design work. For example, a recent graduate working as a manufacturing engineer placed less emphasis on skills related to the concept selection and prototyping SET module for his position, as he was focused on developing production methods for prototypes developed by other engineers. This role-based variation finding shows that sociotechnical skills are not uniformly enacted across engineering positions, but are shaped by workplace responsibilities and authority structures.

This study contributed to a greater understanding of the ways socially engaged design education can translate directly into students' roles upon graduation, supporting their readiness for the needs of real-world engineering and design practice. More specifically, the study findings highlight how the SET resources integrated into a senior capstone course provided important training to prepare students with multiple social and contextual skills needed in their professional workplaces. Extending prior work that documented the relevance of sociotechnical skills in engineering practice [28], [29], [30], the findings describe the benefits of complementing an existing senior design course using the SET resources in training students to engage with stakeholders to understand their contexts, gather information, and make informed decisions, as these important skills from their educational experience translated into professional work.

These findings suggest that integrating structured sociotechnical modules within existing design courses may support graduates' readiness for stakeholder-engaged engineering practice. More broadly, this work contributes empirical evidence to ongoing calls for integrating sociotechnical approaches in engineering education. To better support educators, C-SED continues to grow their collection of educational resources and identify ways to support instructors in integrating sociotechnical content through shareable instructional materials that align with recommended practices. The SET offers low-barrier and flexible ways to support the development of social and contextual skills in existing engineering courses. The SET library includes a range of materials that can be delivered as in-person lessons or hybrid learning modules, providing flexibility for instructors to integrate different socially engaged design principles into their curriculum [5]. Various SET modules can be used as stand-alone lessons to provide training on particular skills, or multiple modules could be delivered throughout the semester to support existing learning objectives within a course. SET resources are explicitly designed to support the integration of socially engaged engineering and design content by faculty members who may not have prior expertise in teaching these topics or the time to develop new curricular materials, offering options for facilitation support or hybrid materials with guided presentation of core concepts and built-in reflection prompts. Efforts are currently underway to expand access to the SET library beyond the University of Michigan and several partner institutions. A growing collection of free course materials on a range of sociotechnical engineering and design topics is available for download on C-SED's website (https://csed.engin.umich.edu). These resources are offered both as packages for instructor-facilitated course sessions and as asynchronous learning block modules.

Limitations

This study is limited by the range of engineering roles represented in the sample, which may not reflect the full diversity of early-career engineering contexts. As a study relying on retrospective self-report, the findings reflect participants' perceptions of how they used sociotechnical skills rather than direct observation of workplace practice. Additionally, because participants were all graduates of the same program, the findings speak specifically to this educational context and may not capture how sociotechnical preparation manifests across differently structured curricula. Data interpretation may be influenced by the researchers' perspectives and prior experiences. To mitigate potential bias, iterative review of the data was employed. Future work could further reduce bias by using interrater reliability checks and member checking. Furthermore, future studies can collect and analyze additional data, including quantitative survey data, to further triangulate the results and build on the current findings.

Conclusion

This study examined the use of socially engaged design practices in recent mechanical engineering graduates' workplaces. Participants described utilizing a number of skills emphasized in SET, including translating customer information into quantifiable specifications, using specifications to guide their projects, working with diverse stakeholders to gather information and make decisions for their projects using interviews, considering multiple concepts for their design with their team, and leveraging low-fidelity prototypes to gather information. The use of skills related to the SET modules also depended on their role, which required focusing on particular skills to complete their tasks. Overall, much of their work required collaboration with various stakeholders to make decisions during their design process. This study demonstrated that engineering practitioners viewed the SET modules as providing valuable training in equipping them with transferable skills to consider social and contextual dimensions of engineering at their professional workplaces.

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Appendix 1

Senior Design – Background:

I'd like to learn more about how your senior design experiences may or may not align with your current work. But first, so I have some background…

- Can you tell me about your senior design project?
- What were your responsibilities?
- What topics do you think were most emphasized in your senior design training?

Current Position and Comparison:

- Now, can you please tell me about your current job?
    - How long have you worked in your position?
- I'm interested in learning more about your current role. Can you tell me about an example of a project at your job that you've worked on and give me an overview of how you were involved?
- Generally speaking, what would you say are your primary responsibilities in your current role?
    - On a scale of 1-5 (with one being *not prepared at all* and five being *very prepared*), how prepared did you feel for these responsibilities based on your educational experiences? (Probe: How did you come up with that rating? What do you think helped prepare you?)
    - What additional experiences or resources, if any, do you think would have helped you feel more prepared for your current position?
- [*If already mentioned, may need to reword start of this question to* "Are there other ways your current work…"] How do your current work responsibilities compare to your responsibilities in senior design?
    - What are things that stand out as similar?
    - What are things that stand out as different?
    - What, if any, are particular experiences from your senior design that you have found helpful in preparing you for your current role?
- What, if anything, has been most challenging about your new role and responsibilities?
    - How did your senior design experiences prepare you, or not, in navigating those challenges?

C-SED training

- As you may recall, in your senior design class, you were introduced to training modules. Specifically, I want to discuss the training focused on design requirements and specifications, interviewing, concept generation and development, and concept selection and prototyping. I'd like to ask more about these particular training topics and how they may or may not relate to your current work. Now, I will discuss each training module with you:
    - How, if at all, are you using lessons from the "design requirements and specifications" module?

        - Probe if using – can you give me an example of how you used this?
        - Probe if not using – why do you think that is not being used?
    - How, if at all, are you using lessons from the "interviewing" module?
        - Probe if using – can you give me an example of how you used this?
        - Probe if not using – why do you think that is not being used?
    - How, if at all, are you using lessons from the "concept generation and development" module?
        - Probe if using – can you give me an example of how you used this?
        - Probe if not using – why do you think that is not being used?
    - How, if at all, are you using lessons from the "concept selection and prototyping" module?
        - Probe if using – can you give me an example of how you used this?
        - Probe if not using – why do you think that is not being used?

- In what ways did these training modules we discussed prepare you for your responsibilities at work?
- In what ways did these training modules we discussed <u>not</u> prepare you for your responsibilities at work?
- Are there areas we discussed in senior design that you would like to do more in your current job?
        - What hinders you from doing so?
        - What would help you do more work in this area?

<u>Reflection – senior design experience</u>

- What do you wish you had learned during senior design that would have better helped you prepare for your current job?

<u>Ending the interview</u>

- Is there anything else that you'd like to share about your experiences in your current job or senior design?
- Thank the participant– ask if he/she has any questions about the study.